Teens have the highest crash rate of any group in the United States.


# Evaluation of Beginner Driver Education Programs

## Studies in Manitoba and Oregon

*September 2014*

AAA Foundation for Traffic Safety

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## Title

Evaluation of Beginner Driver Education Programs: Studies in Manitoba and Oregon *(September 2014)*

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## About the Sponsor

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## Executive Summary

Driver education is designed to teach new drivers the rules of the road and the driving skills to prepare for the road test and obtain a driver's license. Most jurisdictions, in the United States, Canada, and elsewhere, deliver driver education in high schools and/or commercial driving schools. These programs typically consist of both "theoretical" instruction in the classroom and practical training in the vehicle.

Although driver education provides an efficient means to learn how to drive, evaluations have failed to show that such formal programs produce safer drivers. Poor evaluation methods may be part of the reason for this, but even well-designed evaluations have produced findings that raise questions about the safety benefits of driver education. These evaluations have focused primarily on whether driver education reduces crashes and not whether it achieves other important program objectives, such as improving safe driving knowledge, attitudes, motivations, skills, and behaviors.

Evaluation, however, is increasingly being viewed not simply as a tool for determining the success of the program in achieving its safety benefits, in terms of fewer crashes, but as a tool for determining the effectiveness of a program in achieving these other safety-related objectives. It also is a means of gathering intelligence about which aspects of programs are effective and which are not. This investigation was designed to apply this more comprehensive approach to the evaluation of driver education programs in the United States (Oregon) and Canada (Manitoba). More specifically, its objectives were to:

- Generate new knowledge about the safety and operational effectiveness of driver education;
- Provide new information about how to improve the delivery and content of driver education to enhance its safety impact;
- Demonstrate the implementation of the Comprehensive Guidelines for evaluating driver education developed by the AAA Foundation for Traffic Safety (AAAFTS); and,
- Showcase more effective and constructive methods to evaluate driver education.

The purpose of the project was to demonstrate a more comprehensive evaluation and highlight how evaluations can better support program development in driver education. The project was not intended to provide a definitive answer to the question of whether driver education, in its current common forms, "works" or if it could "work" in some future form.

In striving to achieve these important objectives, this investigation, on balance, produced some results that are favorable to the driver education programs studied, however these results have been cautiously interpreted. The evidence that these programs have safety value is by no means conclusive and should not be interpreted as such, especially since the positive results found were typically small.

Despite these cautionary remarks, the study results provide insights into where the two driver education programs that were evaluated appear to be working and where they appear to have failed and why. More importantly, it provides some direction to guide improvements to strengthen them.

The report also provides insight into reasons why evaluations to date have so often produced inconclusive or controversial results. The complexities of the environment and the population studied make driver education inherently difficult to evaluate. Future evaluations must move beyond traditional methods and adopt a much more sophisticated, comprehensive, and constructive approach if progress is to be achieved to increase the effectiveness of driver education. The investigation also provides guidance to bring us closer to this goal.

### *Driver Education Programs in Manitoba and Oregon*

The driver education program evaluated in Manitoba is delivered by Manitoba Public Insurance (MPI), and this program is available to high school students across the province, with the exception of remote areas. The program evaluated in Oregon is administered by the Transportation Safety Department of Oregon's Department of Transportation (ODOT), and this program is available through both public and private providers. Unlike the situation in Manitoba, where most teens complete the MPI High School Driver Education (HSDE) program, about 30 percent of Oregon teen drivers complete the ODOT-approved driver education (DE) program.

Although the Manitoba and Oregon DE programs have important differences in terms of administration, content features, and delivery methods, they are both generally similar to traditional driver education programs in that they offer about 30 hours in-classroom education and six to eight hours of in-car "behind-the-wheel" instruction. They are delivered in a single stage, before teens are licensed to drive independently, and although the programs have introduced some improvements over traditional teaching methods, they use little or no interactive electronic instructional technology. These programs, while comparable in form to those in most other North American jurisdictions, do not meet the standards that most experts now agree must be met for driver education to achieve its potential positive safety effects.

### *Method*

This investigation involved several independent but inter-connected studies in Manitoba and Oregon that used different evaluation designs and approaches. In this respect, this project is one of the most comprehensive evaluations of driver education to date, but it still does not represent all possible or needed studies or all methods.

Since random assignment of subjects using an experimental evaluation design was neither feasible nor practical for myriad reasons, a quasi-experimental evaluation design with pre-post comparisons (before and after driver education) and a comparison group (non-driver education teens) was adopted for most of these studies. A cross-sectional approach (collecting data on different people in the groups of interest all at the same time) was also employed.

The Manitoba studies involved:

- A survey (Wave 1) administered to students in high schools across the province that provided baseline data to compare students who indicated they were going to take driver education with those who indicated they were not planning to take it.
- A longitudinal comparison of the initial (Wave 1) survey responses to those of a follow-up survey (Wave 2) administered to a subset of the same teens who had initially stated they planned on or did not plan on taking the MPI HSDE program several months later. At the time of the second survey, teen participants had either completed the MPI HSDE program or they had not done so.
- A cross-sectional comparison based on another survey of separate groups of Manitoba teen drivers who had or had not taken the MPI HSDE program, and had been driving independently on an Intermediate license for several months. It also included a survey of their parents.
- A cross-sectional comparison of performance on a simulated drive test of pre-drivers, learner drivers, and new drivers who took the MPI HSDE program versus those who did not.
- A comparison of scores on the Manitoba driver license road test among license applicants who had graduated from the MPI HSDE program versus those who had not.

The Oregon studies involved:

- A baseline survey (Wave 1) administered to Oregon teens shortly after they obtained their provisional instruction permit to identify pre-existing differences between DE and Non-DE teen drivers.
- A longitudinal comparison based on a follow-up survey (Wave 2) administered several months later, to a subset of the same two groups of teens – i.e., one group had completed the ODOT-approved DE program and the other had not – to determine if exposure to driver education was associated with changes from Wave 1 to Wave 2 in safe driving knowledge, attitudes, skills, and behaviors.
- A longitudinal comparison of the safety performance of teen drivers participating in the baseline survey who had taken the ODOT-approved driver education program with that of those who had not taken this program over their first few months of independent driving. Safety performance was defined in terms of license test results, collisions, convictions, and license suspensions.
- A cross-sectional comparison of the driving records (collisions and convictions) of a large population of teen drivers that had and had not taken the ODOT-approved driver education program using a retrospective design.

### *Key Findings*

Pre-existing Factors: Baseline Survey Comparisons

- Even though teens volunteer to take driver education in both Manitoba and Oregon, DE and Non-DE teens are similar in relation to many personal attributes as well as factors related to safety knowledge, attitudes, skills, and behaviors before some of them are exposed to driver education. A few differences, however, were also apparent.
- In Manitoba, the DE group compared to the Non-DE group was younger, expressed greater support for graduated driver licensing (GDL) overall, scored higher on risky attitudes, and were less tolerant of deviant behavior.
- In Oregon, the DE group compared to the Non-DE group were younger, more likely male, less likely Hispanic/Latino, from an urban residence, had higher support for GDL features, and reported less driving skills and driving.
- Other than these few differences, no other variables in the regression models used in the Manitoba and Oregon multivariate analyses had a significant effect on DE status – that is, on whether a teen chose to take driver education or not.

Changes in Student Outcomes

Taken together, the survey findings across the studies are suggestive of some positive but modest influences of the two driver education programs studied.

- In Manitoba, exposure to the MPI HSDE program was associated with greater self-reported driving skills, and less risk taking behaviors after controlling for age and gender. As well, the survey of teen drivers several months after they passed their road test suggested that those in the MPI HSDE program, in comparison to the Non-DE group, had slightly greater safe driving knowledge scores, rated their driving skills higher, estimated they took fewer trips, and spent less time driving.
- In Oregon, from the first wave of the survey to the second, after controlling for age and gender, the ODOT-approved driver education program was associated with increases in knowledge about the GDL program and safe driving practices, greater self-reported driving skills, and more driving exposure.
- Completion of the driver education programs in Manitoba and Oregon did not appear to be associated with changes in any other factors compared to changes that occurred over the same time in the group that had not completed these programs.

Knowledge Gains

- Significant increases in knowledge both in terms of the GDL program and safe driving issues were found among teens in the ODOT-approved DE program, but not for those in the MPI HSDE program, with the possible

exception of higher knowledge scores for MPI HSDE teens compared to Non-DE teens who had been driving independently for several months.
- However, there is still a relatively low level of knowledge among teen drivers completing these programs in both Manitoba and Oregon.

Improved Driving Skills

- Participation in the Manitoba and Oregon DE programs was associated with greater self-reported driving skills.
- Learner drivers who had recently completed the MPI HSDE program generally performed better on a simulated drive test than learner drivers who had not taken the MPI program, suggesting a short-term training effect on skill performance of the program. This finding, however, should be interpreted cautiously due to study limitations – i.e., small sample sizes.
- During the simulated drive test, HSDE learner drivers performed better on hazard anticipation than HSDE pre-drivers, and HSDE new drivers performed best. The same pattern was observed for Non-DE drivers. Differences in hazard anticipation were not significant between the HSDE and Non-DE groups at any license level. The MPI HSDE group still failed to identify 60 percent of hazards on the simulated drive test.

Safety Effectiveness

The safety effectiveness of the MPI HSDE program and the ODOT-approved DE program were assessed in terms of performance on the license test(s), and (in Oregon only) in terms of collisions, convictions, and suspensions. Although the study results were mixed, some evidence emerged from one of the studies that the ODOT-approved DE program was associated with fewer collisions, convictions, and suspensions.

*License Test Performance*

- In regard to the Manitoba driver license road test, there was no significant difference in the pass rates of the MPI HSDE and Non-DE groups, although the MPI HSDE group did have better test scores, both among those who passed and failed the test. MPI HSDE teen drivers failed the road test more often due to errors that resulted in an automatic failure – e.g., the need for the driver examiner to assist the applicant or dangerous actions on the part of the driver.
- MPI HSDE teen drivers with an Intermediate license still showed a significantly higher rating of their self-reported driving skills, which might suggest they overestimate their actual skill level.
- Although the overall pass rate on the road test in Oregon was much higher than in Manitoba, the results in Oregon were generally similar to those in Manitoba. Teen drivers who had completed the ODOT-approved DE program did not have higher pass rates than those that had not completed it, after taking into account the effects of other variables.

*Collisions and Convictions*

Two independent studies were conducted to determine whether the ODOT-approved DE program was associated with reductions in collisions, convictions, and suspensions.

- In the first study of teen drivers who participated in the baseline survey, bivariate analyses showed that DE teen drivers either have significantly higher adjusted collision rates than Non-DE teen drivers or, for some of the comparisons, that there were no differences in the collision involvement of both groups. For example, for female teen drivers, the collision rate of the DE group was not significantly different from that of the Non-DE group.
- Logistic regression revealed that, after taking into account the influence of other factors, DE status among survey participants was not found to have a significant effect on collision involvement. Logistic regression also showed that DE status was not associated with having had a conviction or a suspension. These findings from the first study were based on a relatively small sample of teen drivers who had few collisions and convictions so should be treated with caution.
- In the second study of a much larger sample of teen drivers, bivariate analyses showed that DE teen drivers had lower adjusted collision and conviction rates. Poisson regression analyses suggested that driver education was still associated with a lower incidence of collisions and convictions after taking into account other factors such as age, gender, driving exposure (months licensed), and place of residence (urban/rural). Completing the DE program was associated with significant decreases in the expected number of collisions by 4.3 percent and the expected number of convictions by 39.3 percent.

Of importance to the interpretation of these results, the first Oregon study was based on a relatively small sample size but had a rich pool of information on teen driver attributes derived from both the survey and official records. The second was based on a much larger sample size but had limited information on teen driver attributes derived from only official sources. Further sensitivity analysis, however, produced some limited evidence that the positive results from the larger sample probably are not biased by not controlling for these other potentially confounding variables. As well, this analysis suggests that the positive effects of driver education on collisions, after controlling for key variables, are greater several months to 24 months following obtaining a provisional license than over a longer period of time, although benefits are still apparent over the entire study period.

On balance, the two studies suggest that at worst, the ODOT-approved driver education program is not associated with increased collision involvement, and at best it is associated with a modestly but statistically significant lower incidence of collisions. This suggests that the overall findings on the safety effects of driver education are either neutral, based on the results of the first Oregon study, or cautiously optimistic based on the results of the second study. However, the second study's lack of rich, survey-based information to make more refined corrections for pre-existing differences between the groups suggests that other factors related to self-selection might still account for some or all of the differences in collisions and convictions, and not just having taken driver education.

### *Implications*

For Driver Education

There is some evidence that the MPI HSDE program and the ODOT-approved DE program were associated with limited but positive changes in student outcomes, principally related to knowledge gains and improved driving skills.

*Knowledge Gains*

This research suggested that the program in Oregon is imparting relevant information about graduated driver licensing. Driver education provides an appropriate opportunity to inform teens about the need for, and the features of, the GDL program. However, more could be done in driver education to ensure teen drivers and their parents understand the GDL requirements as well as why it is important to comply with them.

The level of safe driving knowledge improved among Oregon teen drivers completing the ODOT-approved program compared to those who had not. It also appeared higher among the MPI HSDE group compared to the Non-DE group who had been driving independently for a few months.

The level of safe driving knowledge, however, was still quite low even after completion of the driver education programs in both Manitoba and Oregon. The more serious weaknesses in knowledge were identified in item-by-item analyses, and these analyses are included in the Appendices. These results may facilitate a detailed review of the current curricula content and delivery mechanisms to identify areas that could be strengthened. It is possible, for example, that key knowledge items need to be repeatedly reinforced to achieve more significant gains, and that more effective instructional technology should be employed.

*Driving Skills*

Students exposed to the DE programs in Manitoba and Oregon demonstrated a significant increase in self-rated skills, while the Non-DE group showed no such improvement. The higher self-rating of driving skills among DE teens reflects a potential safety benefit of these programs, to the extent that self-rated skill reflects actual skill. However, programs should review the extent to which they may also be generating an optimism bias of an unrealistic skill level that can potentially have negative safety consequences – i.e., teens who take the program may think they are more skilled than they actually are because of exposure to the program.

Parents also need to understand the importance of practice driving with their teens to improve skill levels even if the teen has successfully completed a driver education program. An important role that driver education could potentially play is to encourage and motivate parents to spend more time supervising their teen driver during, and especially after, the program. This could include a follow-up component of the program with parents as part of a second-stage program to reinforce lessons and behaviors.

More focus should be placed specifically on training in hazard anticipation skills, because most MPI HSDE teens still fail to identify hazards, at least on a simulated drive test. As well, other performance categories did not show any improvement with increased driving experience or any differences between HSDE and Non-DE subjects – e.g., inattention – suggesting that the program may exert very little if any influence on teen drivers. Improving performance on these driving skills is important and has been shown to be feasible through use of computer- and simulator-based instructional methods.

The implications of the findings on road test performance are not straightforward. That the pass rate on the road test of the driver education group did not differ from the rate of the non-driver education group suggests the need to lengthen the practice hour requirements for DE graduates. It also suggests the need for improvement in the content and/or delivery of the driver education program so that it better prepares applicants to master the driving skills necessary to pass the road test. The MPI and ODOT DE programs could work more closely with parents to emphasize the importance of practice under supervision as well as restructure delivery so that some in-class and in-vehicle lessons are closer in proximity to the end of the learner period when the teen graduate becomes eligible to attempt the road test.

In Manitoba, a detailed review of the road test and curriculum content is recommended to determine the sources of test unreliability, the extent to which it covers driving errors that are critical, and which errors could be addressed in the driver education program. The reasons for test failure should also be given further consideration since most driver education and non-driver education teens did not fail only because of a score of more than 50 demerit marks, but more often due to the commission of other, more serious, types of errors that resulted in an automatic failure.

In the case of Oregon, reviews of road test procedures and the driver education curriculum are also warranted given that over 80 percent of DE and Non-DE teen drivers pass the road test on their first attempt, suggesting that the test is relatively easy. Consequently, it may not motivate teens to develop their driving skills more fully so they can pass. The reasons for the high road test pass rates also need to be investigated, with consideration given to making adjustments that will result in more rigorous testing that is reliable, evidence-based, and focused on the key driver competencies that should be covered in driver education and tested on the road.

<u>Safety Performance</u>

Previous reviews of the evaluation literature consistently report that driver education fails to reduce collisions and convictions. The results of the current evaluation of the ODOT-approved DE program have been mixed. The first study, using a relatively small sample of Oregon teen drivers that controlled for the influences of various teen attributes and crash-related factors, suggests there are no beneficial effects of driver education on collisions and convictions. These results, however, should be treated cautiously as they are based on a small sample size, which may make them unreliable.

The second study, using a larger sample of Oregon teen drivers and controlling for fewer factors, suggests lower rates of collisions and convictions. This latter finding is encouraging for driver education in Oregon. However, the findings from this study and the earlier one should be interpreted cautiously, and not overvalued, in light of study limitations.

Traditional driver education programs, like the one offered in Oregon, may have had less of an effect than expected because myriad developmental factors, related to lifestyle, motivations, and peer pressure, influence driving behavior and crash involvement. The results of the current investigation support this possibility to the extent that the evaluations of the ODOT-approved DE program did not reveal significant changes in safety attitudes, motivations, behaviors, and lifestyle factors that were measured in the New Driver survey.

A related critical issue raised in the literature is that it may be unrealistic to expect that the traditional form of driver education by itself will lead to fewer teen crashes. Although this may hold some merit, the fact is that driver education programs have been developed and are marketed not just to teach teens how to drive and pass the road test but also to produce safer drivers, which typically translates to drivers that have lower collision rates. The recently published Novice Teen Driver Education and Training Administrative Standards were developed by representatives from the driver education professional community, with assistance from the National Highway Traffic Safety Administration (NHTSA), during the period that the present investigation was underway. The Standards document states that: "The goal of driver education and training is to transfer knowledge, develop skills, and enhance the disposition of the teen, so he/she can perform as a safe and competent driver, thereby contributing to the reduction of crashes, fatalities, and injuries." These National Administrative standards also provide guidance as to how traditional driver education programs should be substantially restructured to potentially better achieve their safety goals.

Also, the ODOT-approved DE program has recently been assessed in relation to these standards by a panel of experts. While the originally-planned detailed formative (or "product and process") evaluation component of this current project did not occur, the brief review of the Oregon program against the national standards provides some basis for understanding how the program could be modified to improve its impact beyond that seen in the current studies. Priority recommendations identified for the Oregon program were, for example: increasing classroom hours from 30 to 45 hours; increasing behind-the-wheel instruction from six hours to 10 hours; increasing in-car observation from six hours to 10 hours; and, requiring second stage education of at least 10 hours. As well, the expert panel recommended that the ODOT-Transportation Safety Department (ODOT-TSD) should establish a procedure for providing an end-of-course evaluation or progress report to parents. This end-of-course "debriefing" could be a written student progress report which includes areas of successful completion of safe driving practices and any necessary recommendations for continued practice prior to licensing.

Only a few other jurisdictions have undergone this NHTSA review, including Maryland, Vermont, Delaware, and Idaho. Other jurisdictions may benefit from participating in this review process. Jurisdictions in Canada and elsewhere can also use these administrative standards to provide guidance for an internal review of their own driver education and training programs to identify workable improvements. While these standards have not yet been proven to result in measurable improvement, the present investigation makes it clear that major improvements in driver education are needed, and the standards provide a direction to start a systematic program of development and evaluation that may lead eventually to substantial safety benefits. Perhaps it is unrealistic to expect that traditional driver education will lead to fewer teen crashes, but there is no reason this should not be a goal of improved programs and the focus of future evaluation to determine whether enhancements lead to better outcomes.

### *Conclusions for Driver Education*

This investigation provides some evidence in support of the benefits of driver education in terms of intermediate measures – i.e., improved knowledge and driving skills – and safety. Positive effects of the MPI HSDE program and the ODOT-approved DE program, however, have been modest or, in relation to some factors absent, and caution must be taken regarding their potential to reduce collisions. Existing driver education programs can certainly be improved, while new ones need to adopt practices that are evidence-based. This study also provides insights into ways that this may be achieved. It is equally important that program enhancements are evaluated and new programs piloted to determine the extent to which they meet their stated objectives.

<u>For Evaluation</u>

*Study Design Limitations*

Several research designs were employed in this investigation – prospective, longitudinal designs with pre-post repeated measures, and cross-sectional, retrospective designs. Data were collected by means of survey, driving simulation, road tests, and driver records. Of most importance, the design for several of the inter-related studies also included a quasi-experimental approach with a pre-post design and a comparison group, rather than an experimental design with random assignment of subjects to experimental conditions.

An experimental design is considered to be the "gold standard" for basic research, whether medical, behavioral, or social. The primary reason for employing such a design is to overcome or minimize self-selection bias – i.e., individuals choose to take or not take some treatment, which means these two groups are likely different in ways other than whether they take treatment. A common contention in the road safety field is that young people who are more safety conscious are more likely to take driver education, and consequently, the lower crash rates of DE graduates are due to them being safety conscious and not their exposure to driver education.

The problem of self-selection bias has plagued previous evaluations of driver education programs. Unfortunately, there is no completely satisfactory solution to this problem. Even evaluations using experimental designs that randomly assign teens to driver education or no driver education have difficulties and limitations. For example, students assigned to take driver education do not always do so, or if they do, they may not complete the program; additionally, those assigned to the no-program condition sometimes find comparable instruction anyway. It is also possible that teens assigned to a program might not learn and benefit as much as teens that are self-motivated to take the program. This means that suitable and unbiased comparison groups are hard to establish and maintain. As well, random assignment is often not politically nor ethically feasible or practical when evaluating well-established programs, which is the case with the MPI HSDE and the ODOT-approved DE programs. For these reasons professional evaluators of educational and other social programs do not share the view that randomized control trials are the only, or even the best, methodology for evaluating such programs. The broader evaluators' view is reflected in the AAA Foundation's *Comprehensive Guidelines* for driver education and served as the foundation for this project.

Accordingly, parts of this investigation employed a quasi-experimental design, an alternative to an experimental design, which is often used in the evaluation of road safety programs because of practical, real-world constraints. The current investigation relied on a quasi-experimental design because the driver education programs in Manitoba and Oregon are well-established and unable, for logistical or ethical reasons, to participate in a study that involves random assignment – i.e., that manipulates existing recruitment practices and student enrollment patterns. In addition to methodological, legal, and financial concerns, a major objection to an experimental design with random assignment is that this approach denies people access to a program that they might otherwise have taken and potentially benefited from.

Although DE and Non-DE group assignments proved challenging in this quasi-experimental design, and may not have eliminated all potential biases and uncertainty about results, maintaining teen subjects in DE and Non-DE groups in an experimental design with random assignment has also proven difficult, raising questions as to whether they remain random samples of the driver education and non-driver education populations after assignment.

The use of a quasi-experimental design necessitates developing insights into how teens who self-select to take driver education differ from those who choose not to take driver education. Use of survey and other data to control for personal factors and other pre-existing differences between those who take a program and those who do not is basic to effective evaluation. The overall pattern of results in this project underscore that there are differences in pre-existing factors, confirming the existence of self-selection bias. These pre-existing differences definitely need to be identified and taken into account when evaluating the safety effectiveness of driver education programs.

However, there are also many similarities between the groups, suggesting that the issue of volunteer bias and self-selection, for example, in terms of the DE group being more safety-oriented or having a less risky lifestyle than the Non-DE group, may not be as critical as suggested in the literature. Moreover, there is evidence from Manitoba that some teen drivers do not take driver education because of practical constraints – e.g., availability of the program and scheduling conflicts – rather than fundamental differences between teens that take and do not take driver education. In other words, even in a jurisdiction like Manitoba where most teens voluntarily choose to take driver education, those who do not may differ little from DE teens on important factors shown to be associated with having a collision. The same conclusion can be derived from the results in Oregon where only about one-third of teen drivers voluntarily choose to take the ODOT-approved DE program. Although all plausible alternative explanations for differences in the collision rates of DE and Non-DE teen drivers need to be considered in future evaluations, it is not possible to account for every conceivable factor. Thus, ruling out the key factors should be adequate in assessing the safety effectiveness of driver education programs, or for that matter, other road safety programs where an experimental design is unworkable. In this regard, sensitivity analyses suggested that controlling for all the questionnaire-based variables from the survey might not be too important to draw inferences about the safety performance of driver education. This provides some limited evidence suggesting that the positive results from the larger sample of state-wide teen drivers probably are not biased by not controlling for these other potentially confounding variables.

In practice, if a randomized control trial is not feasible, a quasi-experimental design can still provide considerable insights, increase understanding, and advance knowledge. And, if reasonable efforts are taken to control for key confounding factors in a well-designed quasi-experimental evaluation, results should not be rejected outright. This also speaks to the need for more research into identifying pre-existing factors associated with collision involvement that differentiate teen drivers who voluntarily take and do not take driver education and that should be taken into account in future evaluations.

### *Methods and Lessons*

The present investigation provides a number of interesting implications for an expanded evaluation approach. There are both encouraging and cautionary lessons emerging from the execution of this study and its results.

First, in planning and designing the study, there was a serious lack of reliable and valid measures of desirable driver traits and skills. Measures had to be developed and validated, including the New Driver Survey questionnaire and the simulated drive test. The use of in-vehicle technologies to monitor teen driving behavior was also pilot tested and shown to be a promising method to evaluate the extent to which DE teens drive differently than Non-DE teens in a “naturalistic” setting. Certainly a broad implication of the study is that there is a critical need for development and validation of additional intermediate measures of driver skill, attitudes, and knowledge that can subsequently be linked to crash outcomes.

Second, the study shows that it is possible to use repeated measure surveys to assess the intermediate effects of driver education on students' knowledge and attitudes, as well as aspects of behavior and behavioral intentions. Surveys of reasonable size were able to find significant differences based on modest effects of the program. However, there are practical difficulties with this approach. Substantial attrition between the two survey waves in Manitoba suggests this approach must be planned with care. It is costly in time and, perhaps especially with a youth population and involving schools, subject to loss of strength through difficulty in retaining subjects in the study, even over a period of just a few months. Considerable effort is needed to identify potential sources of attrition and to overcome them. For example, the current study in Manitoba was *ad hoc* and the survey measures were not part of a routine process in the program or the schools. A more regular set of measures as part of an ongoing program evaluation would likely not experience as much subject loss over time.

Third, the cooperation of ODOT-Department of Motor Vehicles (ODOT-DMV) in providing contact lists of teen drivers, including mailing addresses, proved an efficient means of identifying and recruiting teens for the survey in Oregon. However, even with names and mailing addresses it was difficult to obtain telephone numbers to recruit and interview teen drivers. This is because many households no longer have "land-line" telephones or have delisted their numbers. An effective alternative was initial mail contact and an online survey. In addition, the use of a modest direct incentive – e.g., $5 in the mailed envelope to encourage teen drivers to complete the survey online – produced a much higher response rate than did the opportunity for them to win an attractive prize in a raffle(s). The benefits of this approach for future evaluations, however, have to be weighed against the cost, since even a modest direct incentive becomes costly when recruiting several thousand participants.

Fourth, at the broadest level, the study supports the need for a comprehensive approach to evaluation. For example, in Oregon, only modest positive effects of the program were found on student knowledge about GDL and safe driving issues, and on driving skills. This raises the question of why these effects are not greater, why there are no significant improvements on other key outcomes, or how these could be achieved. The comprehensive approach to evaluation proposed in the AAA Foundation *Guidelines* suggests that full understanding of summative outcome results requires formative evaluation data on program products and processes. This implies a close look at the program's curriculum and its delivery to explain the seeming weakness of the knowledge and other results and identify areas that need to be strengthened. However, this investigation suggests that program providers, even public ones, may be reluctant to have researchers looking closely at the details of their program delivery.

Fifth, a simulated drive test can provide a valid and objective measure of driving performance skills for research purposes. However, in this study, recruitment difficulties led to small sample sizes for several of the groups examined, making it difficult to find statistically significant differences across comparison groups. Future studies using simulated drive tests to evaluate the influence of driver education programs on performance skills should recognize the potential difficulty in recruiting larger sample sizes with adequate power to isolate differences in driver errors between comparison groups, if they exist. Through using a simulated drive test this study also adopted a cross-sectional approach to subject selection. Future studies should attempt to replicate this approach as well as to conduct longitudinal designs in which subjects are recruited and then tracked over an extended length of the licensing process. Such a design, with repeated simulated drive tests of the same drivers, has the potential to show the progression of driving skills associated with driver education and increasing driving experience. If simulator training becomes part of a driver education program, this repeated testing could be an automatic and integral part of the program with little additional cost. As was suggested by the survey studies in this investigation, better integration of evaluation measures into driver education programs can have benefits both for evaluation and, potentially, program effectiveness.

Finally, this investigation, in an initial study with the Oregon teen survey participants, did not find that the ODOT-approved DE program was associated with lower incidences of collisions and convictions after extensively controlling for various teen attributes and other factors. It is also possible that if this study had recruited a larger sample of teen drivers, tracked their driving record over a longer period of time, and collected self-reported collisions rather than relying on less-frequently reported collisions from official records, the results might have been different. Although the original research design had proposed a longer tracking period and capturing self-reported data on collisions, both practical and cost constraints precluded doing so. These are now important limitations of this study that should be the focus of follow-up research.

One of the Oregon studies in this project, however, did use a much larger population of Oregon teen drivers and a retrospective design to address the issue of the safety performance of the ODOT-approved driver education program. This study found that the program has safety-related benefits, in terms of being associated with lower incidences of collisions and convictions. This study also took into account some important self-selection factors by controlling for age, gender, driving exposure, and place of residence (urban/rural). However, the study used only official records, with no survey data, so it was not possible to control for other pre-existing factors that could potentially account for differences in the collisions of DE and Non-DE teens (e.g., attitudes and skills). However, the limited evidence from the sensitivity analysis suggests that omitting some pre-existing factors may not have biased the positive results.

Future evaluations focusing on the safety effects of driver education will have to struggle with the trade-offs between using smaller sample sizes where rich information can be derived from self-report and other methods, versus larger sample sizes with limited information derived from official sources. This investigation has demonstrated that both approaches produce highly relevant and practical results to better understand the value of driver education as well as provide directions to improve the development, content, and delivery of programs. A primary goal of this investigation was to build on previous evaluations and provide methods, tools, and lessons learned to better evaluate and develop driver education on an ongoing basis in the future.

### *Final Note*

This report describes the results and implications from a series of inter-related studies in Manitoba and Oregon. A second report describes in more detail the methods and tools investigated and employed in the evaluations of the driver education programs in these study sites (Mayhew et al. 2014).

## Background

Driver education courses for beginners have long been a popular and convenient means of achieving independent mobility, and conventional wisdom is that driver education produces safer drivers. However, most scientific studies of the safety impact of driver education have not supported that wisdom (Christie 2011; Clinton & Lonero 2006; Compton & Ellison-Potter 2008; Lonero & Mayhew 2010; Mayhew 2007; Thomas et al. 2012; Williams & Mayhew 2008; Williams et al. 2009). Inadequate evaluation methods may be part of the reason for this. Evaluation of driver education is increasingly being viewed not simply as a tool for determining the success of a program in achieving its safety benefits, but also as a tool for gathering intelligence about the extent to which programs influence student outcomes associated with safety, such as safe driving practices and driving skills. In this constructive form of evaluation, identifying influences of programs on student outcomes and ways to improve existing programs are critical evaluation goals. Best practices for achieving these critical evaluation goals were developed in the AAA Foundation's *Evaluation of Driver Education: Comprehensive Guidelines* (Clinton & Lonero 2006).

Following from this project to develop evaluation guidelines was a scoping study conducted by Northport Associates (NPA) and the Traffic Injury Research Foundation (TIRF), under funding from the AAA Foundation for Traffic Safety (AAAFTS), to assess the technical, financial, and organizational feasibility of implementing a multi-site evaluation of beginner driver education. That study began with a comprehensive and aggressive outreach to the driver education community in the United States and Canada to participate in the evaluation.

Potential participant states and provinces were reviewed to determine if they were appropriate for the evaluation – e.g., willing to participate. Primary considerations/ criteria for potential participation included: the extent to which the sites would, collectively, offer opportunities for different levels of evaluation to ensure the overall plan was both comprehensive and systematic; the level and extent of cooperation expected from the participating/responsible agencies; characteristics of the program being evaluated; access to needed information and data; and, the number of students in the program.

These criteria, along with input from AAAFTS, led to the selection of the priority sites in Phase 1, the planning phase, of this large-scale project – Michigan, Oregon, and Manitoba. The evaluation in Michigan was discontinued because only one of the two major private providers of driver education programs in that state was prepared to participate and the state lacked a sufficiently large comparison group of teens who had not taken driver education. Montana was identified as an alternative site to Michigan, principally because relevant agencies had previously expressed an interest in participating in the evaluation and Montana met the criteria described above for site selection.

### *Project Purpose and Overview*

The overall investigation involved a multi-site, multi-level evaluation of beginner driver education programs in the United States and Canada that aimed to:

- Generate new knowledge about the outcomes, impact, and operational effectiveness of driver education;
- Provide new information about how to improve the delivery and content of driver education to enhance its safety impact;
- Demonstrate implementation of the AAA Foundation's *Comprehensive Guidelines* for evaluating driver education; and,
- Showcase potentially more effective and constructive methods to evaluate driver education.

Phase II of the research initially focused on the development of evaluation designs in the three priority jurisdictions – Michigan, Oregon, and Manitoba. As mentioned previously, Montana replaced Michigan as a study jurisdiction. The evaluation designs were implemented in Manitoba and in Oregon but not in Montana due to funding constraints. The principal foci are on evaluating the extent to which driver education programs influence student outcomes in Manitoba and Oregon (e.g., improvements in knowledge, attitudes, and safer behavior) and on the impact of these programs in terms of crash reduction in Oregon.

This report describes the results of the investigation in Manitoba and Oregon. A second report describes in more detail the methods and tools investigated and employed in the evaluations of the driver education programs in these study sites (Mayhew et al. 2014).

### *Scope of This Report*

This report is divided into three primary sections that describe the studies conducted in Manitoba (Section 2) and in Oregon (Section 3), and discuss the overall results and implications for driver education and for evaluation (Section 4).

Section 2.1 describes the Manitoba Public Insurance High School Driver Education (MPI HSDE) program. It is followed by sections that describe the independent but related studies that were conducted to evaluate the influences of the MPI HSDE program on student outcomes – safety knowledge, attitudes, skills, and behaviors.

Different evaluation designs and approaches were taken in these studies. Since random assignment of subjects using an experimental evaluation design was neither feasible nor practical, a quasi-experimental evaluation design with pre-post comparisons (before and after driver education) and a comparison group (non-driver education group) was adopted for most of these studies. Both a cross-sectional approach (collecting data on different people in the groups of interest all at the same time) and a prospective approach (collecting data from the same people at different points in time) were also employed. In this regard, Section 2.2 of this report initially describes the results of a survey administered to students in high schools across the province that provides baseline data to determine whether there are differences between teens who plan and do not plan on taking driver education. This is followed by descriptions of the results that emerged from a comparison of the initial survey responses to those of a second survey administered to a subset of the same teens several months later using a prospective study design. Section 2.3 describes the results from another survey of both Manitoba teen drivers and their parents that applied a cross-sectional study design. Section 2.4 describes a cross-sectional comparison of performance on a simulated drive test of pre-drivers, learner drivers, and new drivers who took the MPI HSDE program versus those who did not. Section 2.5 describes a study that compared scores on the Manitoba driver license road test among license applicants who had graduated from the MPI HSDE program versus those who did not. Finally, Section 2.6 summarizes the findings, and highlights similarities and differences in results across the studies in Manitoba.

Section 3 describes the independent but inter-related studies conducted in Oregon to evaluate the ODOT-approved driver education program. Section 3.1 initially describes the primary features of the Oregon Driver Education Program. Section 3.2 describes the results of a baseline survey administered to Oregon teens shortly after they obtained their provisional instruction permit. This provided a means to identify pre-existing differences between DE and Non-DE teen drivers. Section 3.3 examines whether meaningful changes occurred in intermediate student outcomes, such as knowledge and driving practices, as a result of completion of the ODOT-approved DE program. Similar to the approach adopted in the Manitoba studies, a quasi-experimental design was used involving a pre-post comparison with a comparison group. In this regard, the initial baseline survey was administered again, several months later, to a subset of the same two groups of teens – i.e., one had completed the ODOT-approved DE program and the other had not. Section 3.4 describes a study using a prospective design with teen drivers participating in the baseline survey to compare the safety performance of those who have taken the ODOT-approved driver education program with that of those who have not taken this program over their first few months of independent driving. A retrospective study design was also used to examine the driving records of a large population of teen drivers that have and have not taken the ODOT-approved driver education program and the results are described in Section 3.5. Finally, Section 3.5 summarizes the findings and highlights similarities and differences across the studies in Oregon.

The final section of the report (Section 4) discusses the results from Manitoba and Oregon in terms of implications for driver education and for evaluation.

# Manitoba Public Insurance
# High School Driver Education

## Program Overview

### *Administration, Setting, and Scope*

Manitoba was identified as a desirable evaluation site because of the high school driver education program delivered by Manitoba Public Insurance (MPI HSDE). MPI is a publicly owned auto insurance company that is the only provider of basic automobile insurance in the province.

Attractive features of the MPI HSDE for the current project include:

- A well-established program;
- Centralized administration of the program through MPI;
- Relatively uniform standards across high school delivery sites;
- Previous evaluation work and an ongoing internal formative evaluation project;
- Recent curriculum development work to improve the content and delivery of the program;
- Driver education and licensing administration within one organization;
- Organizational capability and experience in research; and,
- Full-time administrative and development staff for HSDE within MPI.

The HSDE program is available to high school students in nearly all areas of the province, with the exception of remote areas. The fee is $50 (CAD). Students are eligible to enroll when they are 15½ years old. About 11,000-11,500 students take advantage of the course each year, typically (but not exclusively) while they are in grade 10. For comparison, there are about 16,400 total grade 10s in the province's schools in 2011.

The instructors are licensed driving instructors contracted by MPI to deliver the high school driver education program. They are supervised and monitored by MPI staff. Many instructors, but not all, are high school teachers.

Students wishing to register for HSDE visit a local MPI agent's office and sign up. A permanent MPI customer record is established for them at that point.

Private driving lessons are available to Manitoba young drivers, but there is little available in terms of a full driver education program outside the high school program.

### *Relation to the Graduated Driver License (GDL) Program*

Driver education is not mandatory for new drivers to become licensed in Manitoba. There is also no insurance premium discount for completion of driver education. There is a licensing incentive, however, where teens can apply for their Learners license (GDL Class 5L) at age 15½ if they are enrolled in HSDE. The written test for this license (for those enrolled in HSDE) is administered in the classrooms by instructors. For those not enrolled in HSDE, the minimum age for the Learner's license is 16, and the same written test is taken at a licensing office. There is no other relation between HSDE and the GDL system. There is no requirement under GDL for a particular number of accompanied driving hours at the learner stage. HSDE requires log-sheet evidence of 24 hours of accompanied driving within nine months after the end of the course in order for the student to receive the HSDE certificate of completion. There is a single road test in Manitoba's GDL system, at the end of the Learner GDL stage (Class 5L).

### *Goals and Objectives of Manitoba's HSDE*

The HSDE program has a statement of mission, goals, and objectives as part of MPI's quality management approach. The statement has recently been refined and reaffirmed as part of an explicit program logic model previously developed in general terms. The HSDE mission is to provide high school students across Manitoba with a foundation for the safe and responsible operation of a passenger vehicle. Goals address program access, driver mobility, and driver safety and responsibility, with more specific sub-goals under each.

### *Content*

MPI uses its own curriculum and textbook, which were developed with outside consulting assistance. The most recent HSDE curriculum and textbook was implemented in 2006. This curriculum specifies 34 one-hour in-class units (including two-unit blocks each for parental attendance and for Learner's license written test administration). In addition to the 30 hours of in-class instruction, the curriculum specifies eight hours of in-car instruction behind the wheel and eight hours of observation from the back seat.

The curriculum provides objectives and content for each classroom unit, which are presented in three sections. The topics and general objectives for each unit are listed in Table 1 on the next page.

### *Delivery Methods*

Delivery in class consists of partially-scripted classroom facilitation by instructors, with lecture, exercises, group discussions, and AV support. Curriculum support materials (such as videos) are obtained from outside suppliers and provided to instructors.

## The New Driver Survey

### *Background*

One segment of the project involves an examination of differences and changes in student knowledge, attitudes, opinions, driving practices, and skills. Most of these were measured using a questionnaire, the New Driver Survey, which was carefully developed and tested (See Mayhew et al. 2013, for a description of the development and pilot testing of this survey). The current section initially provides findings from the first fielding and administration of the survey to high school students across Manitoba. The section then presents a comparison of results from the first survey to those of the second fielding of the survey, which was administered to the same high school students several months later.

**Table 1: MPI HSDE Curriculum**

| Unit | Objective |
|---|---|
| **SECTION 1 – Knowledge for Class 5L Test** | |
| **Unit** | **Objective** |
| **1 – Getting Ready for Driver Education** | Understanding course requirements & expectations |
| **2 – Signs & Signals** | Understanding the importance of signs & signals |
| **3 – Parental 1** | Understanding needs for parental involvement |
| **4 – Parental 2** | Understanding needs for parental involvement |
| **5 – Safe & Legal Driving Practices** | Clear understanding of Driver's Handbook |
| **6 – Emergencies & Legal Consequences of Unsafe Driving** | Clear understanding of Driver's Handbook |
| **SECTION 2 – Basic Knowledge for a Licensed Driver** | |
| **Unit** | **Objective** |
| **7 – Manitoba GDL & Insurance** | Understanding administrative & insurance basics |
| **8 – Preparing to Drive** | Learning controls & instruments |
| **9 – Basic Maneuvering Skills** | Understanding routine driving on an empty road |
| **10 – Conditions Affecting Seeing** | Learning about driving with your eyes |
| **11 – Maintaining Safe Space** | Learning to think about driving space |
| **12 – Traffic & Roadway Conditions** | Learning about changing environments |
| **13 – Weather & Traction Challenges** | Understanding driving in a wider range of conditions |
| **14 – Understanding Other Road Users** | Understanding that they're people, not vehicles |
| **15 – Crashes & Injury Prevention** | Learning to protect people & property |
| **16 – Driver Conditions & Fitness** | Understanding the range of potential impairments |
| **17 – Alcohol** | Understanding the effects of alcohol |
| **18 – Alcohol & Other Drugs** | Understanding the impacts of alcohol & other drugs |
| **19 – Section 2 Test** | |
| **SECTION 3 – Advanced Skills & Insight** | |
| **Unit** | **Objective** |
| **20 – Trip Planning & Navigation** | Knowing where you are & where you're headed |
| **21 – Hazards & Risks for New Drivers** | Understanding the effects of youth & inexperience |
| **22 – Pressures that Raise Risk** | Understanding factors that challenge young drivers |
| **23 – Scan, Search & Identify** | Knowing what's happening & what's coming next |
| **24 – Choices & Consequences** | Improving the consistency of good decision making |
| **25 – Emergency Situations** | Understanding vehicle control |
| **26 – Fuel Efficient Driving 1** | Understanding fuel efficiency & the link to safety |
| **27 – Fuel Efficient Driving 2** | Understanding environmental & cost savings |
| **28 – Vehicle Systems** | Understanding current & emerging technologies |
| **29 – Becoming Part of the Solution** | Understanding & building personal power to help |
| **30 – Obtaining Your Driver's License** | Knowing testing & administrative requirements |
| **31 – Keeping Your Driver's License** | Understanding driver license control |
| **32 – Section 3 Test** | |

### *Objectives*

The research design involved a pre-post survey with a comparison group (Campbell & Stanley, 1966). The initial administration of the New Driver Questionnaire was to obtain baseline information about the knowledge, attitudes, opinions, as well as professed driving practices and skills of two primary groups – a group of students who intended to take high school driver education, and a group who did not intend to do so. That differences might exist, particularly in lifestyle-related variables, is supported by other research (Mayhew & Simpson 1990; Mayhew et al. 2006; Clinton & Lonero 2006; Lonero et al. 1995; Lonero & Mayhew 2010); therefore, it is critical to know what differences may exist in this sample.

The survey was administered again, several months later, to as many of the same individuals as possible who initially said they planned and did not plan on taking driver education, primarily to determine if exposure to driver education has an effect on knowledge, attitudes, opinions, driving practices, and skills.

### *The New Driver Questionnaire*

The New Driver Questionnaire was developed and used to measure students' safety knowledge, attitudes, beliefs/opinions, motivations, skills, and behaviors/behavioral intentions. This questionnaire is part of a set of instruments developed to measure variables that would be expected to change as a result of exposure to driver education. Some of these (e.g., knowledge, attitudes) can be measured using a questionnaire, but some can only be validly measured using other techniques. Driving skills can be measured with road tests and perhaps simulators. Driving behavior can probably only be measured with in-vehicle technologies or possibly using a high quality simulator. Accordingly, one purpose of this investigation was to produce a "toolkit" that provides a set of instruments/scales that can be used to assess changes in a variety of measures as a result of the exposure to driver education. The term "toolkit" was selected intentionally because it describes a set of measuring techniques or instruments that could be used by other investigators to evaluate the effects of driver education, while providing the flexibility needed to accommodate different study sites in the current evaluation (see Mayhew, et al. 2013).

<u>Development of the New Driver Questionnaire:</u> Development of the New Driver Questionnaire began with the identification of primary domains (e.g., knowledge, attitudes, lifestyle) and their components (e.g., rules of the road, attitudes toward safe driving) that should/could be expected to change as a result of exposure to driver education. In addition, variables associated with crash risk were also measured to identify pre-existing differences that might need to be controlled statistically during analysis.

The three research partners at the time (TIRF, NPA, and the University of Michigan Transportation Research Institute – UMTRI) identified what they believed were the relevant domains and components in the areas of teen driver safety, driver education, and program evaluation. They also identified existing questionnaires/ scales that purported to assess these aspects. To expand this pool of items, the research team conducted a literature review and a survey of international experts in the field to solicit their advice about the domains/components and to identify other questionnaires or items they felt were relevant. In addition, a review of driver education curricula and driver tests was undertaken, to further expand the pool of items by obtaining or creating items that would tap information relevant to beginning drivers and road safety.

The large number of survey items, scales, and indices obtained was reviewed by the research team to identify those with established reliability and validity, and to eliminate those that were redundant or inappropriate. These items were then clustered according to the domain/component they appeared to tap. This information was then submitted to several experts as well as a research advisory panel for review and comment. They were asked to review and comment on the appropriateness of the domains, the specific components within each domain that should be measured, and the measurement tools (e.g., scales, questions/items) that were being proposed for this purpose.

Agreement was reached on the importance of measuring six primary domains: Knowledge, Attitudes, Beliefs/Opinions, Motivations, Skills, and Behaviors/Practices/Intentions. Agreement was also reached on an item pool to be used to measure these primary domains and the priority components within each of them.

The final item pool was then subjected to cognitive testing by an independent research firm (NuStats) to ensure the items could be understood by the target audience and that they conveyed what was intended. To do this, students were questioned about the wording, meaning, and their interpretations of the items (a copy of the NuStats, 2008 report is included in Mayhew et al. 2013). The item pool was formatted by NuStats for use as a self-administered instrument. This was then cognitively tested with a total of 48 students in Central Texas who had recently taken or planned to take driver education.

Following cognitive testing, some relatively minor revisions were made to the item pool. This was reformatted and tailored by the project team, with input from the local evaluation team in Manitoba. It was then administered in two pilot studies with several hundred driver education students in Manitoba.

The first of these pilot studies was designed to test for ceiling effects; that is, where virtually all respondents provide the same response, thus diminishing the item's discriminative value. This study involved 57 students who were in their first driver education class, and 195 who had completed driver education. The first group provided evidence of ceiling effects. The second group provided information about potential improvements in knowledge as a result of exposure to driver education. Based on the findings from this study, it was recommended that nine of the 23 knowledge items be deleted from the questionnaire (see Mayhew et al. 2013).

In the second pilot study the entire questionnaire was administered by driver education instructors to 287 students in the MPI driver education program. The primary purpose of the study was to identify redundant items that could be eliminated. Analyses were also conducted to identify and eliminate scales or items with low reliability. More details of this second pilot study are described in the "tool kit" report (Mayhew et al. 2013).

<u>Final Version of the Questionnaire:</u> The final questionnaire has 45 questions/items and was divided into the following sections: confidential information; driver

education/training; graduated driver licensing; safe driving; skills and abilities; driving behavior; and lifestyle and other person-centered attributes. A copy of the New Driver Questionnaire tailored for Manitoba is contained in Appendix A. It takes approximately 30 minutes to administer.

### ***Survey Method***

The New Driver Questionnaire was initially administered to grade 10 students in high schools in Manitoba between February and June 2009. The second wave of the survey involved administering the questionnaire to grade 10 and 11 students in the same high schools. This occurred between May and June as well as between September and October 2009. This second administration was designed to ensure that students who completed Wave 1 of the survey had finished their driver education program. The time between the first and second waves of the survey ranged from three to five months, depending on when the high school granted access for administration of the survey.

<u>Enlisting Schools:</u> MPI solicited schools throughout the province to participate. For various reasons as discussed in more detail below, participation was not nearly as widespread in the second survey as for the first one. In part this accounts for the much smaller number of respondents in the second wave of the survey.

<u>Recruiting Student Respondents:</u> The procedure for recruiting students was consistent for both survey waves. A contact within each school served as the liaison with MPI. Questionnaires were distributed to the school with instructions to administer them to grade 10 students in a classroom in the first wave, and, in the second wave, grade 10 and 11 students from the same schools who had participated in the first wave.

Grade 10 was selected for the first wave since virtually all of these students would be below the licensing age and many would not yet have enrolled in driver education. Grade 11 was also included in Wave 2 to capture those students who had participated in Wave 1 and had graduated to grade 11 – i.e., most teens in grade 10 would graduate to grade 11 in the same high school the next school year.

Students were contacted through handouts in class or other means (e.g., announcement) at school and offered a chance to win a prize for volunteering to participate in two surveys and possibly a third one. The students were asked to obtain permission to participate by having their parents complete a consent form. In some school districts the policy states that formal, written parental consent is not required; only those who explicitly indicate they do not want their son/daughter to participate are excluded. Although consent was not requested of these students, parents had the option of excluding their teen from the survey.

<u>Administration of the Survey:</u> The designated contact person (e.g., vice-principal) in each school received copies of the questionnaire along with instructions on its administration. The contact person briefed teachers, who then distributed the questionnaires to each student with parental consent, who in turn completed it

during a class period. Students were assured of confidentiality, but were instructed to put their name on the questionnaire so that linkages could be made between the Wave 1 and 2 surveys.

The contact person or teacher distributing the questionnaires provided information about the school division, school name, number of students completing the survey in their class, and the date and time of administration. The completed questionnaires were then assembled along with the signed consent forms and sent to the research team.

<u>Questionnaire Completions:</u> MPI initially distributed 11,604 questionnaires to 151 schools throughout the province. Cooperation was obtained from 92 high schools (61%) in 36 school divisions throughout Manitoba, providing a cross-section of the province. The primary reasons for non-participation of a school were that staff was currently too busy to assist with the administration of the survey, or that the school had just participated in a survey or several surveys and thus was not prepared to do another one. A total of 3,878 questionnaires were completed (33% of those distributed). It was not possible to calculate a response rate per school or per eligible student, because information was not available on the number of eligible students enrolled in each of these schools.

In Wave 2, approximately 4,000 questionnaires were distributed to the 92 high schools that participated in Wave 1; cooperation this time was obtained from 65 schools (70%) in 28 school divisions throughout the province. However, a number of the schools that participated in the first wave of the survey decided not to participate in the second wave. Moreover, some students who participated in the initial wave had moved either to another school or out of the province, and it was not feasible to track them to their new location. As a consequence, only 1,722 questionnaires were returned (43% of the 4,000 questionnaires distributed). Although participation in Wave 2 was not as widespread, the completion rate for the survey was higher in Wave 2 than in Wave 1 (43% versus 33%).

Since high schools volunteered to participate in the survey and teens in these high schools volunteered to complete the questionnaire, the study sample is potentially biased and not necessarily representative of the population of teens in high schools across Manitoba. A similar limitation has been reported in other cohort studies regarding their method of recruitment, which produced a convenience or opportunistic sample and not necessarily a sample representative of the population (e.g., Iver et al. 2006). This investigation and others, however, were not intended to extrapolate data (for example, on the prevalence of a behavior), from the study sample to the population. The objectives of this study were to determine if there were pre-existing differences between those who have and have not completed driver education, and whether driver education was associated with improvements in safe driving knowledge, attitude, and skills. The study design and sample recruited for this study provided a suitable means to accomplish these objectives.

### ***Data Treatment***

Database: A coding system was developed for each item in the questionnaire and an electronic database file constructed in Microsoft Excel. The coded data were entered into a secure database by staff trained at TIRF for data entry. Each case record contained a coded version of the student's identity. Names, addresses, and licensing identifiers (e.g., learner) were also included in the file, which was used to match respondents from Wave 2 to those in Wave 1, and then confidential identifiers were purged from the database.

Entry Reliability: To test the reliability of data entry, a second independent person entered data from a sample of 20 respondents selected at random from both the first and second waves of the survey – this amounted to a total of 3,820 items in each wave. For Wave 1, the number of errors identified was negligible, with only eight detected, for an error rate of 0.2 percent; for Wave 2, the error rate was 1.4 percent. Periodic data entry rechecks were conducted with comparably low error rates.

Final N and Missing Data: A total of 3,878 questionnaires were completed in the first wave (1,950 males, 1,885 females, and 43 with missing gender data). In the second wave, 1,722 surveys were returned (804 males, 911 females, and 7 with missing gender data). Not all respondents answered all questions, so the "n" varied from item to item in the analyses.

Group Composition and Comparisons: Two sets of analyses were conducted. The first set compared teens in the first survey wave who did and did not plan to take driver education. The second set of analyses compared Wave 2 responses with Wave 1 responses for a group that had completed driver education at the time of the second wave of the survey, and a group that had not taken it by that time, whether or not they had originally intended to take it.

For these comparisons, it was possible to match Wave 1 and Wave 2 responses for 1,616 of the 1,722 questionnaires returned. However, not all of these matched respondents met the criteria for this analysis. Some had already completed driver education in Wave 1 (n=405); 282 were still taking driver education at the time the Wave 2 survey was administered; 43 took commercial driver education and were excluded, since the focus of this study was on the impact of the MPI driver education course; and, six who said they had completed driver education in Wave 1 and said they were taking it in Wave 2 were also excluded.

This left 780 respondents who met the criteria established for this set of analyses. Of these, 425 had not taken driver education when they completed the New Driver Questionnaire for the first time but had completed driver education by the time they participated in the second survey wave. These are referred to as the HSDE group. In addition, 355 students had not taken driver education at the time of the first or second waves of the survey. These are referred to as the Non-DE group.

The 425 students in the HSDE group included 317 students who were in the process of taking driver education (at the beginning of their course) when Wave 1 was administered, 105 who planned to take driver education (and subsequently did so), as well as three who said they were not going to take driver education but did in fact complete it. The decision to include students who planned on taking driver education and those in the process of taking driver education in the HSDE group was based on the results of preliminary analyses that showed they were similar on measures of student attributes. For example, they did not differ to a statistically significant degree in their knowledge of safe driving practices. Differences would logically have been expected here because those in the process of taking driver education may have already been exposed to in-class education on safe driving practices. Accordingly, given further similarities on other key measures, all these students were included in the HSDE group.

The 355 students in the Non-DE group included 47 who initially said they did not plan on taking driver education. At Wave 2, 35 of them still said they did not plan on taking it, but 12 said they planned to do so at some time in the future. These groups were combined since they were non-driver education participants at that time. Of the 308 students who initially said they were going to take driver education, 252 had not done so and 56 now said they do not plan to take it. Thus, the "comparison" group includes only students who had not taken driver education at the time of the second wave of the survey, regardless of whether they stated an intention to do so at some point in time.

The comparative analyses are, therefore, based on these two groups – 425 students in the HSDE group and 355 students in the Non-DE group. Comparison of Wave 1 and Wave 2 measures for the HSDE group shows changes that might be associated with exposure to driver education. Comparison of the measures between Waves 1 and 2 for the Non-DE group indicates changes associated with extraneous factors and, therefore, will serve as a "control" for changes occurring in the HSDE group.

### *Data Analysis*

Table 2 below provides a brief description of the 17 different measures. In the table, each measure is given a descriptive label (e.g., GDL knowledge); the scoring method is shown (this is important for interpreting the results); its location in the questionnaire is identified, in terms of Section and questions/items; reference is provided to the primary origin of the scale; and, the number of items in the scale is shown in the right hand column. The Manitoba New Driver Questionnaire is included in Appendix A.

**Table 2: Measures in The New Driver Questionnaire**

| Measure | Location in Survey | Scale Origin | # of Items |
|---|---|---|---|
| **1. GDL Knowledge**<br>response 1= yes<br>response 2= no<br>response 3= don't know | Section B; Q1 &Q2 | no pre-existing scale used; developed by research team and advisory panel | 17 |
| **2. GDL Overall Support**<br>response 1= strongly oppose<br>response 5= strongly support | Section B; Q3 | no pre-existing scale used; developed by research team and advisory panel | 1 |

| Table 2: Measures in The New Driver Questionnaire | | | |
|---|---|---|---|
| **Measure** | **Location in Survey** | **Scale Origin** | **# of Items** |
| **3. GDL Support- Specific Requirements** response 1= strongly oppose response 5= strongly support | Section B; Q4 | no pre-existing scale used; developed by research team and advisory panel | 5 |
| **4. GDL Influence** response 1= strongly disagree response 5= strongly agree | Section B; Q10 | no pre-existing scale used; developed by research team and advisory panel | 3 |
| **5. Safe Driving Knowledge**[1] | Section C; Q1-14 | no pre-existing scale used; developed by research team and advisory panel | 14 |
| **6. Self-rated Skills** response 1= very poor response 5= very good | Section D; Q1 | > Driving Skills and Safety Mindedness: Skill items (DQ1: items a, b, c, d, e, i, j, k, m) > Driving Skills and Safety Mindedness: Safety-mindedness items (DQ1: items f, g, h, n, o, p) | 16 |
| **7. Perceived Likelihood of Accident or Injury** response 1= very unlikely response 5= very likely | Section D; Q2 | no pre-existing scale used; developed by research team and advisory panel | 2 |
| **8. Risk Taking Behavior** response 1= never response 5= very frequently | Section E; Q1 | Donovan Risk-Taking (EQ1: items a-h) | 8 |
| **9. Risky Driving Behavior** response 1= never response 5= very frequently | Section E; Q2 & Q3 | > Manchester Driving Behavior Questionnaire (DBQ): Errors subscale (EQ2: items a-d, j-l) > Manchester DBQ: Highway Code Violations Subscale (EQ2: items e, f, g, m-o) > Drink/Driving (EQ2: items i, p-r) > Distraction (EQ3: items a-e) | 23 |
| **10. Risky Driving Attitude** response 1= strongly disagree response 5= strongly agree | Section F; Q1 | Competitive Attitude Toward Driving (FQ1: items d, e, h, i, j) | 10 |
| **11. Risk Taking Attitude** response 1= strongly disagree response 5= strongly agree | Section F; Q2 & Q6 | > Normlessness (FQ2: items c, d, e) > Peer-Pressure (FQ2: items, f-m) > Risk Taking Propensity (FQ6 a-c) | 16 |
| **12. Lifestyle** response 1= strongly disagree response 5= strongly agree | Section F; Q5 | Adolescent Lifestyle Questionnaire (FQ5: items a-h) | 8 |
| **13. Tolerance of Deviance** response 1= very unacceptable response 5= very acceptable | Section F; Q7 | Tolerance of Deviance (FQ7: items a-f) | 6 |
| **14. Parental Monitoring** response 1= never response 5= very frequently | Section F; Q4 | Parental Behavioral Monitoring (FQ4: items a-d) | 4 |
| **15. Exposure** response 1= never response 5= every day | Section E; Q5 | no pre-existing scale used; developed by research team and advisory panel | 13 |

| Table 2: Measures in The New Driver Questionnaire | | | |
|---|---|---|---|
| **Measure** | **Location in Survey** | **Scale Origin** | **# of Items** |
| **16. Time Perspective**<br>response 1= not at all like me<br>response 5= very much like me | Section F; Q3 | Zimbardo Time Perspective Inventory (FQ3: items a-g) | 7 |
| **17. Responsibility When Driving**<br>response 1= not at all responsible<br>response 5 = extremely responsible | Section E; Q4 | no specific scale used; developed by research team and advisory panel | 3 |

*[1]The knowledge questions were not specifically targeted by the MPI HSDE program, but were basic safe driving knowledge items.*

The references for each of the scales or indices cited in the table are provided in Appendix B.

All of the scales and indices used in this investigation are composed of combinations of ordinal 5-point Likert scale questions. This suggests the use of non-parametric techniques to identify statistically significant differences in responses between groups, because the distance in intervals (e.g., between strongly agree and agree) is not known. Parametric techniques for interval variables, however, can be applied to appropriately score ordinal rank variables, as long as assumptions are not made about population parameters (McClendon 2004). This implies that a normal distribution is not a necessary assumption, and when tests of differences in means are performed for a sample larger than 50 the assumption of a normal distribution is not necessary (Frankfort-Nachmias and Leon-Guerrero 2006).

Accordingly, the analyses used parametric techniques for the baseline comparisons by focusing on differences between mean scores of the groups of interest on each of the 17 measures described in Table 2. A t-test was used to determine whether the mean scores of the groups were statistically different from each other, and p-values are shown in the table. Where appropriate, standard deviations and median scores are also provided. Logistic regression is also used to determine which factors are associated with planning to take driver education.

In the Wave 1 and Wave 2 comparisons, the analyses focused on determining whether exposure to driver education had a positive and salutary effect on knowledge, driving behavior, lifestyle, and other factors. If this were the case, measures of these should differ between survey waves. Accordingly, the primary analysis compared mean scores obtained in Wave 1 to those obtained in Wave 2 for both the HSDE and Non-DE groups.

A t-test for paired (within group) comparisons was used to determine if the change was statistically significant. If the t-tests for paired comparisons revealed a statistically significant result with a p-value of less than 0.05 for either the HSDE or Non-DE group, a Two-way factorial ANOVA was used to determine if driver education was in fact associated with a significantly different change in the factor (e.g. knowledge) than was observed in the Non-DE group from Wave 1 to Wave 2. To account for any change in outcomes from Wave 1 to Wave 2 that may be due to other factors, gender and age have also been included in these models.

A secondary objective was to compare the HSDE and Non-DE groups in both Waves 1 and 2. A t-test for independent samples was used to determine if: (1) the differences between HSDE and Non-DE groups in Wave 1 were significant; and, (2) the differences between the HSDE and Non-DE groups in Wave 2 were significant.

### *Results*

Baseline Comparisons: The following compare measures for the group that indicated in the initial survey (Wave 1) that they were going to take driver education (but were not yet enrolled) with those for the group that indicated they were not planning to take driver education. Thus, for purposes of these comparisons, groups were defined in terms of their plans, or "intentions," to take driver education, and not whether they actually had or had not completed driver education.

Group Characteristics: Table 3 shows the mean age, gender, and license status of the two groups. As can be seen, those who planned to take driver education were somewhat younger than those who did not plan on taking driver education at a later date. Table 3 also shows that fewer males than females indicated they planned to take driver education.

As expected, most students in both groups had no license. However, the group that did not intend to take driver education more often reported they had a Learner's license.

Graduated Driver Licensing: Several measures in the questionnaire relate to graduated licensing – knowledge about the program, support for it (both in general and for the specific features of the program), and the extent to which students believe it has influenced (or would influence) their driving behavior. The relevant data for these measures appear in Table 4.

As shown in Table 4, the group that planned on taking driver education had only slightly greater knowledge about the graduated licensing program than the group that did not plan on taking driver education, but the difference was not statistically significant. On five of the 17 knowledge items, students in both groups either did not know the answer, or answered incorrectly.

Although knowledge about the program was less than perfect, both groups were generally supportive of GDL overall, as well as of its specific features. Moreover, those who planned on taking driver education were more supportive of the program. Additionally, those who planned on taking driver education believed more strongly that the GDL program would have a positive impact on their driving behavior.

| Table 3: Group Characteristics — Baseline Comparisons | | |
|---|---|---|
| | Driver Education Status | |
| | Plan on Taking | Do Not Plan on Taking |
| **Mean Age** | 15 years, 7 months | 16 years, 1 month |
| | SD=0.47<br>5.64 months<br>(n=1487) | SD=0.77<br>9.24 months<br>(n=151) |
| **Gender** | | |
| **Males** | 48%<br>(n=755) | 60%<br>(n=99) |
| **Females** | 51%<br>(n=812) | 40%<br>(n=67) |
| **License Status** | | |
| **No License** | 98%<br>(n=1546) | 82%<br>(n=136) |
| **Learner's License** | 1%<br>(n=21) | 16%<br>(n=26) |
| **Intermediate License** | 0.1%<br>(n=2) | 2%<br>(n=3) |

| Table 4: Graduated Licensing Scores: Baseline Comparison | | | | |
|---|---|---|---|---|
| | # of Items | Driver Education Status | | Meaning of High Score (range) |
| | | Plan on Taking | Do Not Plan on Taking | |
| **GDL Knowledge** | 17 | n=1413<br>11.57<br>SD=3.08 | n=148<br>11.34<br>SD=3.50 | **Greater knowledge (0-17)** |
| | | p=0.46 | | |
| **GDL Overall Support** | 1 | n=1425<br>3.83<br>SD=0.93 | n=148<br>3.21<br>SD=1.15 | **Greater support (1-5)** |
| | | p<0.01 | | |
| **GDL Support-Specific Requirements** | 5 | n=1463<br>3.60<br>SD=0.84 | n=152<br>3.38<br>SD=0.96 | **Greater support (1-5)** |
| | | p=0.01 | | |
| **GDL Influence** | 3 | n=854<br>3.71<br>SD=0.94 | n=110<br>3.24<br>SD=1.14 | **Greater influence (1-5)** |
| | | p<0.01 | | |

Although the differences in GDL overall support scores were statistically significant, they are small in absolute terms (e.g., GDL overall support scores of 3.83 versus 3.21), and may reflect the limited range of the scale (from 1 to 5). They also reflect a relatively large percentage difference in support scores – a 19 percent higher GDL overall support score for those who planned on taking driver education.

The smaller n's on GDL influence resulted from fewer teens responding to these question items. The reasons these items were more frequently skipped are not known.

Collectively, these results suggest that even though students who planned on taking driver education do not know any more about the GDL program than those who are not planning to take driver education, they are more supportive of it and believe it will make them safer drivers.

Safe Driving Knowledge, Self-Rated Skills, and Crash Likelihood: Fourteen multiple-choice items assessed safe driving knowledge. As shown in Table 5, the two groups did not differ notably in their knowledge about safe driving practices. However, the average scores indicate that both groups of students had relatively low levels of knowledge about safe driving practices. On average they failed to correctly answer eight of the 14 items (approximately 57% incorrect).

**Table 5: Safe Driving Knowledge, Skills, and Crash Risk Scores:**

| | # of Items | Driver Education Status | | Meaning of High Score (range) |
|---|---|---|---|---|
| | | Plan on Taking | Do Not Plan on Taking | |
| **Safe Driving Knowledge** | 14 | n=1246 | n=130 | **Greater knowledge (0-14)** |
| | | 5.68 | 5.88 | |
| | | SD=1.90 | SD=1.93 | |
| | | p=0.26 | | |
| **Self-Rated Skills** | 16 | n=1264 | n=137 | **Better skills (1-5)** |
| | | 3.62 | 3.58 | |
| | | SD=0.65 | SD=0.81 | |
| | | p=0.57 | | |
| **Perceived Likelihood of Accident or Injury** | 2 | n=1398 | n=146 | **More likely (1-5)** |
| | | 2.30 | 2.24 | |
| | | SD=1.07 | SD=1.12 | |
| | | p=0.56 | | |

Students were also asked to rate, on a five-point scale, how good they thought their driving skills were (or would be when they started driving) for handling 16 different driving maneuvers. Results are shown in Table 5. Both groups were quite positive about their skills and they did not differ in their self-assessment.

Survey respondents were also asked about the likelihood they would be involved in a collision or injured in one while driving during the coming year. Results are shown in Table 5. Both groups saw this as relatively unlikely and did not differ meaningfully from one another.

Problem Behaviors: Previous research has shown that problem/risky behaviors among teens are related (e.g., smoking, early drug use, a lack of social norms or normlessness), and that these problem behaviors are also predictive of crash involvement (e.g., Beirness & Simpson 1988). Accordingly, a number of the scales/items included in the New Driver Questionnaire tapped various dimensions of problem behaviors. Results are summarized in Table 6. Of the five measures of problem behavior, the two groups were nearly identical on all but tolerance of deviance. Neither group was particularly tolerant of deviance, but those who did not plan to take driver education were notably more so.

| Table 6: Problem Behavior Scores: Baseline Comparison | | | | |
|---|---|---|---|---|
| | # of Items | Driver Education Status | | Meaning of High Score (range) |
| | | Plan on Taking | Do Not Plan on Taking | |
| **Risk Taking Behavior** | 8 | n=1327 | n=132 | **Frequent risk taking (1-5)** |
| | | 1.84 | 1.88 | |
| | | SD=0.87 | SD=0.95 | |
| | | p=0.59 | | |
| **Risky Driving Attitude** | 10 | n=1282 | n =129 | **More risky attitude (1-5)** |
| | | 2.73 | 2.63 | |
| | | SD=0.77 | SD=0.93 | |
| | | p=0.21 | | |
| **Risk Taking Attitude** | 16 | n=1221 | n =130 | **More risky attitude (1-5)** |
| | | 2.24 | 2.39 | |
| | | SD=0.80 | SD=0.83 | |
| | | p=0.05 | | |
| **Lifestyle** | 8 | n=1315 | n =137 | **Positive attitude (1-5)** |
| | | 4.01 | 3.86 | |
| | | SD=0.80 | SD=0.86 | |
| | | p=0.05 | | |
| **Tolerance of Deviance** | 6 | n=1321 | n =140 | **More tolerant of deviant behavior (1-5)** |
| | | 1.87 | 2.15 | |
| | | SD=0.85 | SD=0.98 | |
| | | p<0.01 | | |

<u>Other Teen Attributes:</u> Parental monitoring was assessed using a four-item scale (Bingham & Shope 2005) that has been used in other research. As shown in Table 7, students who plan on taking driver education more often follow their parents' values and advice and accept monitoring by their parents.

The measure of time perspective indirectly assesses willingness to engage in planning by determining the extent to which a student is concerned about the present and the future. As shown in Table 7, more students who plan on taking driver education indicated they are likely to think about the future compared to those who do not plan on taking driver education.

Responsibility when driving was assessed using three items that asked teens to indicate how responsible they feel when driving for their own safety, the safety of passengers, and the safety of others outside their vehicle, using a five-point scale on which 1 indicates "not at all responsible," and 5 indicates "extremely responsible." As shown in Table 7, the group that planned on taking driver education had a slightly higher score on the responsibility-when-driving scale than the group that did not plan on taking driver education, but the difference failed to reach statistical significance at the 0.05 level (p=0.06).

| Table 7: Other Teen Attribute Scores: Baseline Comparison | | | | |
|---|---|---|---|---|
| | # of Items | Driver Education Status | | Meaning of High Score (range) |
| | | Plan on Taking | Do Not Plan on Taking | |
| **Parental Monitoring** | 4 | n=1346 | n=135 | **More accepting (1-5)** |
| | | 3.92 | 3.73 | |
| | | SD=0.79 | SD=0.82 | |
| | | p=0.01 | | |
| **Time Perspective** | 7 | n=1311 | n=135 | **Not future oriented (1-5)** |
| | | 2.87 | 3.10 | |
| | | SD=0.76 | SD=0.83 | |
| | | p<0.01 | | |
| **Responsibility When Driving** | 3 | n=1271 | n=137 | **More responsible (1-5)** |
| | | 4.34 | 4.18 | |
| | | SD=0.78 | SD=094 | |
| | | p=0.06 | | |

<u>Factors Associated with Planning to Take Driver Education:</u> Logistic regression was used to investigate which teen driver attributes measured in the baseline survey (Wave 1) may be associated with planning to take driver education. These analyses were conducted for 1,638 students – 1,487 students in the group that indicated they were going to take driver education, and 151 students in the group that indicated they were not planning on taking driver education in the initial survey.

Independent demographic variables included age at time of the survey and gender. All other independent variables were composite scales or indices including GDL knowledge, GDL overall support, support for specific GDL requirements, GDL influence, Safe driving knowledge, Self-rated skills, Perceived likelihood of accident or injury, Risk taking behavior, Risky driving attitudes, Risk taking attitudes, Lifestyle, Tolerance of deviance, Parental monitoring, Time perspective, and Responsibility when driving. Only those who said they have driven in the past three months answered questions used to form the Risky driving behavior scale and the Exposure scale. To minimize the number of missing values, these were not included in the analyses.

Table 8 below shows the factors that were found to have a p-value below 0.10, as there were many variables included in these analyses which would make the tables showing all results cumbersome for readers. Thus, results with a p-value above this level are not shown, as results with such high p-values would not be considered to be significant or to approach significance, even when less conservative interpretations of statistical significance are used. Only those results with a p-value equal to or below the 0.05 level will be discussed in the text.

As can be seen, logistic regression revealed that as age at the time of the first wave of the survey increases the chances of planning to take driver education decreases by 72 percent. It was also found that having reported being more supportive of the program increases the likelihood of teens reporting that they plan to take driver education by 80 percent. Having a higher Risk taking attitudes score (indicating higher agreement with a list of risk taking behaviors) increases the chances of planning to take driver education by 119 percent. Finally, having a higher score on the Tolerance of deviance scale (indicating greater acceptance of a variety of deviant behaviors) decreases the likelihood of planning to take driver education by 43 percent.

| Table 8: Logistic regression with DE status as dependent variable | | | |
|---|---|---|---|
| **Factor (N=425)** | **Odds ratio** | **%** | **p-value** |
| **Age at survey** | 0.28 | -72% | p<0.01 |
| **GDL overall support** | 1.80 | +80% | p=0.01 |
| **Safe driving knowledge** | 0.86 | -14% | p=0.09 |
| **Risk taking attitudes** | 2.19 | +119% | p=0.04 |
| **Tolerance of deviance** | 0.37 | -63% | p<0.01 |
| **Time perspective** | 0.57 | -43% | p=0.05 |

The same model was also run for males and females separately, and results are shown in Tables 9 and 10, respectively.

| Table 9: Logistic regression with DE status as dependent variable: Males | | | |
|---|---|---|---|
| **Factor (N=215)** | **Odds ratio** | **%** | **p-value** |
| **Age at survey** | 0.21 | -79% | p<0.01 |
| **GDL overall support** | 1.91 | +91% | p=0.03 |
| **Risk taking behavior** | 1.93 | +93% | p=0.09 |
| **Risky driving attitudes** | 0.49 | -51% | p=0.06 |
| **Tolerance of deviance** | 0.44 | -56% | p=0.02 |

As shown in Table 9, logistic regression revealed that, for males, as age at the time of the first wave of the survey increases the chances of reporting planning to take driver education decreases by 79 percent. It was also found that having reported being more supportive of the program increases the likelihood of male teens reporting that they plan to take driver education by 91 percent. Finally, having a higher score on the Tolerance of deviance scale (indicating greater acceptance of a variety of deviant behaviors) decreases the likelihood of reporting planning to take driver education by 56 percent.

| Table 10: Logistic regression with DE status as dependent variable: Females | | | |
|---|---|---|---|
| **Factor (N=210)** | **Odds ratio** | **%** | **p-value** |
| **Age at survey** | 0.35 | -65% | p=0.08 |
| **GDL overall support** | 2.06 | +106% | p=0.10 |
| **Safe driving knowledge** | 0.68 | -32% | p=0.06 |
| **Risky driving attitudes** | 2.54 | +154% | p=0.09 |
| **Risk taking attitudes** | 8.99 | +799% | p=0.02 |
| **Tolerance of deviance** | 0.16 | -84% | p=0.02 |
| **Parental monitoring** | 0.27 | -73% | p=0.10 |
| **Time perspective** | 0.28 | -72% | p=0.05 |

As for females, logistic regression revealed that having a higher Risk taking attitudes score (indicating higher agreement with a list of risk taking behaviors) increases the chances of reporting planning to take driver education by 799 percent. Finally, having a higher score on the Time perspective scale (indicating a greater willingness to engage in planning) interestingly decreases the likelihood of females reporting that they plan to take driver education by 72 percent.

### *Longitudinal Comparisons*

This set of analyses reports results for students in the HSDE and Non-DE groups participating in both the first and second waves of the survey.

Group Characteristics: Table 11 provides information on the age, gender, and license status of participants in the HSDE and Non-DE groups during the first and second waves of the survey.

| Table 11: Group Characteristics: Longitudinal Comparisons | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | HSDE Group Wave 1 | HSDE Group Wave 2 | Non-DE Group Wave 1 | Non-DE Group Wave 2 |
| **Mean Age** | 15 years, 9 months | 16 years, 1 month | 15 years, 7 months | 15 years, 10 months |
| | SD=0.36 (4.32 months) n=410 | SD=0.37 (4.44 months) n=396 | SD=0.41 (4.92 months) n=332 | SD=0.51 (6.12 months) n=327 |
| **Gender** | | | | |
| **Males** | 48% (n=201) | 47% (n=200) | 44% (n=154) | 45% (n=159) |
| **Females** | 52% (n=219) | 53% (n=225) | 57% (n=199) | 55% (n=195) |
| **License Status** | | | | |
| **No License** | 64% (n=272) | 1% (n=6) | 97% (n=344) | 91% (n=323) |
| **Learner's License** | 34% (n=146) | 94% (n=398) | 3% (n=9) | 8% (n=28) |
| **Intermediate License** | 1% (n=4) | 5% (n=19) | 0% (n=0) | 0.3% (n=1) |

Table 11 also shows that the HSDE groups comprised approximately equal numbers of males and females during the first and second waves. The Non-DE groups had slightly higher proportions of females in both waves.

The majority of the HSDE group in Wave 1 was not licensed; they almost all had a Learner license in Wave 2. Almost the entire Non-DE group was not licensed in Wave 1, and this was also the case in Wave 2.

The differences in licensing status of the HSDE and Non-DE groups are largely explained by the fact that students can obtain a Learner license at age 15½ years if they are enrolled in the Manitoba HSDE program, but at age 16 if they are not enrolled in this program. The average ages of the Non-DE group when surveyed in Waves 1 and 2 were 15 years 7 months and 15 years 10 months, respectively, so many were not eligible to obtain a Learner license.

Graduated Licensing: Four measures in the questionnaire related to graduated licensing, and the results appear in a series of tables – knowledge about the program (Table 12 and Table 13), and support for it (both in general and for the specific features of the program), as well as the extent to which students believe it has influenced or will influence their driving behavior (Table 14). Table 12 and Table 14 are formatted in the same manner. The first column describes the variable or dimension being measured, and the next column shows the number of items in the questionnaire that make up that index or scale. The next two columns present the results from the paired comparisons that examine changes from Wave 1 to Wave 2 for both HSDE and Non-DE groups. The values for each group are means collapsed across the total number of items for the corresponding group. The standard deviations of the mean scores are also provided. The final two columns present the results from the independent (between group) comparisons during Wave 1 and Wave 2. In each case, the number of students in a group is shown. Also shown is the p-value from the t-test. If paired t-tests revealed significant results at the less than 0.05 level for the HSDE group or the Non-DE group from Wave 1 to Wave 2, the data were examined further using Two-way factorial ANOVA. This test measures the effect of two independent variables, and the interaction of these variables, on a continuous dependent variable (e.g., knowledge about the program). Where these additional analyses have been conducted, results of the Two-way factorial ANOVA are appended to the bottom of the tables when significant interaction effects were found.

Table 12 presents the results for knowledge about the graduated licensing program. The paired (within group) comparisons show that neither the HSDE group nor the Non-DE group showed a statistically significant increase in knowledge about the program, although the change among HSDE students, which was in the appropriate direction, did approach significance (p=0.07). Additionally, while the HSDE group showed an increase, albeit a small one, in knowledge about graduated licensing following exposure to driver education, no comparable increase occurred among the Non-DE students over a similar time period. Moreover, a comparison of the HSDE and Non-DE groups in Wave 1 showed that the HSDE group had greater knowledge at that time. This initial difference was sustained at Wave 2.

**Table 12: Graduated Licensing Knowledge Scores: Longitudinal Comparison**

| | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Paired Comparisons** | | | | **Independent Comparisons** | | | |
| | | **HSDE Wave 1** | **HSDE Wave 2** | **Non-DE Wave 1** | **Non-DE Wave 2** | **HSDE Wave 1** | **Non-DE Wave 1** | **HSDE Wave 2** | **Non-DE Wave 2** |
| **GDL Knowledge** | 17 | n=425 | n=425 | n=355 | n=355 | n=425 | n=355 | n=425 | n=355 |
| | | 13.53 | 13.83 | 11.67 | 11.43 | 13.53 | 11.67 | 13.83 | 11.43 |
| | | SD=2.94 | SD=3.26 | SD=3.64 | SD=3.94 | SD=2.94 | SD=3.64 | SD=3.27 | SD=3.94 |
| | | p=0.07 | | p=0.31 | | p<0.01 | | p<0.01 | |

Two-way factorial ANOVA (results discussed but not shown in table) revealed that the DE status (HSDE versus Non-DE) significantly affects the model (p<0.01); however, the wave of the survey (Wave 1 versus Wave 2) did not (p=0.84). When combining the effect of both driver education and the wave of the survey, the interaction effect of the two is not statistically significant (p=0.12).

This analysis was performed again including both age and gender as additional independent variables. These results revealed that DE status (HSDE versus Non-DE) significantly affects the model (p<0.00), and the wave of the survey (Wave 1 versus Wave 2) does not ($p=0.25$). Age also did not significantly affect the model ($p=0.87$), but gender did ($p<0.01$). When combining the effect of both driver education and the wave of the survey, the interaction effect of the two was not statistically significant ($p=0.13$). Thus, the increase in mean knowledge from Wave 1 to Wave 2 for the HSDE group is not significantly different than the change in mean knowledge from Wave 1 to Wave 2 for the Non-DE group.

It is noteworthy that on approximately five of the 17 knowledge items, students in both groups either did not know the answer, or answered incorrectly. Even the HSDE group, following exposure to the program, answered an average of four items incorrectly.

An item-by-item analysis of the GDL knowledge items appears in Appendix C. It shows the percent of respondents who selected the items correctly. A review of these results shows that the HSDE group had an increase in knowledge on 10 of the 17 items from the first to second wave of the survey, but so did the Non-DE group. However, the differential improvement between the groups is reflected in the magnitude of the changes noted. For example, item 2a asked (during the Intermediate license phase) if driving home from school with one teenage friend in the car is allowed. It was found that in the HSDE group approximately 86 percent answered this item correctly during Wave 1, and about 92 percent answered correctly in the second wave. By contrast, only 74 percent of the Non-DE group responded correctly in Wave 1, with 77 percent answering correctly in Wave 2.

Table 13 presents the items which 20 percent or more of the HSDE group in Wave 2 answered incorrectly. The survey question asked the respondent to indicate which of a series of activities were permitted during the learner and intermediate phase. It is noteworthy that the majority of errors occurred on items related to the Intermediate licensing stage, suggesting that the HSDE program may have failed to cover these GDL features adequately. However, most of the respondents were still in the learner stage, so the requirements of the intermediate stage were not yet relevant to them and they may not have retained the HSDE information about the intermediate phase of the GDL program.

**Table 13: Percent Incorrect for Graduated Licensing Knowledge Items**

| | Graduated Licensing Question<br>Which of the following are permitted? | HSDE Group Wave 2 Percent Incorrect |
|---|---|---|
| **Learner Phase** | 1g. Driving with a supervising driver whose blood alcohol exceeds .05 | 20% |
| **Intermediate License Phase** | 2c. Driving home from school with two teenage friends in the front seat of your car | 29% |
| | 2d. Driving home from your job at 1am | 47% |
| | 2e. Driving home from your friends at 1am with only 3 teenage friends in the car | 24% |
| | 2f. Driving home from school with one teenage friend in the front seat and three in the backseat | 21% |
| | 2i. Talking on a hand-held cell phone while you are driving | 21% |
| | 2j. Talking on a hands-free cell phone while you are driving | 34% |

Table 14 presents information on overall support for the program, support for the various requirements, and the influence of the program on safe driving. Overall support for the program was quite high initially and did not change from Wave 1 to Wave 2 for either group. Support for the specific requirements was also high in both groups during Wave 1 and Wave 2, but of some interest, there was a significant decrease in support among the HSDE group. The reasons for this are not evident. The difference in the decrease in support for the specific requirements of the program from Wave 1 to Wave 2 for the HSDE group compared to the Non-DE group was further investigated using Two-way factorial ANOVA. Results revealed that DE status does not significantly affect the model (p=0.35). The wave of the survey (Wave1 versus Wave 2), however, does (p=0.02). The interaction of the two was not significant (p=0.42).

When gender and age were added to the model, the effect of DE on the model remained insignificant (p=0.24), and wave remained significant (p=0.03). Age also significantly affects the model (p=0.02), as does gender (p<0.01). The interaction between DE and wave remains insignificant (p=0.36). Thus, there is no significant difference between the HSDE group and the Non-DE group in terms of support for the specific requirements of the program.

**Table 14: Graduated Licensing Scores: Longitudinal Comparison**

| Measure | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| GDL Overall Support | 1 | n=365 | n=365 | n=293 | n=293 | n=388 | n=323 | n=400 | n=321 |
| | | 3.82 | 3.77 | 3.76 | 3.77 | 3.83 | 3.74 | 3.76 | 3.75 |
| | | SD=1.00 | SD=1.08 | SD=0.88 | SD=0.95 | SD=1.00 | SD=0.88 | SD= 1.07 | SD=0.96 |
| | | p=0.35 | | p=0.90 | | p=0.22 | | p=0.90 | |
| GDL Support-Specific Req. | 5 | n=392 | n=392 | n=312 | n=312 | n=406 | n=332 | n=408 | n=332 |
| | | 3.72 | 3.58 | 3.64 | 3.57 | 3.71 | 3.61 | 3.56 | 3.56 |
| | | SD=0.85 | SD=0.95 | SD=0.81 | SD=0.86 | SD= 0.87 | SD=0.84 | SD=0.96 | SD=0.86 |
| | | p<0.01 | | p=0.12 | | p=0.10 | | p=0.98 | |
| GDL Influence | 3 | n=301 | n=301 | n=135 | n=135 | n=316 | n=190 | n=403 | n=203 |
| | | 3.94 | 3.86 | 3.62 | 3.64 | 3.94 | 3.66 | 3.84 | 3.66 |
| | | SD=0.86 | SD=0.92 | SD=0.99 | SD=1.03 | SD=0.86 | SD=0.95 | SD=0.93 | SD=0.97 |
| | | p=0.16 | | p=0.69 | | p<0.01 | | p=0.03 | |

Both groups strongly believe that the GDL program has a positive impact on their driving behavior, but the HSDE group was significantly more positive than the Non-DE group both before and after driver education. However, there was no apparent change associated with exposure to driver education.

Safe Driving Knowledge: Fourteen multiple choice items assessed safe driving knowledge. As shown in Table 15, the HSDE group showed no improvement in safe driving knowledge from Wave 1 to Wave 2. On the other hand, the Non-DE group showed a significant change, but this represented a decline in knowledge.

Two-way factorial ANOVA was used to further investigate the difference from Wave 1 to Wave 2 for the DE group compared to the Non-DE group (results discussed but not shown in table). Analyses of the difference in the decrease in safe driving knowledge from Wave 1 to Wave 2 revealed that DE status (HSDE versus Non-DE) significantly affects the model ($p<0.01$), but the wave of the survey does not (Wave 1 versus Wave 2; $p=0.66$). More importantly, when combining the effect of both driver education and the wave of the survey, the interaction effect of the two is not statistically significant ($p=0.79$).

**Table 15: Safe Driving Knowledge Scores: Longitudinal Comparison**

| Measure | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| Safe Driving Knowledge | 14 | n=425 | n=425 | n=355 | n=355 | n=425 | n=355 | n=425 | n=355 |
| | | 7.15 | 7.13 | 5.51 | 5.43 | 7.15 | 5.51 | 7.13 | 5.43 |
| | | SD=2.22 | SD=2.28 | SD=2.28 | SD=2.35 | SD=2.22 | SD=2.28 | SD=2.28 | SD=2.35 |
| | | p=0.50 | | p=0.01 | | p<0.01 | | p<0.01 | |

This analysis was performed again including both age and gender as additional independent variables. The level of significance of DE status remained the same ($p<0.01$). The wave of the survey was, however, not significant ($p=0.95$). Age does significantly affect the model ($p=0.04$), but gender does not ($p=0.51$). These results revealed that the interaction effect of both driver education and the wave of the survey remains non-significant ($p=0.74$). Thus, there is no significant difference in the change from Wave 1 and Wave 2 between the HSDE group and the Non-DE group in terms of safe driving knowledge.

Even though there was no statistically significant change from Wave 1 to Wave 2, the DE group had significantly greater safe driving knowledge than the Non-DE group both before and after driver education. Again, this initial difference might be accounted for by the fact that many of the students in the HSDE group were actually in the process of taking driver education at the time of the first survey. In this regard, some may have read the Drivers' Handbook in order to be ready for the Learners license test, which happens early in the course.

Regardless of the greater level of knowledge among the HSDE group, their average scores indicate that even they have relatively low levels of knowledge about safe driving practices that should have been covered in their curriculum, since they either failed to answer or answered incorrectly nearly half of the 14 items. At the same time, the knowledge items were relatively difficult, since easy ones (those that most students answered correctly) had been dropped from the questionnaire as a result of pre-testing.

An item-by-item analysis of responses to the safe driving knowledge questions is contained in Appendix D. It shows the percent of respondents in each of the groups during the first and second waves of the survey that selected each of the multiple choice alternative answers. There was an increase in the percent correct among the

HSDE group on 10 of the 14 items from the first to the second wave; by contrast, the Non-DE group showed an increase in the percent correct for only five of the items. Table 16 provides a summary by listing those items which 20 percent or more of the respondents in the HSDE group during Wave 2 got wrong (refer to Appendix D for the complete wording of the item). As can be seen, some of the items were answered incorrectly by over 60 percent of the teens in the HSDE group, even after completing driver education. The percentages shown in Table 16 include incorrect and unanswered responses, so they do not correspond directly to the percentage shown in Appendix D.

**Table 16: Percent Incorrect for Safe Driving Knowledge Item by Item Analysis**

| | Safe Driving Knowledge Question | HSDE Group Wave 2 Percent Incorrect |
|---|---|---|
| **1.** | **When changing lanes, you can check your blind spot by:** | 73% |
| **3.** | **What is the most common cause of minor accidents among teens?** | 80% |
| **4.** | **A car going twice as fast as another would strike an object how much harder?** | 49% |
| **5.** | **What is most important in preventing a vehicle from going off the road in a curve?** | 28% |
| **8.** | **To safely drive into a curve, you should:** | 64% |
| **9.** | **Which of the following best describes where you should be looking when driving:** | 61% |
| **10.** | **What is the most common cause of serious injury accidents among teens?** | 63% |
| **11.** | **The most common type of accident at entrances to freeways (expressways) is:** | 65% |
| **12.** | **Because of their faster reaction time, teens deal with which of the following situations better than typical 40 year old drivers:** | 69% |
| **13.** | **Which of the following accident types result in the greatest number of deaths to teenage drivers and their passengers each year?** | 59% |
| **14.** | **On a wet road, hydroplaning can be caused by:** | 26% |

<u>Self-rated Skills:</u> Students were asked to rate on a five-point scale how good they thought their driving skills were (or, for those not yet driving, how good they would be when they started driving) for handling 16 different driving maneuvers. Results are shown in Table 17. As can be seen, both groups were quite positive about their skills, giving a rating in excess of three on the five-point scale. Of some note, the HSDE group showed a significant change following exposure to the driver education program, rating their skills as better than they anticipated prior to driver education. The Non-DE group did not show a significant change.

The analysis also showed that in Wave 1 the HSDE group had significantly more confidence in their skills than the Non-DE group. This difference could be attributable to exposure to the course (keeping in mind that many of the students were already enrolled in the driver education program) or to the characteristics of those who choose to take driver education. The difference was sustained in the second wave, but the self-rated improvement changed more in the HSDE group. This improvement cannot be ascribed to differences in the characteristics of those who take driver education; it seems more likely that the changes are associated with exposure to the course.

Two-way factorial ANOVA was used to further investigate the difference in the increase in self-rated skills from Wave 1 to Wave 2 for the HSDE group compared to the Non-DE group. Analyses revealed that DE status (HSDE versus Non-DE) significantly affects the model (see Table 17). The wave of the survey (Wave 1 versus Wave 2) also had a significant effect on the model. More importantly, when combining the effect of both driver education and the wave of the survey, the interaction effect of the two did not reach significance at the 0.05 level (p=0.09). Two-way factorial ANOVA analysis was also performed including both age and gender as additional independent variables. Both DE status and the wave of the survey significantly affect the model. Age does not significantly affect the model. Gender does not significantly affect the model at the 0.05 level. More importantly, these results revealed that the interaction effect of both driver education and the wave of the survey was not significant at the 0.05 level (p=0.09).

**Table 17: Self-rated Skills Scores**

| Measure | # of items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | HSDE WAVE 1 | HSDE WAVE 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE WAVE 1 | Non-DE Wave 1 | HSDE WAVE 2 | Non-DE Wave 2 |
| Self-Rated Skills | 16 | n=354 | n=354 | n=263 | n=263 | n=380 | n=301 | n=394 | n=307 |
| | | 3.72 | 3.89 | 3.59 | 3.64 | 3.73 | 3.57 | 3.90 | 3.65 |
| | | SD=0.56 | SD=0.62 | SD=0.65 | SD=0.65 | SD= 0.57 | SD=0.66 | SD=0.61 | SD=0.68 |
| | | p<0.01 | | p=0.27 | | p<0.01 | | p<0.01 | |

| Measure | # of items | Two-way factorial ANOVA | | | | |
|---|---|---|---|---|---|---|
| | | Factor | df | F | Prob > F | |
| Self-Rated Skills | 16 | Model | 3 | 14.60 | p<0.000 | n=1234<br>$R^2$=0.0344<br>Adj $R^2$=0.0320 |
| | | DE | 1 | 29.89 | p<0.000 | |
| | | Wave | 1 | 9.16 | p=0.003 | |
| | | Wave*DE | 1 | 2.93 | p=0.087 | |

| Measure | # of items | Two-way factorial ANOVA (including age and gender) | | | | |
|---|---|---|---|---|---|---|
| | | Factor | df | F | Prob > F | |
| Self-Rated Skills | 16 | Model | 9 | 4.76 | p<0.000 | n=1168<br>$R^2$=0.036<br>Adj $R^2$=0.028 |
| | | DE | 1 | 18.8 | p<0.000 | |
| | | Wave | 1 | 8.15 | p=0.004 | |
| | | Age | 5 | 0.77 | p=0.569 | |
| | | Gender | 1 | 2.94 | p=0.087 | |
| | | Wave*DE | 1 | 2.94 | p=0.087 | |

Thus, the improvement in self-rated driving skills in the HSDE group from Wave 1 to Wave 2 is larger (although not significantly so at the 0.05 level) than the improvement in self-rated driving skills from Wave 1 to Wave 2 for the Non-DE group. It should be noted, however, that the improvement in self-rated driving skills for both groups was quite small (0.17 for the DE group compared to 0.05 for the Non-DE group), suggesting the magnitude of the influence of exposure to DE on self-rated driving skills is not very large.

Collision Likelihood: Survey respondents were also asked about the likelihood they would be involved in a collision or injured in one while driving during the coming year. Results are shown in Table 18. In the first wave both groups saw this as relatively unlikely.

Of considerable note, the HSDE group actually rated their chances as significantly less likely following exposure to driver education. This is consistent with other research (DeJoy 1989; Finn & Bragg 1986; Matthews & Moran 1986; Svenson 1981; Svenson, Fischhoff, & MacGregor 1985), and the findings above on self-rated skills that show students who take driver education can perhaps become more confident and, therefore, less pessimistic about their chances of being involved in a crash.

The decrease in perceived likelihood of accident or injury from Wave 1 to Wave 2 for the HSDE group compared to the Non-DE group was further investigated using Two-way factorial ANOVA (results discussed but not shown in table). Results indicate that DE status does not significantly affect the model (p=0.59), and neither does the wave of the survey at the 0.05 level, but does approach significance (p=0.06). Taken together, the interaction of HSDE versus Non-DE and the wave of the survey were not significant.

**Table 18: Collision Involvement Scores: Longitudinal Comparison**

| Measure | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| Perceived Likelihood of Accident or Injury | 2 | n=394 | n=394 | n=302 | n=302 | n=406 | n=328 | n=412 | n=323 |
| | | 2.43 | 2.23 | 2.31 | 2.29 | 2.42 | 2.30 | 2.24 | 2.27 |
| | | SD=1.02 | SD=0.99 | SD=1.04 | SD=1.09 | SD=1.03 | SD=1.05 | SD=1.01 | SD=1.09 |
| | | p<0.01 | | p=0.85 | | p=0.11 | | p=0.71 | |

Two-way factorial ANOVA analysis was also performed including both age and gender as additional independent variables. Results revealed that DE status did not significantly affect the model (p=0.41) as was the case for the wave of the survey (p=0.08). Age did not significantly affect the model (p=0.21), and neither did gender (p=0.40). More importantly, the interaction effect of both DE status and the wave of the survey was not significant (p=0.11) when controlling for age and gender. Thus, the decrease in perceived likelihood of accident or injury from Wave 1 to Wave 2 in the HSDE group is not significantly different from that of the Non-DE group.

Problem Behaviors: A number of scales/items included in the New Driver Questionnaire tapped various dimensions of problem/risky behaviors, and the results for these separate measures are summarized in Table 19.

On average, prior to and following driver education, the two groups both indicated that they would rarely engage in the listed risk taking behaviors. However, the Non-DE group was significantly more likely to say they engaged in the risky behaviors during the second wave of the survey. No such change was detected in the HSDE groups following exposure to driver education.

Two-way factorial ANOVA was used to further investigate the difference in risk taking behavior from Wave 1 to Wave 2 for the HSDE group compared to the Non-DE group (see Table 19). The analyses revealed that although the effect of DE status and the wave of the survey were both non-significant, the interaction effect of the two was significant (p=0.026).

Two-way factorial ANOVA analysis was again performed including both age and gender as additional independent variables (see Table 19). Results revealed that DE status did not significantly affect the model and the wave of the survey also did not. Age did significantly affect the model, and so did gender. More importantly, the interaction effect of both DE status and the wave of the survey was significant (p=0.02). Thus, the change in risk taking behavior from Wave 1 to Wave 2 in the HSDE group is significantly different from that of the Non-DE group.

**Table 19: Problem Behavior Scores: Longitudinal Comparison**

| **Measure** | **# of items** | **Driver Education Status** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Paired Comparisons** | | | | **Independent Comparisons** | | | |
| | | **HSDE Wave 1** | **HSDE Wave 2** | **Non-DE Wave 1** | **Non-DE Wave 2** | **HSDE Wave 1** | **Non-DE Wave 1** | **HSDE Wave 2** | **Non-DE Wave 2** |
| **Risk Taking Behavior** | 8 | n=366 | n=366 | n=283 | n=283 | n=383 | n=313 | n=405 | n=316 |
| | | 1.80 | 1.75 | 1.72 | 1.89 | 1.81 | 1.74 | 1.75 | 1.88 |
| | | SD=0.83 | SD=0.85 | SD=0.79 | SD=0.90 | SD= 0.83 | SD=0.79 | SD=0.84 | SD=0.89 |
| | | p=0.28 | | p<0.01 | | p=0.24 | | p=0.05 | |
| **Measure** | **# of Items** | **Two-way factorial ANOVA** | | | | | | | |
| | | **Factor** | | **df** | **F** | | **Prob > F** | | |
| **Risk Taking Behavior** | 8 | Model | | 3 | 2.08 | | p=0.101 | n=1298<br>$R^2$=0.005<br>Adj $R^2$= 0.003 | |
| | | DE | | 1 | 0.43 | | p=0.512 | | |
| | | Wave | | 1 | 1.47 | | p=0.226 | | |
| | | Wave*DE | | 1 | 4.94 | | p=0.026 | | |
| **Measure** | **# of Items** | **Two-way factorial ANOVA (including age and gender)** | | | | | | | |
| | | **Factor** | | **df** | **F** | | **Prob > F** | | |
| **Risk Taking Behavior** | 8 | Model | | 9 | 9.30 | | p<0.000 | n=1228<br>$R^2$=0.064<br>Adj $R^2$= 0.057 | |
| | | DE | | 1 | 0.16 | | p=0.685 | | |
| | | Wave | | 1 | 1.35 | | p=0.245 | | |
| | | Age | | 5 | 2.56 | | p=0.026 | | |
| | | Gender | | 1 | 63.05 | | p<0.000 | | |
| | | Wave*DE | | 1 | 5.11 | | p=0.024 | | |
| **Measure** | **# of items** | **Driver Education Status** | | | | | | | |
| | | **Paired Comparisons** | | | | **Independent Comparison** | | | |
| | | **HSDE Wave 1** | **HSDE Wave 2** | **Non-DE Wave 1** | **Non-DE Wave 2** | **HSDE Wave 1** | **Non-DE Wave 1** | **HSDE Wave 2** | **Non-DE Wave 2** |
| **Risky Driving Behavior** | 23 | n=114 | n=114 | n=15 | n=15 | n=123 | n=26 | n=123 | n=47 |
| | | 1.51 | 1.59 | 2.52 | 2.81 | 1.53 | 2.29 | 1.60 | 2.33 |
| | | SD=0.50 | SD=0.54 | SD=1.02 | SD=1.18 | SD=0.51 | SD=1.20 | SD=0.55 | SD=1.19 |
| | | p=0.15 | | p=0.28 | | p<0.01 | | p<0.01 | |

| Table 19: Problem Behavior Scores: Longitudinal Comparison | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Measure | # of items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparison | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| Risky Driving Attitude | 10 | n=348 | n=348 | n=264 | n=264 | n=380 | n=301 | n=389 | n=306 |
| | | 2.67 | 2.48 | 2.67 | 2.67 | 2.67 | 2.67 | 2.50 | 2.66 |
| | | SD=0.83 | SD 0.80 | SD=0.75 | SD=0.76 | SD=0.82 | SD=0.73 | SD=0.82 | SD=0.77 |
| | | p<0.01 | | p=0.93 | | p=0.92 | | p=0.01 | |
| Measure | # of Items | Two-way factorial ANOVA | | | | | | | |
| | | Factor | | df | F | | Prob > F | | |
| Risky Driving Attitude | 10 | Model | | 3 | 4.60 | | p=0.003 | n=1224<br>R²=0.011<br>Adj R²= 0.009 | |
| | | DE | | 1 | 4.05 | | p=0.044 | | |
| | | Wave | | 1 | 4.41 | | p=0.036 | | |
| | | Wave*DE | | 1 | 4.01 | | p=0.046 | | |
| Measure | # of items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparison | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| Risk Taking Attitude | 16 | n=339 | n=339 | n=251 | n=251 | n=370 | n=286 | n=384 | n=305 |
| | | 2.19 | 2.10 | 2.20 | 2.18 | 2.20 | 2.21 | 2.11 | 2.21 |
| | | SD=0.82 | SD=0.82 | SD=0.77 | SD=0.84 | SD=0.82 | SD=0.76 | SD=0.82 | SD=0.83 |
| | | p=0.03 | | p=0.63 | | p=0.97 | | p=0.11 | |
| Measure | # of items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparison | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| Lifestyle | 8 | n=372 | n=372 | n=283 | n=283 | n=391 | n=305 | n=399 | n=322 |
| | | 3.96 | 4.05 | 4.04 | 4.08 | 3.97 | 4.03 | 4.05 | 4.06 |
| | | SD=0.85 | SD=0.87 | SD= 0.77 | SD=0.77 | SD=0.84 | SD=0.76 | SD=0.86 | SD=0.76 |
| | | p=0.09 | | p=0.33 | | p=0.31 | | p=0.79 | |
| Measure | # of items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparison | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| Tolerance of Deviance | 6 | n=371 | n=371 | n=285 | n=285 | n=388 | n=307 | n=403 | n=321 |
| | | 1.79 | 1.74 | 1.79 | 1.85 | 1.79 | 1.82 | 1.73 | 1.86 |
| | | SD=0.77 | SD=0.76 | SD= 0.76 | SD=0.88 | SD=0.76 | SD=0.77 | SD=0.75 | SD=0.86 |
| | | p=0.19 | | p=0.24 | | p=0.60 | | p=0.03 | |

A related set of scales on risky and unsafe driving behaviors asked those students who had driven in the past three months to indicate how often they had engaged in 23 listed behaviors. Again, the two groups indicated on average that they rarely engaged in these behaviors, and no changes were detected from Wave 1 to Wave 2. However, both prior to and following driver education, the HSDE group said they were less likely to engage in risky driving than the Non-DE group.

Consistent with the findings on reported behaviors, the DE group showed a change in risky driving attitudes following exposure to driver education that indicated less accepting attitudes. The Non-DE group showed no change, although both groups generally disagreed with the listed behaviors.

As shown in Table 19, Two-way factorial ANOVA analyses of the difference in the change in risky driving attitude from Wave 1 to Wave 2 revealed that DE status (HSDE versus Non-DE) significantly affects the model as does the wave of the survey (Wave 1 versus Wave 2). Of interest, when combining the effect of both driver education and the wave of the survey, the interaction effect of the two is statistically significant (p=0.046).

Two-way factorial ANOVA analysis was again performed including both age and gender as additional independent variables (results discussed but not shown in table). Results revealed that DE status did not significantly affect the model (p=0.17) and the wave of the survey also does not (p=0.13). Age did not significantly affect the model (p=0.28), but gender did (p<0.00). More importantly, the interaction effect of both exposure to DE and the wave of the survey was not significant (p=0.10). Thus, the change in risky driving attitude from Wave 1 to Wave 2 in the HSDE group is not significantly different from that of the Non-DE group when controlling for age and gender.

The difference between the groups in attitudes toward risk taking in general during Wave 1 and Wave 2 was not significant. However, the HSDE group showed a small but significant change in their attitudes toward risk taking following exposure to driver education – they indicated less accepting attitudes.

The difference in the decrease in risk taking attitude from Wave 1 to Wave 2 for the HSDE group compared to the Non-DE group was further investigated using Two-way factorial ANOVA (results discussed but not shown in table). Results revealed that DE status does not significantly affect the model (p=0.37), and neither does the wave of the survey (Wave 1 versus Wave 2; p=0.27). The interaction effect when combining both driver education and the wave of the survey was not significant (p=0.52).

When examining the results of the Two-way factorial ANOVA including gender and age in the model, DE status (HSDE versus Non-DE) does not significantly affect the model (p=0.32). The wave of the survey also does not significantly affect the model (p=0.28). Age also does not significantly affect the model (p=0.08), but gender does (p<0.01). The interaction of DE status and Wave is, however, insignificant in this model (p=0.35). Therefore, the decrease in risk taking attitude from Wave 1 and Wave 2 in the HSDE group is not significantly different from the decrease in risk taking attitude in the Non-DE group.

The difference in lifestyle scores between the groups during Wave 1 and Wave 2 was not significant; neither group showed any significant change from the first to second wave of the survey.

The difference between the groups in Tolerance of deviance during Wave 1 was not significant. However, the analyses showed that during the second wave, following exposure to driver education, the HSDE group was significantly less accepting of the behaviors than the Non-DE group. Although the HSDE group appeared less accepting and the Non-DE group more accepting of the behaviors from the first wave to the second wave, these changes were not statistically significant.

Parental Monitoring: As shown in Table 20, there were no significant changes in either group in the extent to which students said they were likely to follow their parents' values and advice and to accept monitoring by them. Wave 1 and Wave 2 results for the groups were also not different.

**Table 20: Parental Monitoring Scores: Longitudinal Comparison**

| Measure | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| Parental Monitoring | 4 | n=368 | n=368 | n=294 | n=294 | n=390 | n=313 | n=399 | n=325 |
| | | 4.03 | 4.00 | 3.97 | 4.01 | 4.02 | 3.94 | 3.99 | 3.99 |
| | | SD=0.74 | SD=0.77 | SD=0.77 | SD=0.80 | SD=0.74 | SD=0.77 | SD=0.77 | SD=0.80 |
| | | p=0.47 | | p=0.38 | | p=0.18 | | p=0.96 | |

Exposure: As can be seen in Table 21, there was a significant increase in exposure estimates in the HSDE group from Wave 1 to Wave 2, likely owing to the fact that many had become licensed and were driving.

Two-way factorial ANOVA was used to further investigate the increase in driving exposure from Wave 1 to Wave 2 for the HSDE group compared to the Non-DE group (results discussed but not shown in table). Results revealed that DE status (HSDE versus Non-DE) significantly affects the model ($p<0.01$), but the wave of the survey does not ($p=0.57$). The interaction effect of both the wave of the survey and DE status was also not significant ($p=0.12$).

When examining the results of the Two-way factorial ANOVA including gender and age in the model, DE status (HSDE versus Non-DE) significantly affects the model ($p<0.01$), but the wave of the survey does not ($p=0.63$). Age significantly affects the model ($p=0.02$), but gender does not ($p=0.28$). More importantly, the interaction of DE status and the wave of the survey is not significant ($p=0.32$). Therefore, the increase in driving exposure from Wave 1 and Wave 2 in the HSDE group is not significantly different from the increase in driving exposure in the Non-DE group.

**Table 21: Exposure Scores: Longitudinal Comparison**

| Measure | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| Exposure | 13 | n=99 | n=99 | n=12 | n=12 | n=107 | n=21 | n=343 | n=44 |
| | | 2.18 | 2.35 | 3.22 | 2.85 | 2.15 | 2.73 | 2.31 | 2.49 |
| | | SD=0.76 | SD=0.76 | SD=1.01 | SD=1.23 | SD=0.76 | SD=1.33 | SD=0.74 | SD=1.07 |
| | | p=0.04 | | p=0.29 | | p=0.01 | | p=0.13 | |

Time Perspective: As shown in Table 22, there were no significant changes in time perspective scores (willingness to engage in planning) from Wave 1 to Wave 2; there were also no significant differences between the HSDE and Non-DE groups either before or after driver education.

| Table 22: Time Perspective Scores: Longitudinal Comparison | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Measure | # of Items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | HSDE Wave 1 | HSDE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | HSDE Wave 1 | Non-DE Wave 1 | HSDE Wave 2 | Non-DE Wave 2 |
| Time Perspective | 7 | n=355 | n=355 | n=281 | n=281 | n=384 | n=304 | n=392 | n=320 |
| | | 2.82 | 2.84 | 2.87 | 2.87 | 2.83 | 2.86 | 2.84 | 2.86 |
| | | SD=0.78 | SD=0.93 | SD=0.77 | SD= 0.81 | SD=0.78 | SD=0.77 | SD=0.93 | SD=0.80 |
| | | p=0.72 | | p=0.87 | | p=0.63 | | p=0.73 | |

Responsibility when Driving: Responsibility when driving was assessed using three items that asked teens to indicate how responsible they feel when driving for their own safety, the safety of passengers, and the safety of others outside their vehicle. As shown in Table 23, there were no significant changes in responsibility-when-driving scores from Wave 1 to Wave 2; there were also no significant differences between the DE and Non-DE groups either before or after driver education.

| Table 23: Responsibility When Driving Scores: Longitudinal Comparison | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Measure | # of Items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | DE Wave 1 | DE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | DE Wave 1 | Non-DE Wave 1 | DE Wave 2 | Non-DE Wave 2 |
| Responsibilit y When Driving | 3 | n=363 | n=363 | n=245 | n=245 | n=380 | n=298 | n=405 | n=288 |
| | | 4.40 | 4.43 | 4.39 | 4.35 | 4.40 | 4.40 | 4.42 | 4.32 |
| | | SD=0.70 | SD=0.69 | SD=0.69 | SD=0.80 | SD=0.70 | SD=0.6 6 | SD=0.7 0 | SD=0.6 8 |
| | | p=0.56 | | p=0.52 | | p=0.99 | | p=0.95 | |

### *Summary*

As part of this investigation, the study reported here sought to determine if there are pre-existing differences between students who plan and do not plan on taking driver education, and if exposure to Manitoba high school driver education was associated with changes in a variety of student outcomes, such as safe driving knowledge, self-rated driving skills, attitudes and opinions about risk taking, and related lifestyle issues.

Students who planned on taking driver education, compared with those who did not:

- Were generally younger, female, and had no license;
- Were more in favor of the GDL program in general, more supportive of its features, and believed more strongly that the program will benefit them in terms of safe driving;
- Were less tolerant of deviant behavior – e.g., more likely to indicate that damaging public property was unacceptable;

- Were more likely to follow their parents' values and advice and to accept monitoring by their parents; and,
- Were much more likely to think about the future.

Students who planned on taking driver education were similar to those who did not in terms of safe driving knowledge, self-rated driving skills, the perceived likelihood of being in an accident or injured in one, self-reported risk taking, attitudes toward risky driving that indicated a low propensity for taking risks, risk taking attitudes in general, and lifestyle.

Logistic regression revealed that several of the above factors, which were measured at the time of the baseline survey, were significantly (at 0.05 level) associated with being in the group that planned on taking driver education.

- As age increases, the chances of planning to take driver education decreases by 72 percent.
- Having reported being more supportive of the graduated licensing program increased the likelihood of teens reporting that they plan to take driver education by 80 percent.
- Having a higher Risk taking attitudes score (indicating higher acceptance of a list of risk-taking behaviors) increased the chances of planning to take driver education by 119 percent.
- Having a higher score on the Tolerance of deviance scale (indicating greater acceptance of a variety of deviant behaviors) decreased the likelihood of planning to take driver education by 43 percent.

No other variables in the model were found to have significant effects. The same model was also run for males and females, separately, and results were similar for both genders.

The longitudinal comparisons focused on "within" group changes using a pre-post design with a comparison group. In this regard, the survey was administered again to as many of the same students as possible several months later. This longitudinal approach permitted comparisons to be made of changes in such things as safe driving knowledge following exposure to driver education, compared to any changes that occurred in the group not exposed to driver education. It also revealed the extent to which these two groups differed on these factors in Wave 1 and Wave 2 of the survey. Results are shown below.

- The driver education group was significantly more informed about the provincial graduated licensing system and more positive than the non-driver education group about the impact of the graduated licensing program on their driving behavior, both in Wave 1 and Wave 2.
- No significant increase in knowledge about safe driving practices was found among the driver education group. However, they were significantly more knowledgeable than the Non-DE group, the latter of which actually showed a decline in safe driving knowledge.

- Despite the higher level of safe driving knowledge among the group that took driver education, the results also showed that their overall level of knowledge on the test items in the New Driver Questionnaire was quite low – on a majority of the questions, 60 percent or more of the respondents chose the wrong answer.
- Students who took driver education showed a significant change in self-rated driving skills following exposure to the program, rating their skills as significantly better than anticipated prior to driver education. Those in the Non-DE group did not show a significant change.
- Survey respondents were also asked about the likelihood they would be involved in a collision or injured in one while driving during the coming year. Even in the first wave of the survey, both groups saw this as relatively unlikely. Those who took driver education actually rated their chances as significantly less likely following exposure to driver education, but this change was not significantly different from that of the Non-DE group from Wave 1 to Wave 2 survey.

Previous research has shown that problem/risky behaviors among teens are highly inter-correlated (e.g., smoking, early drug use, normlessness), and that these problem behaviors are also predictive of crash involvement. Accordingly, a number of the scales/items in the New Driver Survey tapped various dimensions of such problem behaviors.

- On average, prior to and following driver education, the two groups both indicated that they would rarely engage in risky behaviors. However, during the second wave of the survey, the Non-DE group was significantly more likely to say they engaged in the risky behaviors than the HSDE group. No such change was detected in the HSDE group following exposure to driver education.
- The two groups indicated on average that they rarely engaged in risky and unsafe driving behaviors and no changes were detected from Wave 1 to Wave 2. However, both prior to and following driver education, the HSDE group said they were less likely to engage in the risky driving behaviors than the Non-DE group.
- The HSDE group became less accepting in their attitudes toward risky driving and toward risk taking in general following exposure to driver education. The Non-DE group showed no change. However, the interaction of DE status and wave of the survey, after controlling for age and gender, was not significant for these attitude scales.
- The difference between the groups during Wave 1 and Wave 2 was not significant in terms of Lifestyle items; neither group showed any significant change from the first to second wave of the survey.
- During the second wave, following exposure to driver education, the HSDE group was significantly less accepting of deviant behaviors than the Non-DE group, but the changes for both groups from Wave 1 to Wave 2 were not significant.

- There were also no significant changes in parental monitoring scores in either group from Wave 1 to Wave 2, and their results for the two waves were not different.
- The DE group recorded an increase in exposure estimates from Wave 1 to Wave 2, but the difference in changes for the HSDE and Non-DE groups from Wave 1 to Wave 2 were not significant.
- There were no significant changes in time perspective from Wave 1 to Wave 2 for either the HSDE or Non-DE groups.

## Student Outcomes: Survey of Teen Drivers and Their Parents

### *Background*

The present section describes a part of the investigation that uses a version of the New Driver Questionnaire to examine differences between groups of teen drivers who had taken the Manitoba Public Insurance High School Driver Education program (HSDE Group) and those who had not taken this course (Non-DE Group). The New Driver Questionnaire was administered to teen drivers in these two groups several months after their road test when they had accumulated several months of independent driving. Ideally, this sample should have been drawn from those teens participating in Wave 1 and 2 of the survey, but this was not possible due to logistical and time constraints that precluded surveying them again in high schools. Significant attrition of subjects had already occurred in the second wave primarily because some high schools participating in the first wave were unable to do so again, and further attrition would have occurred in a third wave of the survey. As well, some of these teens would have changed schools, or graduated from high school, and could not be tracked. For these reasons, a mail survey was used to recruit a new sample of teen drivers meeting the criteria for this part of the investigation.

Although MPI provides the only high school driver education in the province, there are some private providers of driving lessons, and some teen survey participants reported taking instruction from a professional instructor. Based on these survey responses, some analyses permit comparisons among four DE status groups, according to whether the teen driver reported: (1) HSDE only; (2) HSDE with additional private/commercial driving instruction; (3) private/commercial driving instruction; or (4) no HSDE or professional driver education at all.

All the teen drivers in this part of the study were in the Intermediate stage of the Manitoba GDL program; they had passed the road test and had been driving independently for three to 12 months. This section also examines the views, opinions, and practices of the parents of teens, comparing those parents whose teen had or had not taken the MPI HSDE program.

### *Purpose and Design*

The primary purpose of this segment of the research was to determine if there are meaningful differences between teen drivers who have and have not taken the MPI HSDE program, and are in the Intermediate stage of GDL – after they have passed the road test and are driving independently. Similar to the research described in earlier sections, the measures examined are:

- Safe Driving Knowledge;
- Self-Rated Skills;
- Risk Taking Behavior;
- Risky Driving Behavior;
- Risky Driving Attitude; and,
- Lifestyle.

The design involved a retrospective cross-sectional survey of teens with an Intermediate license, who have and have not taken the MPI HSDE program. In a retrospective survey design, subjects – i.e., teen drivers – answer questions related to their current and past experiences. A cross-sectional survey design means that information on teen drivers who have and have not taken driver education was gathered at one point in time – a “snapshot” of this population when they had held an Intermediate license for between three and 12 months.

Parents of these teen drivers were also surveyed to assess their views and practices regarding the process of learning to drive, driving privileges, and driver education. Since the HSDE program would have been completed when the HSDE group was in the learner stage of the GDL program, any differences in student outcomes between the HSDE and the other groups surveyed in this study may reflect intermediate or long-term effects of the HSDE program. Previous studies suggest that driver education programs have either no effect or, at best, only a short-term effect of a few months (Stock et al. 1983; Mayhew & Simpson 1996). Most of the previous studies focused on whether driver education was effective in reducing crashes and violations and not on whether driver education is associated with other variables, such as safe driving knowledge and attitudes or driving skills and practices. Accordingly, this portion of the study assesses whether exposure to the MPI HSDE program is associated with these variables after the teen driver has accumulated several months of experience driving independently. Non-DE teens constitute the primary comparison group to the HSDE group.

### *Method*

<u>The Teen and Parent Questionnaires:</u> The New Driver Questionnaire was initially developed for administration to teens before and after they had learned to drive (all of whom would not yet be licensed, or would be in the learner stage of the Manitoba GDL program). For the purposes of this study, the questionnaire was revised and shortened for administration to teens with an Intermediate license. Some question items and scales were dropped because they did not apply as much to older teens (e.g., the parental monitoring scale), and some questions relevant to older teens driving independently were added (e.g., driving exposure questions). This version of the questionnaire had 37 questions and 100 question items and took approximately 30 minutes to complete. A copy is contained in Appendix E.

The Parent Questionnaire was also developed for administration to the parents of teens. It had 26 questions and 53 question items and took approximately 15 minutes to complete. A copy of the Parent Questionnaire is provided in Appendix F.

The Survey: The survey of teens and their parents was conducted by Prairie Research Associates (PRA), a Winnipeg-based research firm. The Project team supplied PRA with the questionnaire.

Mailings: Manitoba Public Insurance supplied the Project team with a database of 3,600 teen drivers (ages 16 to 19). The database included those who had taken the MPI HSDE program (n=1,800) and those who had not taken the MPI HSDE program (n=1,800). The sample of Non-HSDE teens meeting the study criteria established for both groups – i.e., age 16-19, and held an Intermediate license from three to 13 months – actually constituted the entire population of such teens in Manitoba at the time of the data extractions. A much larger population of eligible teens in the province – e.g., approximately 11,000-11,500 – takes the MPI HSDE program annually. The sample of 1,800 HSDE teens was drawn randomly by Manitoba Public Insurance from this population.

PRA attempted to reach teen drivers and their parents involved in the study employing up to three points of contact, as described below.

> *First survey package.* The first mailing included a survey package containing a cover letter for the teen (Appendix G), a copy of the questionnaire for teen drivers, and a postage-paid return envelope. Also included was a cover letter for the parent (Appendix H), a copy of the questionnaire for parents, and a postage-paid return envelope. The letter, questionnaire, and postage-paid return envelope for parents were sealed in an envelope inside the mailing package, which was labeled "PARENT SURVEY: Please pass this on to your parent or guardian immediately."
>
> *Reminder postcard.* A reminder postcard (Appendix I) was sent to teen drivers approximately 20 days after the first mailing. The postcard was mailed only to those who had not returned their questionnaire and had not already indicated to PRA that they did not want to participate.
>
> *Second mailing.* To increase the response rate among teen drivers, PRA sampled 900 teens to follow-up with a second survey package (minus the parent survey). This sample included all teens who hadn't returned their questionnaire, but whose parents had (n=165). The remaining sample was randomly selected from the remaining teens who had not returned their questionnaire.

Table 24 shows a summary of these mailings, including the date and sample size.

| Table 24: Summary of mailings | | |
|---|---|---|
| | **Date of mailing** | **N** |
| **Initial mailing** | November 24–26, 2010 | 3,600 |
| **Reminder postcard** | December 16, 2010 | 3,117 |
| **Follow-up mailing to subgroup** | January 24, 2011 | 887 |

Survey Response: Table 25 shows a summary of responses to the survey overall and by Driver Education status based on MPI program records. The overall response rates for teens and parents were 29 percent and 27 percent, respectively. The response rates were different for the two comparison groups. For example, 24 percent of teens in the non-HSDE group and 34 percent of those in the HSDE group returned questionnaires.

| Table 25: Final Questionnaire Returns | | | |
|---|---|---|---|
| **Outcome** | **Overall (n = 3,600)** | **MPI HSDE status** | |
| | | **HSDE not taken (n = 1,800)** | **HSDE Taken (n = 1,800)** |
| **Teens** | **1050** | **432** | **618** |
| **With parent survey** | 862 | 323 | 539 |
| **Without parent survey** | 188 | 109 | 79 |
| **Parents** | **966** | **360** | **606** |
| **With teen survey** | 862 | 323 | 539 |
| **Without teen survey** | 104 | 37 | 67 |
| **Undeliverable mail** | 43 | 32 | 11 |
| **Refusal** | 16 | 10 | 6 |

### *Data Treatment*

The steps involved in converting hard copy information on the survey to an electronic database for the data analysis are described below.

Entering Hard Copies: To capture responses from the paper survey, PRA created a data-entry form in their survey software, which allowed them to program the skips and logic check at the time of data entry. This ensured that for questions where responses were not required, this information was not collected. In cases where teens gave answers that did not fit the question (for example, giving a range rather than a specific value), PRA would take the midpoint of the range as the value. For example, a teen may have indicated that they drove an average of 10 to 15 hours per week. In this case, PRA would have entered the response as 12.5. Other than enforcing skips in the survey, PRA did not impose any other logic checks for out of bounds responses. Further data logic checks and data cleaning were done by the Project team prior to the main data analysis.

Verifying Returned Surveys: PRA verified that all surveys had been entered by comparing the ID numbers of those surveys entered against PRA's internal database that tracked the outcome for each respondent. Any discrepancies were reconciled.

Linking Driver Data with Driver Information: Each teen was assigned a unique ID number, which was also the teen's survey number. To link their survey responses with information provided by MPI, such as license issue dates or driver education status (but excluding personal information like name and mailing address), PRA matched the ID numbers from the data entry form to the survey sample form (which contained the information from MPI). PRA spot checked the dataset to ensure that the information from the appropriate ID had been matched correctly. PRA achieved 100 percent match.

Final Numbers and Group Membership: PRA provided the linked database to the Project team, who made additional checks for data inconsistencies and data entry errors – e.g., ensuring values were in the range of acceptable values and, for continuous variables, that there were no values that were logical outliers. Inconsistent data entries were assigned as missing data.

The final database included 1,049 teen drivers and 963 parents. One teen and three parents were dropped as a result of incomplete data.

Driver Education Status: The analysis showed that 17 teens had not responded to the question as to whether they had taken a driver education or training course. The driver education status of these teen drivers was recoded based on the driver information that MPI provided on whether the teen had or had not taken the MPI HSDE program, according to their program records. In addition to data on the two primary groups, data on two additional groups were captured: one group had taken the MPI HSDE program and reported private/commercial driving instruction; another group had not taken the MPI HSDE program but indicated they had taken a private/commercial driving instruction. Table 26 shows the number of teen drivers in each of these four groups based on self-report and the recoding of the 17 drivers who did not respond to the question on driver education status. As can be seen, the MPI HSDE group comprised 66 percent, and the Non-DE group 27 percent, of teen drivers completing the survey. Although the numbers are relatively small in the two additional groups, they are sufficiently distinct from the two primary groups that they were not re-assigned to the MPI HSDE and the Non-DE groups.

Almost three quarters of parents (74%; n=710) indicated that their teen had taken the program (HSDE group), and 27 percent (Non-DE group; n=253) said that their teen had not taken the program. These two groups – HSDE and Non-DE – are the focus of the analyses in the parent results section of this report.

**Table 26: Driver Education Status**

| | Driver Education Status | | | | |
|---|---|---|---|---|---|
| | **MPI HSDE** | **MPI and Private DE** | **Private DE** | **Non-DE** | **Total** |
| **Number** | 691 | 40 | 40 | 278 | 1,049 |
| **Percentage** | 66% | 4% | 4% | 7% | 100% |

### *Results: Teen Drivers*

The primary purpose of the survey was to determine if there were meaningful differences in knowledge, driving-related behaviors, and lifestyle associated with exposure to driver education. Accordingly, the primary analysis compared mean scores for the HSDE and Non-DE groups. The standard deviations of mean scores and medians are included, where appropriate. The results are summarized in a series of tables below that correspond to the variables being measured.

The tables included in this section do not include the results of statistical tests of significance because of the number of group comparisons. Statistically significant differences in results between groups are mentioned in the text.

Group Demographics: Table 27 provides information of the age, gender, and months licensed of teen participants in the four groups defined in terms of driver education status. As can be seen, the HSDE group was slightly younger than the other three groups, with the Private DE group being the oldest of the groups ($p<0.01$).

**Table 27: Group Characteristics By DE Status**

| | Driver Education Status | | | |
|---|---|---|---|---|
| | **HSDE** | **HSDE and Private DE** | **Private DE** | **Non-DE** |
| **Average Age** | 17 years, 9 months | 18 years, 6 months | 18 years, 4 months | 18 years, 2 months |
| | SD=0.61 (7.32 months) n=684 | SD=0.72 (8.64 months) n=40 | SD=0.69 (8.28 months) n=40 | SD=0.64 (7.68 months)n=275 |
| **Gender** | | | | |
| **Males** | 50% (n=342) | 43% (n=17) | 38% (n=15) | 56% (n=155) |
| **Females** | 51% (n=349) | 58% (n=23) | 62% (n=25) | 44% (n=123) |
| **Months Licensed** | | | | |
| **3-6 months** | 28% (n=193) | 38% (n=11) | 28% (n=15) | 51% (n=143) |
| **7-13 months** | 72% (n=498) | 62% (n=29) | 72% (n=25) | 49% (n=135) |
| **Mean** | 8.20 SD=2.50 n=691 | 8.23 SD=2.57 n=40 | 7.55 SD=2.47 n=40 | 7.05 SD=2.76 n=278 |

Table 27 also shows that the HSDE group comprised approximately equal numbers of males and females. The Non-DE group had more males than females, but the opposite was the case among those that had taken private DE, either alone or in combination with HSDE ($p=0.07$).

Table 27 also shows that teen participants in all four groups held an Intermediate license from three to 13 months, which is consistent with the criteria used in sample selection. More teens in the HSDE group and the Private DE group, compared to the “HSDE and Private DE” group and the Non-DE group, held their Intermediate license from seven to 13 months.

Table 28 provides information on the place of residence of the four groups. More teens in the HSDE group lived in a city than those who did not take DE. More teens in the HSDE and Private DE group lived in a city. The place of residence differed significantly by DE status (p=0.02).

| Table 28: Residence by DE Status | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | HSDE only | HSDE and Private DE | Private DE | Non-DE |
| **City** | 51% (n=353) | 63% (n=25) | 50% (n=20) | 44% (n=123) |
| **Town** | 18% (n=122) | 13% (n=5) | 18% (n=7) | 16% (n=44) |
| **Rural** | 31% (n=213) | 25% (n=10) | 28% (n=11) | 39% (n=107) |

Safe Driving Knowledge: Fourteen multiple-choice items assessed safe driving knowledge. As shown in Table 29, the HSDE group had a slightly higher mean knowledge score (out of 14) than did the Non-DE group as well as the other two groups. Although the HSDE group showed greater knowledge of safe driving practices than the other comparison groups, these differences were not statistically significant.

Regardless of the slightly greater level of knowledge among the HSDE group, their average scores suggest that even they have relatively low levels of knowledge about safe driving practices, since they either failed to answer or answered incorrectly nearly half of the 14 items.

| Table 29: Safe Driving Knowledge Scores by DE Status | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | HSDE | HSDE and Private DE | Private DE | Non-DE |
| **Mean Score** | 7.75 | 7.25 | 7.18 | 7.59 |
| **SD** | 1.92 | 1.97 | 1.71 | 1.89 |

An item-by-item analysis of responses to the safe driving knowledge questions shows that the HSDE group was more likely than the Non-DE group to answer correctly on nine of the 14 items, albeit with only a slightly higher number of correct answers on several of these items (see Appendix J).

Table 30 provides a summary by listing those items which 20 percent or more of the respondents in the HSDE group failed to answer correctly (refer to Appendix J for the complete wording of the item). As can be seen, some of the items were not answered correctly by over 60 percent of the teens in the HSDE group. The percentages shown in Table 30 include incorrect and unanswered responses, so they do not correspond directly to the percentage shown in Appendix J.

| Table 30: Percent Incorrect for Safe Driving Knowledge Item by Item Analysis on the New Driver Survey for the HSDE only group. | |
|---|---|
| **Safe Driving Knowledge Question** | **MPI DE Only Group Percent Incorrect** |
| **1. When changing lanes, you can check your blind spot by:** | 67% |
| **3. What is the most common cause of minor accidents among teens?** | 75% |
| **4. A car going twice as fast as another would strike an object how much harder?** | 57% |
| **8. To safely drive into a curve, you should:** | 42% |
| **9. Which of the following best describes where you should be looking when driving:** | 69% |
| **10. What is the most common cause of serious injury accidents among teens?** | 63% |
| **11. The most common type of accident at entrances to freeways (expressways) is:** | 62% |
| **12. Because of their faster reaction time, teens deal with which of the following situations better than typical 40 year old drivers:** | 58% |
| **13. Which of the following accident types result in the greatest number of deaths to teenage drivers and their passengers each year?** | 54% |
| **14. On a wet road, hydroplaning can be caused by:** | 22% |

Self-Rated Driving Skills: Teen drivers were asked to rate on a five-point scale how good they thought their driving skills were for handling 16 different driving maneuvers. Results are shown in Table 31. All groups gave a rating in excess of three on the five-point scale. Of some note, the HSDE group showed a significantly higher rating of their driving skills than the Non-DE group ($p<0.01$) and the Private DE-only group ($p=0.01$). There were no further statistically significant differences in skill ratings.

| Table 31: Self-rated Driving Skills by DE Status | | | | |
|---|---|---|---|---|
| | **Driver Education Status** | | | |
| | **HSDE** | **HSDE and Private DE** | **Private DE** | **Non-DE** |
| **Mean Score** | 4.05 | 4.07 | 3.84 | 3.92 |
| **SD** | 0.49 | 0.59 | 0.73 | 0.53 |

Problem Behaviors: Table 32 summarizes results for several measures of problem/risky behaviors. As can be seen, all four groups indicated that they would rarely engage in risk taking behaviors. Although the HSDE group was less likely than the Non-DE group to say they engaged in the risky behaviors, this difference was not statistically significant. No statistically significant differences were found in group comparisons on this measure.

The four groups also indicated on average that they rarely engaged in risky driving behaviors, and no statistically significant differences were detected in the group comparisons. Further analysis, however, of the subscales comprising the risky driving behavior measure revealed that teens in the HSDE group gave lower ratings than the Non-DE group on driving after drinking (1.07 versus 1.12; $p=0.01$). Consistent with the findings on reported risky/unsafe behaviors, the four groups generally disagreed with risky driving attitudes, and the HSDE group did not show significantly less-accepting attitudes compared to the Non-DE group or the other two groups. The differences between the four groups were also not significant on the measure of lifestyle.

| Table 32: Problem Behavior Scores by DE Status | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Driver Education Status | | | | | | | |
| | HSDE | | HSDE & Private DE | | Private DE | | Non-DE | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| **Risk Taking Behavior** | 1.59 | 0.61 | 1.71 | 0.77 | 1.57 | 0.81 | 1.65 | 0.66 |
| **Risky Driving Behavior** | 1.65 | 0.37 | 1.75 | 0.50 | 1.68 | 0.39 | 1.66 | 0.40 |
| **Risky Driving Attitudes** | 1.78 | 0.79 | 1.79 | 0.84 | 1.75 | 0.82 | 1.80 | 0.74 |
| **Lifestyle** | 4.28 | 0.65 | 4.21 | 0.64 | 4.21 | 0.73 | 4.33 | 0.68 |

Learning to Drive: Driver education is not the only means for teens to learn how to drive. The Manitoba GDL program includes a nine-month learner period when teens can practice driving under supervision. Teen driving practice with parents is recognized as an important part of learning to drive, and it can be potentially influenced by driver education. In this regard, previous research suggests that teens that complete driver education may not practice driving as much with parents/guardians as those that do not take driver education (Mayhew et al. 2006). Accordingly, the New Driver survey included questions to determine whether the learning to drive experiences and driving practices differed among teens who completed and those who did not complete the MPI HSDE Program.

More specifically, teen drivers were asked several questions related to who supervised their driving as learners, the amount of driving practice they received as learners, and the amount of driving practice after they obtained their Intermediate license. The amount of driving practice was defined in terms of time (hours driven) rather than distance (kilometers driven), because previous research suggests that respondents can better estimate or recall time driven than they can recall distance driven (Leaf et al. 2008). Moreover, although the GDL program in Manitoba does not require a minimum amount of supervised driving practice, the requirements in some jurisdictions to complete a minimum amount of supervised driving practice are defined in terms of hours, not distance.

As shown in Table 33, more teens in the HSDE group than the other three groups, especially the Non-DE group, said their mother served as a supervising driver accompanying them ($p<0.01$). The Non-DE group, however, was significantly more likely than the other groups to state that an older sibling supervised their driving (e.g., the difference between the Non-DE group and the HSDE group was significant at $p=0.03$).

Not surprisingly, compared to the other two groups (especially Non-DE), more teens in the HSDE group and the HSDE and Private DE group said that a driving instructor served as the experienced driver accompanying them ($p<0.01$). Not all the DE groups, however, mentioned that a driving instructor served as the supervising driver, which may suggest that they misinterpreted the question. It is also possible that they may not have considered their eight hours of in-car instruction with a driving instructor as practice driving.

| Table 33: Accompanying Driver When You Were a Learner by DE Status | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | HSDE | HSDE & Private DE | Private DE | Non-DE |
| **Mother** | 89% | 78% | 85% | 71% |
| **Father** | 85% | 90% | 78% | 83% |
| **Older sibling** | 16% | 13% | 18% | 23% |
| **Other relative** | 19% | 10% | 20% | 18% |
| **Friend** | 7% | 15% | 10% | 10% |
| **Driving Instructor** | 65% | 70% | 58% | 19% |

Teen drivers were also asked which one person rode with them the most as the supervising driver accompanying them, and results are shown in Table 34. For all four groups, their mother or father served most often as the supervising driver accompanying them. More teens in the HSDE group than the Non-DE group mentioned their mother rather than their father most often as the experienced driver who accompanied them when they were driving in the learner stage (a significant difference).

| Table 34: Most Often Served as the Experienced Driver by DE Status | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | HSDE | HSDE & Private DE | Private DE | Non-DE |
| **Mother** | 47% | 35% | 45% | 42% |
| **Father** | 40% | 48% | 38% | 42% |
| **Older sibling** | 1% | 0% | 3% | 3% |
| **Other relative** | 1% | 3% | 3% | 1% |
| **Friend** | 0.3% | 0% | 0% | 2% |
| **Driving Instructor** | 6% | 10% | 8% | 3% |

Table 35 shows, in an average week, how many hours of supervised driving practice each of the four groups estimated they received before they obtained their Intermediate license. As can be seen, the majority of teens in each of the four groups reported driving less than 10 hours in an average week, and one in 10 reported driving 40 hours or more in an average week.

Consistent with previous research, the HSDE group said they received slightly less driving practice than the Non-DE group, but this difference was not statistically significant (p=0.58). Some caution should be taken in interpreting these estimates, because previous research suggests that self-reports of driving practice hours or driving exposure are often unreliable (Goodwin & Foss 2010; Leaf et al 2008). This would appear to be especially the case for those few teens who reported driving 40 or more hours in an average week. Since so many practice hours seem implausible, they were apparently poor at estimating hours, misunderstood the question, or were being untruthful.

| Table 35: Weekly Hours of Supervised Driving Practice as Learners by DE Status | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | HSDE | HSDE & Private DE | Private DE | Non-DE |
| **Less than 10 hours** | 76% | 68% | 78% | 70% |
| **10-19 hours** | 10% | 13% | 5% | 13% |
| **20-29 hours** | 5% | 3% | 5% | 4% |
| **30-39 hours** | 1% | 5% | 0% | 1% |
| **40 hours or more** | 7% | 10% | 8% | 8% |
| **No Response** | 2% | 3% | 5% | 4% |
| **Mean # of hours** | 7.56 SD=11.09 | 8.64 SD=1.73 | 6.62 SD=1.35 | 8.03 SD=12.77 |
| **Median # of hours** | 4.00 | 5.00 | 5.00 | 4.00 |

Given that the learner stage is a nine-month minimum, these results suggest that learners are accumulating a significant number of supervised practice driving hours, and certainly more than the minimum 50 hours that are required in some jurisdictions. Even four hours per week means that more than 100 hours of driving practice would have accumulated over this nine-month period. However, this assumes that the supervised driving practice hours are occurring each week over the entire learner period of nine months. Furthermore, as mentioned above, the MPI HSDE group reported less practice than the Non-DE group.

Table 36 shows that relatively few teen drivers in the four groups drove with a parent or other adult driver specifically to obtain more supervised practice, after they obtained their intermediate license to drive by themselves. The differences shown in this table across groups were not statistically significant (p=0.47).

| Table 36: Practice Driving on Intermediate Stage by DE Status | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | HSDE | HSDE & Private DE | Private DE | Non-DE |
| **Yes** | 20% | 30% | 28% | 21% |
| **No** | 79% | 68% | 73% | 78% |
| **No Response** | 1% | 3% | 0% | 1% |

<u>Exposure:</u> Driving exposure was assessed in two ways. First, teen drivers were asked: after they obtained their license to drive by themselves, how many short trips (at least one kilometer or up to 10 kilometers) and long trips (10 kilometers or more) did they take on a typical day during the week and during the weekend? The second method was to obtain an estimate of recent exposure by asking: in the past three days, about how much time, in minutes, did they drive each day, beginning with yesterday?

Table 37 shows results for the average number of total trips overall, on weekdays, on weekends, as well as short and long trips. As can be seen, the HSDE group estimated a lower average number of trips than the Non-DE group on all of these exposure measures. The differences between these two groups are statistically significant for: total trips (p=0.01), total weekend trips (p=0.01), and total short trips (p=0.01). No further significant differences were found in these driving exposure measures for the groups of interest.

As shown in Table 37, almost all teens in each of the four groups drove recently – i.e., in the past three days. Consistent with the findings above, the HSDE group also differed from the Non-DE group in regard to recent driving exposure in that they estimated they drove fewer minutes, on average, over this time period ($p<0.01$) (Table 38). This pattern of results was also reflected in median minutes – 80 minutes for the HSDE group compared to 97.5 for the Non-DE group. The lower driving exposure of the HSDE group could be related to the fact that they more often reported living in a city, which could possibly result in shorter trips.

**Table 37: Driving Exposure by DE Status**

| | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | HSDE | | HSDE & Private DE | | Private DE | | Non-DE | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| **Total Trips** | 14.01 | 13.02 | 13.80 | 16.50 | 15.67 | 15.15 | 17.01 | 15.14 |
| **Weekday Trips** | 8.47 | 8.12 | 8.53 | 7.24 | 10.19 | 11.92 | 10.45 | 12.25 |
| **Weekend Trips** | 6.00 | 8.12 | 7.39 | 7.24 | 5.47 | 11.92 | 7.31 | 12.25 |
| **Short Trips** | 9.41 | 0.93 | 9.39 | 7.55 | 9.16 | 7.83 | 11.70 | 14.98 |
| **Long Trips** | 4.90 | 8.56 | 4.97 | 4.98 | 6.36 | 11.83 | 5.92 | 8.64 |

**Table 38: Recent Exposure by DE Status**

| | Driver Education Status | | | |
|---|---|---|---|---|
| | HSDE | HSDE& Private DE | Private DE | Non-DE |
| **Percent Driven** | 97% | 100% | 93% | 98% |
| **Mean Minutes** | 109.76 SD=121.50 | 114.05 SD=111.10 | 119.19 SD=93.83 | 140.04 SD=165.74 |
| **Median Minutes** | 80.00 | 82.50 | 110.00 | 97.50 |

### *Results: Parents*

Parents are integral to decisions on their teens' readiness to drive. They may also play a significant role in the learning to drive process: whether their teen takes driver education, the amount and type of driving practice their teen receives as a learner, the decision for their teen to attempt the road test, and monitoring their teen's driving once they can drive independently. For these reasons, parents/ guardians of teens contacted for this survey were asked to complete a questionnaire to assess their views and practices regarding the learning to drive process. The parent questionnaire is provided in Appendix F.

<u>Group Demographics:</u> The 963 parents/guardians who completed the questionnaire were asked whether their teen had taken the MPI HSDE Program. Almost three quarters (74%) indicated that their teen had taken the program (HSDE group), and 26 percent (Non-DE group) said that they had not taken the program. Table 39 shows the gender of parents/guardians in the HSDE and Non-DE groups. For both the HSDE and Non-DE groups, the parent/guardian who completed the

questionnaire was more often female, and there were no statistically significant differences in gender between the two groups (p=0.61).

The age distribution of parents/guardians in the HSDE and Non-DE groups are also shown in Table 39. The majority of parents/guardians in both groups were aged 46-55 years. The HSDE group was significantly more often than the Non-DE group to fall within this age range (p=0.03).

**Table 39: Group Characteristics of Parents of the HSDE and Non-DE Groups (%)**

| | Driver Education Status | |
|---|---|---|
| | **HSDE** | **Non-DE** |
| **Gender** | | |
| **Male** | 30% | 33% |
| **Female** | 70% | 67% |
| **No Response** | 1% | 0.4% |
| **Age** | | |
| **34-45 years** | 25% | 32% |
| **46-55 years** | 65% | 59% |
| **56 and over years** | 10% | 10% |

Most survey participants in both the HSDE and Non-DE groups reported their relationship to the teen driver as mother, as shown in Table 40. About one out of three in the HSDE and the Non-DE groups were fathers. Few adults surveyed in both groups reported another relationship to their teen driver. Differences in relationship to the teen driver were not statistically significant (p=0.59).

**Table 40: Relationship to Teen Driver for HSDE and Non-DE Groups (%)**

| | Driver Education Status | |
|---|---|---|
| | **HSDE** | **Non-DE** |
| **Mother** | 69% | 66% |
| **Father** | 29% | 31% |
| **Sibling** | 0.1% | 1% |
| **Relative** | 0.3% | 0.4% |
| **Other** | 1% | 2% |
| **No Response** | 0.3% | 0.4% |

As shown in Table 41, the HSDE group reported a significantly higher level of education than the Non-DE group (p<0.00): slightly over half of the HSDE group said their highest level of education completed was community college or higher, compared to only one in three of the Non-DE group.

**Table 41: Education Level for HSDE and Non-DE groups (%)**

| | Driver Education Status | |
|---|---|---|
| | **HSDE** | **Non-DE** |
| **Some grade/High School** | 8% | 25% |
| **Completed High School** | 22% | 22% |
| **Some college/university** | 19% | 17% |
| **Community college** | 23% | 12% |
| **Bachelor's degree** | 15% | 13% |
| **Graduate degree** | 13% | 8% |
| **No response** | 0.4% | 3% |

Table 42 shows that more parents in the HSDE group live in a city (p<0.00) compared to the Non-DE group. About one-third of the HSDE group and the Non-DE group live in a rural area, and relatively few parents in both groups live in a town.

| Table 42: Parent Residence for HSDE and Non-DE Groups (%) | | |
|---|---|---|
| | Driver Education Status | |
| | HSDE | Non-DE |
| **City** | 53% | 44% |
| **Town** | 16% | 16% |
| **Rural area** | 31% | 38% |
| **No Response** | 0% | 2% |

<u>Learning to Drive:</u> Parents were asked about practice driving with their teen. Table 43 shows who supervised the teen most often when they were driving with a Learner license. Consistent with the teen responses to a similar question discussed in the previous section of this report, mothers were more often identified as the supervising drivers by parents in both the HSDE and Non-DE groups. However, the HSDE and Non-DE groups also reported that fathers served in this role often, and driving supervision was often shared by both parents equally. The apparent differences shown in this table were not statistically significant (p=0.10).

| Table 43: Who Supervised Driving Practice Most for HSDE and Non-DE Groups (%) | | |
|---|---|---|
| | Driver Education Status | |
| | HSDE | Non-DE |
| **Mother** | 40% | 39% |
| **Father** | 26% | 32% |
| **Both parents equally** | 31% | 24% |
| **Sibling** | 1% | 2% |
| **Relative** | 1% | 2% |
| **No one** | 0.1% | 0.4% |
| **Other** | 2% | 2% |
| **No Response** | 0.4% | 0% |

The ease or difficulty for the parent to find the time to accompany teen practice driving was rated on a scale from 1 (very difficult) to 5 (very easy). As shown in Table 44, the majority of both the HSDE and the Non-DE groups reported that it was easy to find time to supervise their teen as learners (60% versus 62%). The mean rating for the Non-DE group was significantly higher than the rating for the HSDE group, suggesting that it was slightly easier for them to find time in their schedule to supervise their teen when they drove with a Learner's license (p=0.03).

| Table 44: Ease/Difficulty of Supervising Driving Practice for HSDE and Non-DE Groups (%) | | |
|---|---|---|
| | Driver Education Status | |
| | HSDE | Non-DE |
| **1, Very Difficult** | 1% | 1% |
| **2** | 5% | 3% |
| **3** | 34% | 32% |
| **4** | 33% | 30% |
| **5, Very Easy** | 27% | 32% |
| **Don't Know** | 0.3% | 2% |
| **Mean Rating** | 3.78<br>SD= 0.91 | 3.93<br>SD=0 .95 |

Parents were also asked to rate, during the first few weeks of driving, how often they talked with their teen to review how things went following a driving session. As shown in Table 45, more parents in the HSDE group indicated that they very frequently or often discussed practice sessions with their teens, but overall differences were not statistically significant (p=0.35). This was also the case when the mean ratings of the HSDE and Non-DE groups were compared (p=0.41).

| Table 45: How Often Practice Driving Discussed for HSDE and Non-DE Groups (%) | | |
|---|---|---|
| | Driver Education Status | |
| | HSDE | Non-DE |
| **Very Frequently** | 22% | 21% |
| **Often** | 45% | 42% |
| **Occasionally** | 28% | 29% |
| **Rarely** | 4% | 5% |
| **Never** | 1% | 1% |
| **DK/NR** | 1% | 2% |
| **Mean Rating** | 2.17<br>SD= 0.85 | 2.22<br>SD= 0.88 |

Parents were asked how many total hours their teen driver practiced with various supervisors, and Table 46 shows the percentage that indicated one hour or more. The pattern of results is difficult to interpret. For example, 79 percent of the HSDE groups reported their teen practiced with an MPI driving instructor, which means that 21 percent either did not enter a value or entered "0" hours. This is perplexing because all teens in the HSDE program would have had in-car instruction. These parents either misinterpreted the question or did not know the number of hours of in-car instruction their teen received or did not think in-car instruction constituted supervised driving practice with a driving instructor. In any event, the HSDE group more often reported hours of supervised practice with an MPI instructor (p<0.01). No other statistically significant differences were found between these two groups.

| Table 46: Driving Practice Hours with Different Supervision for HSDE and Non-DE Groups (%) | | |
|---|---|---|
| | Driver Education Status | |
| | HSDE | Non-DE |
| **MPI Driving Instructor** | 79% | 7% |
| **Private Driving Instructor** | 32% | 31% |
| **Parent** | 88% | 89% |
| **Another Adult** | 26% | 26% |

Further analyses examined how many hours of driving practice the HSDE and the Non-DE group reported their teen received with each of the supervisors. As shown in Table 47, and not surprisingly, the most supervised driving hours are with parents/guardians, and this is the case in both groups ($p<0.01$). In fact, 89 percent of the MPI DE group and 80 percent of the Non-DE group actually reported 40 or more hours of supervised driving practice with parents/guardians.

It is not clear how some of the Non-DE group had practice with an MPI instructor. If their teen had some in-car training, the parent may have incorrectly assumed that this was provided by an MPI instructor. Alternatively, the teen may have had some driving practice with an MPI driving instructor, but without completing the entire Manitoba HSDE program.

| Table 47: Reported Hours of Practice with Different Supervisors for HSDE and Non-DE Groups (%) | | |
|---|---|---|
| | Driver Education Status | |
| | HSDE | Non-DE |
| **MPI Driving Instructor** | | |
| **Less than 10 hours** | 49% | 77% |
| **10-19 hours** | 34% | 18% |
| **20 hours and over** | 17% | 6% |
| **Private Instructor** | | |
| **Less than 10 hours** | 55% | 77% |
| **10-19 hours** | 26% | 18% |
| **20 hours and over** | 19% | 6% |
| **Parent** | | |
| **Less than 10 hours** | 4% | 5% |
| **10-19 hours** | 7% | 15% |
| **20 hours and over** | 89% | 80% |
| **Other Adult** | | |
| **Less than 10 hours** | 58% | 34% |
| **10-19 hours** | 23% | 37% |
| **20 hours and over** | 19% | 29% |

<u>Reasons for Taking or Not Taking Driver Education:</u> Parents who indicated that their teen had taken the HSDE program were asked what led them to choose this program for their teen. They were provided a list of reasons and instructed to check all that apply.

As shown in Table 48, convenience, affordability, and the skill and safety reasons received majority support. Other reasons such as peer attendance, family tradition, and lack of competition were mentioned less. Clearly, most of the reasons for taking the course play a role, with the strongest reasons being making their teens safer and more skilled drivers.

| Table 48: Reasons for Choosing the HSDE program (more than one choice possible) | |
|---|---|
| | MPI DE |
| Convenience of location | 58% |
| Convenience of classroom schedule | 50% |
| Convenience of in-car schedule | 42% |
| Qualifications of instructors | 39% |
| Quality of instruction methods | 41% |
| Affordability | 59% |
| Availability of vehicle for practice driving | 39% |
| To have someone to teach teen how to drive | 69% |
| To get a variety of driving practice | 59% |
| To get more driving experience | 62% |
| Obtain a learner license before they turn 16 | 37% |
| Everyone in teen's class was taking it | 11% |
| Program's reputation | 52% |
| Only program in area | 13% |
| Easy registration/no hassle | 30% |
| Family has always taken de | 29% |
| To make them a safer driver | 83% |
| To make them a more skilled driver | 76% |
| To help them pass the road test | 58% |
| Other | 6% |

Parents who indicated their teen had not taken the HSDE program were asked the reasons their teen did not take this program. They were provided a list of reasons and instructed to check all that apply. Table 49 shows that relatively few parents identified the listed reasons as why their teen did not take the HSDE program. However, about one in four or five indicated the reasons were that the program was not necessary because others could teach their teens just as well, they could not fit the classes into their teen's schedule, and they could not register for or take the program when they wanted to. Relatively few parents had not heard of the HSDE program, which speaks to its widespread availability. Also, few thought the program too expensive, which may be related to the fact that MPI subsidizes the cost of the program; alternatively, these parents may have been unaware of the costs.

| Table 49: Reasons for Not Taking the MPI HSDE program (%, more than one choice possible) | |
|---|---|
| | Non-DE |
| Never heard of it | 6% |
| Too expensive | 8% |
| Not available where we live | 10% |
| Other courses just as good | 5% |
| Not necessary, others could teach them | 21% |
| Couldn't fit the classes into teen's schedule | 24% |
| Couldn't register for/take program when wanted to | 23% |
| Teen wasn't in hurry to get a Learner license | 15% |
| Other reason | 23% |

Over one in five parents also identified other reasons their teen did not take the HSDE program. Reasons not already listed mentioned by a few parents included: just moved, drove on a farm, and/or not attending high school.

Driving Privileges: Parents were asked several questions related to placing restrictions on their teen's driving and taking away the teen's driving privileges as a result of their driving unsafely or as a result of behaviors not related to driving (e.g., skipping classes, not doing homework, not doing chores, or breaking house rules). Results are shown in Table 50. As can be seen, the HSDE group reported less often that, after their teen obtained an Intermediate license, they or someone else in the family placed restrictions or limits on the teen's driving compared to the Non-DE group, a non-significant difference.

Almost all parents in both the HSDE and the Non-DE groups reported that they or some other family member had taken away their teen's driving privileges as a result of unsafe driving on the part of the teen. The vast majority of both the HSDE and the Non-DE groups also reported that they or a family member had taken away their teen's driving privileges as a result of behaviors not related to driving. For both these measures in driving privileges the differences between the HSDE and the Non-DE groups were not statistically significant.

**Table 50: Restricting Driving and Removing Privileges for MPI HSDE and Non-DE Groups (%, more than one choice possible)**

| | Driver Education Status | |
|---|---|---|
| | **MPI DE** | **Non-DE** |
| **Placed Restrictions** | 40% | 47% |
| **Restrictions for Unsafe Driving** | 93% | 95% |
| **Restrictions for Other Behaviors** | 82% | 85% |

Overall, these results suggest that most parents monitor their teens' driving behavior and place restrictions on and/or remove driving privileges of their teens for driving unsafely or for other inappropriate behaviors not related to driving. This is equally characteristic of parents in both groups.

### *Summary*

As part of this evaluation, the portion of the study reported here sought to determine if there are differences in student outcomes between teen drivers who have and have not taken the Manitoba Public Insurance (MPI) High School Driver Education (HSDE) program.

Results for teen drivers showed that those in the HSDE group, in comparison to the Non-DE group:

- were slightly younger (about 3-4 months);
- were more likely to live in a city or a rural area;
- had an overall knowledge score slightly but not significantly higher;
- were more likely to answer correctly on nine of the 14 knowledge items, but more than half failed to answer correctly on nine knowledge items;

- rated their driving skills higher;
- were less likely to say they drove after drinking, but reported no other behavior differences; and,
- estimated they took fewer trips and spent less time driving.

The results suggest that the HSDE-only group differed little from the Non-DE group. The relatively low level of safe driving knowledge was somewhat surprising, especially for those who had taken HSDE. This could be because they did not learn or did not retain information provided in the program. Teens who took driver education thought they had higher levels of driving skills, despite indicating they actually received less practice as a learner and currently drove less than teens who had not taken the HSDE program. It is possible that Non-DE teens are practicing more to compensate for the fact that they did not take driver education. As well, HSDE teens may be practicing less if they think they have obtained adequate practice driving from the course. Mothers were also found to play a slightly more predominant role in the learning to drive experience of teen drivers who took the HSDE program than those that did not.

Results for parents of teen drivers also revealed the predominant role of mothers in practicing, but differed from the HSDE teens in that more practice by parents of HSDE teens during the learner stage was reported. This could mean that parents and teens interpret the meaning of driving practice differently. Results also showed that parents of teens who had taken driver education:

- were slightly older;
- had higher education levels;
- were more likely to report living in cities;
- found it slightly more difficult to find time to practice driving with their teen; and,
- identified convenience, affordability, and improving skill and safety as reasons for their teen taking driver education.

The primary reasons identified by parents for their teen not taking the HSDE program included that the program was not necessary because others could teach their teens just as well, they could not fit the classes into their teen's schedule, and they could not register for or take the program when they wanted to.

## Student Outcomes: Simulated Drive Test

### *Purpose*

One of the primary purposes of this investigation was to determine whether exposure to the MPI HSDE program was associated with better driving skills. Driver education students learn how to steer, brake, and accelerate, as well as how to identify hazards and make critical decisions on different types of roads and under diverse traffic situations. In-car training of driving skills is an integral part of driver education, and a major purpose of the Manitoba HSDE Program is to teach safe driving skills and habits that help the students become safe drivers.

The alternatives for assessing driving skills include using an in-car, on-road or off-road test, or a simulated version of such a test. Unfortunately, no standardized test exists. The on-road test varies across jurisdictions and simulation has generally been used to “teach” driving skills, rather than to assess them. Accordingly, it was necessary to develop and validate a measure of driving skills.

A series of validation studies was conducted to do this and are described in Mayhew et al. 2011. The first of these involved concurrent validation (i.e., comparing driving performance on the road with driving performance on a simulator). The second, a discriminant validation study, compared driving performance on the simulator across three groups of drivers who differed in their amount of driving experience: a group who had no driving experience, a group of novice drivers who had completed driver education and had a Learner's license, and a group of fully licensed, experienced drivers.

The concurrent validity study showed that the rank-ordering of drivers’ performance on the road was correlated with their performance on the simulator. That is, the worst drivers as measured by their on-road performance were also the worst drivers on the simulator. This suggests that the simulator can be used as a reasonable proxy for driving performance on the road test developed for this study (Mayhew et al. 2009a; Mayhew et al. 2011).

The discriminant validity study showed that drivers with different levels of experience could be distinguished by their simulated driving performance. Beginners had more driving errors than novice drivers, who in turn had more errors than the experienced drivers (Mayhew et al. 2009b; Mayhew et al. 2011).

Taken together, the concurrent and discriminant studies established that the simulator could be used as a valid measure for assessing driving performance. These findings are consistent with other research (Bella 2008; Godley et al. 2002; Lee et al. 2004; Törnros 1998; Yan et al. 2008) that has found simulation can provide a valid index of driving performance. Most prior studies have examined only a few driving performance measures, such as speed and turning; however, it has been acknowledged that the standard for establishing validity should be overall on-road driving performance. The findings for these two studies suggest that on-road performance and performance on the simulator are at least somewhat related (Mayhew et al. 2011).

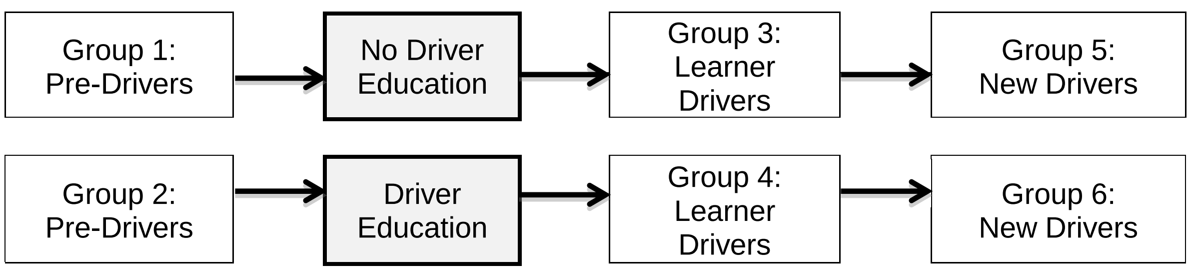
### *Evaluation Design*

The primary purpose of the present study was to determine if there were meaningful differences in driving performance between teens that have and have not completed the MPI HSDE program. To accomplish this, performance on a simulated drive test was examined for teens grouped by driver education status – Non-DE and HSDE – and by license status – pre-drivers, learner drivers, and new drivers. More specifically, the six comparison groups were defined in the following way:

- a group of pre-drivers who had no driving experience and do not plan on taking driver education;
- a group of pre-drivers who had no driving experience and plan on taking driver education;
- a group of novice drivers who had a Learner's license for several (4-9) months and did not take driver education;
- a group of novice drivers who had a Learner's license for several (4-9) months and did take driver education;
- a group of new drivers who had an Intermediate license and have been driving for three-six months and did not take driver education; and,
- a group of new drivers who had an Intermediate license and have been driving for three-six months and did take driver education.

This cross-sectional design with the above six groups defined in terms of driver education status (Non-DE; HSDE) and level of driving experience (pre-driver; learner driver; new driver) is analogous to a quasi-experimental pre-post design with a comparison group – see diagram below.

**Diagram 1: Cross-Sectional Design with Teens Grouped by Driver Education and License Status.**




Using the above design, it was hypothesized that there would be:

- no differences in driving errors on the simulated drive test between pre-drivers who plan and do not plan on taking driver education, because neither group has actually driven. This would establish that driving skills are comparable at baseline and do not explain differences in skill level that might be observed between Non-DE and HSDE learner drivers if, for example, those planning on taking DE do not have an aptitude for driving or lack confidence in their ability to drive compared to those not planning on taking DE;
- fewer driving errors with increases in license status from pre-driver to learner driver to new driver for both HSDE and Non-DE groups – i.e., an experience effect;
- fewer driving errors of the HSDE learner drivers than the Non-DE learner drivers on the simulated drive test – i.e., a short-term HSDE effect; and,
- fewer driving errors of HSDE new drivers than Non-DE new drivers on the simulated drive test – i.e., a longer-term DE effect.

At a minimum, the effects of driver education on driving skills should be apparent shortly after course completion when comparing the results for HSDE and Non-DE learner drivers. As well, it is possible that the influence of driver education on improving driving skills would have lasting effects several months afterwards, when HSDE new drivers are driving independently.

### *Simulated Driving Performance*

The driving simulator used in this investigation is called STISIM Drive, a product of System Technologies Inc. (STI), a California-based research and development firm. This driving simulator runs on an ordinary personal computer (PC), so it is portable and can be used at different locations. It was designed to teach psychomotor and cognitive skills of driving to novice drivers as well as to provide a driving skill evaluation tool for more experienced drivers. It has been used to conduct research measuring sleep, drug, aging, and fatigue effects as well as in validation studies (Allen et al. 1994; Bédard et al. 2010; Marcotte et al. 2005; Partinen et al. 2003; Rosen 2004; Ware et al. 2006). In addition, the concurrent and discriminant studies conducted by the current authors (Mayhew et al. 2011) and evidence from other studies (Garay-Vega et al. 2007) showed that this driving simulator can be used to reliably differentiate novice and experienced drivers in hazard anticipation ability. The STISIM Drive website provides references to other technical reports and publications that have emerged from this research (see http://www.systemstech.com/support/index.php/publications).

STISIM Drive is interactive with brake, accelerator, and steering wheel and allows the end user to build different driving scenarios and performance measures for assessing driving skills. "Scenario Definition Language" (SDL) allows the user to display roadway images and execute events sequentially during a driving simulation. For example, SDL can be used to configure the roadway alignment, traffic control devices (signals, signs, markings), roadside objects, traffic, and pedestrians. The temporal properties of these features can also be triggered relative to the subject's own "vehicle." Thus, the subject can be presented with a fixed number of driving scenarios during which performance can be evaluated.

STISIM Drive incorporates performance measures for assessing driving skills. For the present study, it was possible to measure the frequency of the following driving errors: off road accidents, collisions, pedestrians hit, speeding, traffic light tickets, stop sign tickets, centerline crossings, and road edge excursions.

Besides the automated measures of driving errors generated by the driving simulator software, it was also possible to have an assistant use a checklist to observe driving errors, and the procedures for doing so are described in the next section.

### *Method*

This evaluation study was conducted between December 2010 and December 2011 in Winnipeg, Manitoba, with MPI staff providing logistical assistance – e.g., office space and furniture to setup the driving simulation.

The Driving Task: The driving test on the simulator was designed to resemble the on-road test that was used in the concurrent validity study. An actual on-road driving route driven by applicants applying for an Intermediate license was video-taped by MPI staff and used by System Technologies Inc. as the basis for the simulation. The simulated driving task underwent numerous iterations to ensure it reflected the on-road route as closely as possible (i.e., it was correctly populated with directional signs and signals, buildings, crosswalks). Twelve hazard anticipation scenarios were also created with the assistance of Don Fisher and Matt Romoser, recognized experts in the area of hazard anticipation at the University of Massachusetts. These scenarios required the driver to identify/anticipate a potential hazard in their driving environment and take appropriate action (e.g., slow down for a bus unloading passengers).

Scoring Driving Errors: A modified version of the checklist used by MPI driver examiners for the road test in Manitoba was developed for use in scoring driving errors (see Appendix K). A detailed scoring manual was developed to support the scoring procedure.

A total of nine different driving categories were identified (e.g., stopping, signal violations, vehicles moving on roadway, speeding, turning, inattentive, visual search/scanning, and collisions); a total of 30 possible driving scenarios within these could be scored using the protocol (e.g., stops too suddenly, turns corner too sharply, exceeds stated speed limit), and there was space for the examiner to note up to 10 errors for each of the scenarios, for a maximum potential error score of 300. Also noted were how many of the 12 hazard anticipation scenarios were correctly identified and how many were missed by the subject. Automated performance measures were also analyzed.

Post-Test Questionnaire: A questionnaire was designed for administration at the end of the session. It asked for information regarding demographics, license status, experience with computer games, and driving the simulator, as well as safety knowledge, attitudes, beliefs/opinions, motivations, skills, and behaviors/behavioral intentions. A copy of the questionnaire appears in Appendix L.

Coordinator: The project coordinator had previously worked in the pilot validity studies and was responsible for recruiting subjects, following-up with them about their scheduled appointment, greeting them, collecting parental consent forms, assigning them to the correct research assistant, monitoring progress, maintaining subject files, helping to troubleshoot any problems that arose, and distributing the questionnaire.

Research Assistants: Four research assistants were recruited for this study. The research assistants were trained on the method for testing subjects and use of the checklist to measure driving errors on a simulated drive test. Two of the assistants were retired MPI driver examiners who also assisted with training because of their experience in the use of a checklist to record errors during an actual road test.

The research assistants were informed in general terms about the purpose of this study, but they did not know the driver education or license status of study participants.

The research assistants were informed that they could provide feedback to the subjects on their performance only after the subjects completed the simulation drive. They were also asked to remind the subjects that they were participating in a research study and the results would have no bearing on their insurance or licensing, and would be confidential and used for research purposes only.

After a day of familiarizing, practice driving, and training to score errors on the simulator, inter-rater reliability tests were conducted on all of the research assistants. The reliability test was arranged to allow the four research assistants to observe and score six test drives. The coordinator and TIRF staff took turns driving the simulator. After each test drive a count of all scoring errors observed was conducted for each research assistant. Inter-rater agreement was measured using kappa (see Table 51). For all test drives the inter-rater reliability reached a rating of fair at an acceptable level (0.21 and 0.40; Landis and Koch 1977). This rating, however, is not universally accepted, as others have rated kappa scores below .40 as poor (Gwet 2010; Fleiss 1981). Although these kappa scores are rated as low by some, it warrants mentioning that they are based on a very small sample which would make the degree of agreement less robust. It is possible that if substantially more test drives were done the kappa scores would be higher. This was not feasible because of the additional costs and time constraints.

Inter-rater reliability scores of driver examiners/research assistants for simulated drive tests are also not well known because few of these types of studies have been done and, when conducted, inter-rater reliability is not always examined or reported in published articles of these studies (e.g., Bédard et al. 2010). Bédard et al. (2010) did examine the validity and reproducibility of simulator-based driving evaluations. One part of the study examined whether an evaluator and a second independent rater could reliably score the demerit points using the playback function of the simulator. The study calculated the intra-class correlation coefficient (ICC), which is a general measurement of agreement or consensus, where the measurements used are assumed to be parametric. The coefficient represents agreements between two or more raters or evaluation methods on the same set of subjects. In this study, the authors obtained ICC scores in the range of 0.32 to 0.83. The ICC calculations for the current study ranged from 0.17 to 0.63. ICC can be interpreted as follows: 0-0.2 indicates poor agreement: 0.3-0.4 indicates fair agreement; 0.5-0.6 indicates moderate agreement; 0.7-0.8 indicates strong agreement; and, >0.8 indicates almost perfect agreement (Portney & Watkins 2000). This suggests that fair to moderate agreement was achieved on some of the test runs for this investigation.

| Table 51: Inter-rater Reliability Kappa-Statistic Measure of Agreement | |
|---|---|
| **Test Drive** | **Kappa** |
| **Test Drive 1** | 0.38 |
| **Test Drive 2** | 0.24 |
| **Test Drive 3** | 0.24 |
| **Test Drive 4** | 0.25 |
| **Test Drive 5** | 0.31 |
| **Test Drive 6** | 0.26 |
| **Combined** | 0.29 |

To bolster agreement in scoring driver errors, research assistants were further trained focusing on those aspects of the checklist and the driving errors on which they were most discordant. There was also one-on-one training with one retired examiner and one assistant. The retired examiners described what they were seeing as errors, which allowed for open dialogue about the errors and hazards that occurred. This was overseen by the driver examiner who took part in the validation studies. Additional training also focused on hazard anticipation. Following the additional training there was a general consensus that agreement in scoring driving errors had improved, but further reliability tests were not conducted.

Recruiting Subjects: The recruitment of subjects for the study was handled by the coordinator and TIRF staff. Recruitment was conducted in 12 high schools across Winnipeg.

The recruiter went to each high school to make contact with students and followed a script to confirm interest in their taking part in the study. The recruiter then provided the students with two forms to take home. The first form was a student information sheet on the project (see Appendix M), and the second form was a parental consent form (see Appendix N). Given possible concerns about coercion, the recruiter made it clear that participation in the study was voluntary and that participation (or not) would have no bearing on driving record or insurance.

The student was asked to have a parent or guardian fill out and sign the consent form; the student was instructed to bring it with them to the test center. For completing the simulation they were informed they would be entered and given a chance to win one of six raffles for $1,000. They were told that their total time commitment at the testing session would be approximately one half hour. If the student agreed to participate, a date and time were established for them to be at the testing center (see Appendix O for a copy of the scheduling sheet).

Participants were sent an email confirming the date and time of their testing session. On arrival at the testing center, they were required to verify age and identity, and provide a signed parental consent form.

Subjects: In total, 174 subjects were recruited for the study, and complete data were available for 170 subjects: 35 in the Non-DE group and 135 in the HSDE group (see Table 52).

The number of subjects in the Non-DE group is lower than in the HSDE group because most teens in Winnipeg high schools complete the MPI driver education program. About 70 percent of grade 10 high school students across the province complete the MPI driver education program, and this percentage is likely higher in Winnipeg because most schools offer the program, which would not be the case in rural Manitoba. As a consequence, the population of Non-DE students to draw from in Winnipeg was relatively small, and recruiting them proved challenging.

Given the small numbers of subjects in some of these groups, caution needs to be taken in interpreting the following results.

| Table 52: Number of Subjects by Group Status | | | |
|---|---|---|---|
| | Driver Education Status | | |
| | Non-DE | HSDE | Total |
| **Pre-Drivers** | 18 | 48 | 66 |
| **Learner Drivers** | 13 | 50 | 63 |
| **New Drivers** | 4 | 37 | 41 |
| **Total** | 35 | 135 | 170 |

The gender and mean age of subjects in each group are shown in Tables 53 and 54. The subjects included 98 males and 72 females. The average age of all of the subjects was 16 years 6 months.

| Table 53: Gender of Subjects by Group Status | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | Non-DE | | HSDE | |
| | Male | Female | Male | Female |
| **Pre-Drivers** | 56% (n=10) | 44% (n=8) | 67% (n=32) | 33% (n=16) |
| **Learner Drivers** | 62% (n=8) | 39% (n=5) | 52% (n=26) | 48% (n=24) |
| **New Drivers** | 50% (n=2) | 50% (n=2) | 54% (n=20) | 46% (n=17) |

| Table 54: Mean Age of Subjects by Group Status | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | Non-DE | | HSDE | |
| | Mean | SD | Mean | SD |
| **Pre-Drivers** | 16 years, 2 months | 0.93 | 15 years, 5 months | 0.34 |
| **Learner Drivers** | 17 years, 1 month | 0.35 | 16 years, 10 months | 0.80 |
| **New Drivers** | 17 years, 1 month | 1.64 | 17 years, 3 months | 0.47 |

Procedure: Following a brief project overview, the simulator segment began with a description of how the controls worked. This was followed by a five-minute orientation drive to familiarize the subject with how the system operated and the use of the vehicle controls. Then, the 15-minute simulated drive test began. A voice-over recording provided instructions throughout the drive, informing the driver at what intersections they should turn, and the direction (e.g., “turn left at Nairn”). The driver examiner/assistant was seated beside and slightly behind the subject and recorded driving errors on the checklist described above. At the end of the driving session the subject was asked to complete a questionnaire (see above) regarding such things as their driving experience and their impressions of the simulator.

When a subject had completed the simulated drive test and had filled out the questionnaire, they were informed they would be entered into the raffle pool, with a chance to win one of six raffles for $1,000.

Four of the 174 subjects were dropped from the study: one subject had to be dropped as a result of not having a signed parental consent form; three subjects were dropped resulting from their simulated test drive being discontinued because of computer failures or because a subject was not following instructions – i.e., after asking them repeatedly not to speed and crash they continued to do so.

### *Data Treatment*

Data Entry: To test the accuracy of data entry, a second independent person entered data from a sample of 10 subjects selected at random – this amounted to a total of 1,730 items. The number of errors identified was negligible, with only eight errors detected for an error rate of less than one half of one percent (0.5%).

Data Analysis: T-tests were used to determine if there were statistically significant differences in mean error scores across comparison groups. Regression analyses were also used to determine whether there was a relationship between driving error scores on the simulated drive test and four independent variables: driver education status, license status, age, and gender.

### *Results – Error Rate Based on Driver Examiner Scoring*

This section describes results for overall performance on the simulated drive test as scored by driver examiners/ assistants on the checklist and then for specific performance categories.

Overall Performance: Table 55 shows the average number of errors for each of these six groups. Importantly, in reviewing the results of this table, caution should be taken in interpreting differences in mean scores between the Non-DE new driver group and other groups. As there were only four subjects in this group, their mean scores are less meaningful and more tenuous because such a small sample size may not be representative at all of Non-DE new drivers. Results from the Non-DE new driver group are at best only suggestive and certainly weak.

There was a clear relationship between errors and license status, which presumably is a proxy for driving experience. As a check on whether license status reflects driving experience, subjects in each of these license status groups were asked after they had completed the simulated drive test how many minutes they had driven in each of the last three days. Results are shown in Table 56. As expected, Non-DE and HSDE pre-driver groups had not driven at all. About 75 percent of Non-DE learner drivers and 64 percent of HSDE learner drivers had driven. All of the Non-DE new drivers (only four subjects, so representativeness of results is tenuous) and 95 percent of the HSDE new drivers had driven in the past three days. Overall, a Pearson Chi-square test revealed that differences in minutes driven recently were statistically significant, suggesting that new drivers are the most experienced group, driving more than learner drivers, and pre-drivers do not drive at all.

| **Table 55: Checklist Results: Mean Driving Errors by Group (standard deviation)** | | | | | |
|---|---|---|---|---|---|
| | **Driver Education Status** | | | | |
| | **Non-DE** | | **HSDE** | | **p-value** |
| | **Mean** | **SD** | **Mean** | **SD** | |
| **Pre-Drivers** | 45.94 | 17.39 | 52.10 | 17.80 | p=0.21 |
| **Learner Drivers** | 34.69 | 14.59 | 27.88 | 11.18 | p=0.07 |
| **New Drivers** | 22.75 | 10.14 | 19.49 | 8.46 | p=0.48 |
| **Group Comparisons** | **p-value** | | **p-value** | | |
| **Pre-Drivers to Learner Drivers** | p=0.07 | | p<0.01 | | |
| **Learner Drivers to New Drivers** | p=0.15 | | p<0.01 | | |
| **Pre-Drivers to New Drivers** | p=0.02 | | p<0.01 | | |

Accordingly, since license status appears to be related to driving experience, at least in terms of months licensed and recent driving, the pattern of results in Table 55 suggests that increased experience is associated with fewer driving errors for both these groups. For the Non-DE group, pre-drivers had an average of 45.94 errors, learner drivers averaged 34.69, and new drivers averaged only 22.75. T-tests were used to determine if these differences in mean scores across the license status groups were statistically significant. Some of the differences across these license status groups are statistically significant at the 0.05 level (P to N). For the HSDE group, pre-drivers had an average of 52.10 errors, learner drivers averaged 27.88, and new drivers averaged 19.49. All of these differences were statistically significant.

A further review of Table 55 reveals that although the mean number of driving errors of Non-DE pre-drivers was lower than that of the HSDE pre-drivers, this difference was not statistically significant. Since neither of these pre-driver groups have any driving experience (see Table 56), one of the hypotheses that Non-DE and HSDE pre-drivers would not differ in terms of driving skills has been confirmed.

Of some importance, Non-DE learner drivers had higher mean driving errors than HSDE learner drivers. These results may be suggestive of a short-term or proximate training effect on skill performance of the MPI driver education program. The results, however, do not support a longer-term training effect on skill performance, because although mean driving errors of Non-DE new drivers are higher than that of HSDE new drivers, this difference was not statistically significant. In part, this may result from the fact that there are only four subjects in the Non-DE new driver group, so this comparison needs to be treated extremely cautiously, given that a larger sample may have resulted in a statistically significant difference, if one is actually present.

| Table 56: Recent Exposure for HSDE and Non-DE Groups | | | | | | |
|---|---|---|---|---|---|---|
| | Driver Education Status | | | | | |
| | **Non-DE Pre-Driver** | **HSDE Pre-Driver** | **Non-DE Learner Driver (n=10)** | **HSDE Learner Driver (n=32)** | **Non-DE New Driver (n=4)** | **HSDE New Driver (n=35)** |
| **Percent Driven** | – | – | 77% | 64% | 100% | 95% |
| **Mean Minutes** | – | – | 73.00 SD=79.20 | 46.31 SD=62.79 | 78.75 SD=41.51 | 99.14 SD=88.02 |
| **Median Minutes** | – | – | 55.00 | 33.50 | 67.50 | 82.00 |

Further analysis used regression modeling to determine whether driving performance is associated with driver education status. For this analysis, simulated drive test error scores were used as the dependent variable and the independent variables were: driver education status (Non-DE, HSDE), license status (entered as two dichotomous variables with pre-drivers serving as the reference category), age, and gender. Results are shown in Table 57.

| Table 57:Regression Analysis for Predictors of Checklist Driving Errors | | | |
|---|---|---|---|
| **Factor (n=170)** | **Coef.** | **p-value** | **[95% Conf. Interval]** |
| **Gender** | 0.515 | p=0.814 | -3.82 – 4.85 |
| **Age** | 1.439 | p=0.390 | -1.85 – 4.72 |
| **DE Status** | 0.573 | p=0.838 | -4.95 – 6.10 |
| **Lic Status 1*** | -23.032 | p<0.001 | -29.53 – -16.54 |
| **Lic Status 2*** | -33.008 | p<0.001 | -40.79 – -25.23 |
| **_Cons** | 26.864 | p=0.320 | -26.26 – 79.99 |
| **Learners vs. New** | -56.040 | p<0.001 | -69.180 – -42.900 |

*Lic status 1=learner driver versus pre-driver; Lic status 2= new driver versus pre-driver

Taken together, 44 percent of the variance in checklist errors can be explained from these four independent variables (Adjusted R-squared=0.441), which is statistically significant – p< 0.001. Driver education status, however, was not associated with driving error scores (p=0.838), but the two license status variables were – both learner drivers (p<0.001) and new drivers (p<0.001) are predicted to make fewer errors than pre-drivers. To illustrate, learner drivers have about 23 fewer errors, and new drivers have about 33 fewer errors, than pre-drivers. As well, further linear combination analyses assessing whether there is a significant difference between learner and new drivers (see bottom of Table 57) revealed that new drivers had significantly fewer driving errors than learner drivers (p<0.001).

These regression results suggest that if driver education has any influence on driving skills, it may be overshadowed by driver experience effects as indicated by license status. This was further examined by conducting an additional regression analysis in which license status was dropped from the model. As shown in Table 58, driver education status is now a significant predictor of driving errors – i.e., the HSDE group has fewer errors than the Non-DE group (p<0.05). It is also noteworthy that dropping license status from the model decreased R-squared considerably – from 0.44 to 0.20. It should be noted that the HSDE group contains more new drivers than the Non-DE group (35 subjects versus only four subjects).

| Table 58: Regression Analysis for Predictors of Checklist Errors (Excluding License Status) | | | |
|---|---|---|---|
| **Factor (n=170)** | **Coef.** | **p-value** | **[95% Conf. Interval]** |
| **Gender** | -1.023 | p=0.696 | -6.180 – 4.134 |
| **Age** | -8.860 | p<0.001 | -11.530 – -6.188 |
| **DE Status** | -6.421 | p=0.046 | -12.730 – -112 |
| **_Cons** | 26.413 | p<0.001 | 142.906 – 232.862 |

To address this issue, a further regression analysis was conducted with new drivers dropped from the model. The remaining variables in this model explain about 31 percent of the variance in checklist errors (Adjusted R-squared -0.309). The results are shown in Table 59. As can be seen, license status (pre-driver versus learner driver) predicts significantly fewer driving errors on the simulated test drive, but not driver education status. Accordingly, this regression analysis suggests that driver education may not have a short-term effect on improving driving skills overall, once license status (a surrogate measure for driving experience) is accounted for in the model.

| Table 59: Regression Analysis for Predictors of Checklist Errors (Excluding New Drivers) | | | |
|---|---|---|---|
| **Factor (n=170)** | **Coef.** | **p-value** | **[95% Conf. Interval]** |
| **Gender** | 1.236 | p=0.657 | -4.262 – 6.735 |
| **Age** | 1.372 | p=0.515 | -2.787 – 5.530 |
| **DE Status** | 1.183 | p=0.726 | -5.495 – 7.861 |
| **Lic Status 3** | -23.06 | p<0.001 | -30.719 – -15.408 |
| **_Cons** | 26.413 | p=0.441 | -41.264 – 94.089 |

*Lic status 3=learner driver versus new driver

Driving errors by performance categories: Although the MPI driver education program does not appear to be associated with overall driving errors on the simulated drive test, it is possible that there is a driver education effect on certain driving performance categories. Greater detail on the distribution of errors is provided in Table 60, which shows the mean number of errors as recorded by the driver examiners/assistants according to each performance category on the scoring protocol – nine categories in total – for the comparison groups. For each of these categories, it would be expected that the HSDE learner and new drivers would have fewer errors than the Non-DE learner and new drivers – e.g., fewer errors related to stopping, turning, and speeding.

Tests of significance were performed to compare the mean error scores of Non-DE pre-drivers to those of HSDE pre-drivers, Non-DE learner drivers to those of HSDE learner drivers, and Non-DE new drivers to those of HSDE new drivers. Given the large number of comparisons in this table (i.e., 27 in total), a modified Bonferroni approach (Sidak 1967; more information in: Holland & Copenhaver 1988; Olejnik et.al. 1997; Seaman, Levin & Serlin 1991) was also applied to avoid capitalizing on chance (i.e., concluding there is an effect while in reality there is not). These calculations determined that to test relationships for Table 60, p-values should be evaluated against a threshold of 0.01 rather than 0.05.

| Table 60: Mean Number of Driving Errors for Each of the Nine Performance Categories by Group | | | | | | |
|---|---|---|---|---|---|---|
| **Performance Category** | **Non-DE Pre-Driver** | **HSDE Pre-Driver** | **Non-DE Leaners** | **HSDE Learners** | **Non-DE New Driver** | **HSDE New Driver** |
| **Stopping** | 2.72 SD=2.59 | 2.56 SD=1.84 | 2.38 SD=0.94 | 1.36 SD=1.45 | 0.50 SD=0.58 | 1.05 SD=1.25 |
| | p=0.78 | | p=0.04 | | P=0.39 | |
| **Signal Violations** | 0.94 SD=1.35 | 1.83 SD=3.10 | 0.85 SD=1.14 | 0.36 SD=0.72 | 0.00 SD=0 | 0.30 SD=0.52 |
| | p=0.25 | | p=0.06 | | p=0.27 | |
| **Vehicles Moving on Roadway** | 18.61 SD=9.98 | 18.75 SD=7.82 | 10.85 SD=5.84 | 7.72 SD=5.71 | 5.25 SD=3.30 | 4.59 SD=3.47 |
| | p=0.95 | | p=0.09 | | p=0.72 | |
| **Uncontrolled Intersections/ Yield Signs/ Pedestrian Crosswalks** | 0.39 SD=0.78 | 0.31 SD=0.72 | 0.23 SD=0.60 | 0.28 SD=0.61 | 0.00 SD=0.00 | 0.22 SD=0.53 |
| | p=0.71 | | p=0.80 | | p=0.43 | |
| **Speed** | 4.50 SD=4.03 | 4.85 SD=3.36 | 6.31 SD=3.68 | 3.82 SD=3.01 | 3.25 SD=2.63 | 3.70 SD=2.70 |
| | p=0.72 | | p=0.01 | | p=0.75 | |
| **Turning** | 11.11 SD=4.25 | 13.23 SD=3.31 | 7.92 SD=3.45 | 7.82 SD=3.03 | 7.25 SD=3.40 | 5.35 SD=2.78 |
| | p=0.04 | | p=0.92 | | p=0.21 | |
| **Inattentive** | 1.06 SD=1.83 | 0.90 SD=1.65 | 0.08 SD=0.28 | 0.48 SD=1.00 | 0.25 SD=0.50 | 0.32 SD=0.78 |
| | p=0.74 | | p=0.15 | | p=0.86 | |
| **Visual Search/ Scanning** | 5.22 SD=3.21 | 7.31 SD=4.19 | 4.77 SD=3.42 | 5.28 SD=3.42 | 6.25 SD=0.96 | 3.41 SD=3.06 |
| | p=0.06 | | p= 0.63 | | p=0.08 | |
| **Collisions (only at fault)** | 1.39 SD=1.29 | 2.35 SD=2.64 | 1.31 SD=0.95 | 0.76 SD=.85 | 0.00 SD=0.00 | 0.54 SD=0.99 |
| | p=0.14 | | p=0.05 | | p=0.29 | |

As can be seen, HSDE learners made significantly fewer speeding errors than Non-DE learners (3.82 versus 6.31; p=0.014, just above the threshold of 0.01). None of the other differences in mean error scores between comparison groups are statistically significant at this more rigorous 0.01 level. However, the pattern of results suggests that HSDE learner drivers had fewer driver errors than Non-DE learner drivers on an additional five of the nine categories, and differences were statistically significant at the 0.05 level, albeit not at the more conservative 0.01 level. These included: stopping (2.38 versus 1.36; p=0.04); at-fault collisions (1.31 versus 0.76; p=0.05). These results suggest that the MPI driver education program at least had a short-term or proximate training effect on speeding errors among HSDE learner drivers. The results are also suggestive that HSDE learner drivers have lower mean errors than Non-DE learner drivers, at least for some of the other performance categories, although these differences may have been chance findings since they did not achieve the 0.01 significance level.

To provide further insight into the specific performance skills, the 30 individual driving performance categories contained on the driver examiner checklist were examined separately for the comparison groups (results discussed but not shown in table). Non-DE learner drivers had higher mean scores than HSDE learner drivers for 19 of the 30 individual performance categories (63%), and these differences were significant at the 0.01 level for the following two: stopping too suddenly (0.69 versus 0.06; $p<0.00$), and straddling the center line (5.00 versus 2.50; $p=0.01$). The direction of the findings, (albeit relatively weak because few achieved statistical significance at the 0.01 level), at least suggests that exposure to the MPI driver education program may have had some short-term positive benefits on some driving skills.

There is no evidence that the MPI driver education program had a longer-term effect on driving skills, and this was difficult to find because of the small sample size of the Non-DE new drivers (only four subjects).

Hazard Anticipation: Hazard anticipation was treated separately from the driving errors owing to a slightly different scoring system. As noted in the Method section, 12 different hazard anticipation scenarios had been created and the examiner/assistant noted how many of these were not responded to correctly by the driver (and how many were correctly identified). Driver examiners/assistants noted each hazard situation as it arose and noted if the driver identified it or not – e.g., by decelerating, braking, mirror checking, visual scanning, or changing lanes.

The percent of hazards that the driver failed to identify/anticipate are shown in Table 61.

**Table 61: Checklist Results: Failure to Anticipate/ Identify Hazards by Group**

| | Driver Education Status | | |
|---|---|---|---|
| | **Non-DE** | **HSDE** | **p-value** |
| **Pre-Drivers** | 71%<br>SD=19.85 | 72%<br>SD=21.04 | p=0.95 |
| **Learner Drivers** | 62%<br>SD=26.47 | 64%<br>SD=20.43 | p=0.70 |
| **New Drivers** | 67%<br>SD=20.41 | 60%<br>SD=19.16 | p=0.52 |
| **Group Comparisons** | **p-value** | **p-value** | |
| **Pre-Drivers to Learner Drivers** | p=0.25 | p=0.08 | |
| **Learner Drivers to New Drivers** | p=0.73 | p=0.35 | |
| **Pre-Drivers to New Drivers** | p=0.68 | p=0.01 | |

As can be seen, in most of the comparisons the small differences in hazard anticipation between groups were not statistically significant. The possible exception is that for the HSDE group, pre-drivers failed to identify more hazards than learner drivers and new drivers.

This pattern of results for the HSDE groups suggests that the MPI driver education program may have had a positive influence on improving hazard anticipation skills. Other factors, however, besides or in combination with driver education, may have played a role in the improvements in hazard anticipation skills observed across license status for the HSDE group. It is also worthwhile noting that although hazard anticipation skills improved for the HSDE group, they still failed to identify 60 percent of hazards on the simulated test drive.

### *Results – Error Rate Based on Computer Scoring*

During the simulated drive tests, automated errors of driving performance were also being generated. Both overall performance errors and driving errors for specific categories are discussed below.

Overall Performance: The computer software, STISIM Drive, includes a driving skill assessment tool for measuring driving errors. The average numbers of errors generated by the computer are shown in Table 62. Comparable to the results based on driver examiner/assistant scoring of driving errors discussed previously, there is some evidence of a relationship for both the Non-DE group and the HSDE group between errors and driving experience (i.e., license status).

For the Non-DE group, pre-drivers had an average of 27.3 errors, learner drivers on average 21.2, and new drivers an average of 21.5. The differences between pre-drivers and learner drivers approached significance at the 0.05 level (p=0.06).

For the HSDE group, pre-drivers had an average of 27.9 errors, learner drivers an average 18.0, and new drivers an average of 19.4. The differences between pre-drivers and learner drivers as well as pre-drivers and new drivers were statistically significant.

**Table 62: Automated Results: Mean Driving Errors by Group**

| | Driver Education Status | | |
|---|---|---|---|
| | **Non-DE** | **DE** | **p-value** |
| **Pre-Drivers** | 27.28<br>SD= 8.56 | 27.91<br>SD=17.42 | p=0.88 |
| **Learner Drivers** | 21.23<br>SD= 8.00 | 18.04<br>SD=7.25 | p=0.17 |
| **New Drivers** | 21.50<br>SD= 5.97 | 19.35<br>SD=5.21 | p=0.44 |
| **Group Comparisons** | **p-value** | **p-value** | |
| **Pre-Drivers to Learner Drivers** | p=0.06 | p<0.01 | |
| **Learner Drivers to New Drivers** | p=0.95 | p=0.35 | |
| **Pre-Drivers to New Drivers** | p=0.22 | p=0.01 | |

A further review of the table reveals that, not unexpectedly, Non-DE pre-drivers had an average number of errors that did not differ significantly from that of HSDE pre-drivers. Although the average number of errors was higher for Non-DE learner drivers than for HSDE learner drivers, this difference was not statistically significant. Statistically significant differences in mean errors were also not apparent comparing results for Non-DE new drivers and HSDE new drivers.

The results below suggest an experience effect but not a driver education effect on overall driving performance as assessed on a simulated drive test. Similar results were found in a regression analysis showing that license status predicted automated driving errors, but driver education status did not. However, the analyses did not show that learner drivers had significantly different error scores from new drivers, which was the finding when using the checklist to score driving errors – i.e., learner drivers had more errors than new drivers, and this difference was statistically significant.

Driving Errors by Performance Categories: Table 63 shows the mean number of errors for each group as recorded by the computer software for eight performance categories. In the table, mean errors are compared for Non-DE and HSDE pre-drivers, Non-DE and HSDE learner drivers, and Non-DE and HSDE new drivers.

As can be seen in Table 63, the differences in error rates between Non-DE and HSDE pre-drivers on each performance category were not statistically significant. Non-DE learner drivers, however, had higher error rates than HSDE learner drivers on seven of the eight performance categories, and in two cases these differences were statistically significant at the 0.01 level: collisions; and tailgating. No statistically significant differences were found in comparing the error rates of Non-DE new drivers and HSDE new drivers on each of these eight categories.

These findings based on computer scoring are generally similar to, albeit somewhat weaker, than those based on driver examiner/assistant scoring, and further suggest that the MPI driver education program may have a positive learning effect on at least some driving performance skills, in the short term. No further benefits of the program on driving skills were apparent after a few months of independent driving in the intermediate stage of the GDL program.

**Table 63: Automated Results: Mean number of driving errors for each of the performance categories by group**

| | Non-DE Pre-Driver | HSDE Pre-Driver | Non-DE Learners | HSDE Learners | Non-DE New Driver | HSDE New Driver |
|---|---|---|---|---|---|---|
| **Off-Road accidents** | 0.22 | 1.15 | 0.46 | 0.06 | 0.00 | 0.00 |
| | p=0.14 | | p=0.06 | | p=n/a | |
| **Collisions** | 0.44 | 1.51 | 0.85 | 0.45 | 0.25 | 0.41 |
| | p=0.24 | | p=0.01 | | p=0.72 | |
| **Pedestrian Hits** | 0.44 | 0.26 | 0.31 | 0.27 | 0.00 | 0.22 |
| | p=0.12 | | p=0.77 | | p=0.38 | |
| **Speed Exceedances** | 7.22 | 7.45 | 6.31 | 5.45 | 8.00 | 6.32 |
| | p=0.88 | | p=0.52 | | p=0.50 | |
| **Stop Sign Violations** | 2.67 | 2.81 | 1.92 | 1.31 | 0.25 | 0.51 |
| | p=0.80 | | p=0.18 | | p=0.54 | |
| **Centerline Crossings** | 14.28 | 11.55 | 10.62 | 9.57 | 13.00 | 11.62 |
| | p=0.16 | | p=0.42 | | p=0.41 | |
| **Road Edge Excursions** | 2.00 | 3.19 | 0.77 | 0.94 | 0.00 | 0.27 |
| | p=0.19 | | p=0.66 | | p=0.42 | |
| **Tailgating** | 25.06 | 16.83 | 24.63 | 15.68 | 12.92 | 14.63 |
| | p=0.12 | | p=0.01 | | p=0.78 | |

Group Differences Based on Self Report: As part of the study protocol, subjects were asked a series of questions related to their experience with computers and their thoughts on the simulated test drive – see Appendix L for the questions. Results were compared between Non-DE pre-drivers and HSDE pre-drivers, Non-DE learner drivers and HSDE learner drivers, and Non-DE new drivers and HSDE new drivers, to identify statistically significant differences. These groups did not differ in terms of:

- the amount of experience they had with computer or video games that involve driving;
- the amount of experience they had with computer games;
- the simulator making them feel ill or dizzy;
- how easy they found the instructions;
- how well they thought the simulator reflected their driving skills;
- how easy they thought it was to drive the simulator;
- how difficult it was to use the steering wheel; or,
- how difficult it was to see the stop signs/stop lights.

Responses of the Non-DE and HSDE groups were also very similar in regard to whether they thought each of the following were the most difficult part of "driving" the simulator: steering, keeping the car going straight, turning, keeping the car at a constant speed, braking, changing lanes, and passing other vehicles. Turning was identified by all groups as the most difficult part of driving the simulator.

Only one t-test found a statistically significant difference in responses: more HSDE new drivers thought the driving simulator was realistic compared to Non-DE new drivers – 2.54 versus 1.75 ($p=0.04$), on a four-point scale ranging from 1 meaning not at all and 4 meaning very realistic.

The questionnaire included several questions on learning to drive. The comparison groups did not differ in the number of hours of supervised driving they received (or are receiving) in an average week on their Learner license: Non-DE learner drivers reported 3.17 hours compared to 3.30 hours for HSDE learner drivers, and Non-DE new drivers reported 4.88 hours compared to 5.90 hours for HSDE new drivers. No statistically significant differences were found in responses across comparison groups in terms of other questions related to learning to drive.

Non-DE and HSDE subjects were also asked questions related to their safe driving knowledge and their skills and abilities (further information on the question items and scales that were used in the questionnaire are found in earlier sections of this report). Results for each of the scales that were used are shown in Table 64. Average scores on some of these scales are not provided for HSDE and Non-DE pre-drivers, because they have not driven (e.g., risky driving behavior scale). As can be seen, the following differences were found:

- Non-DE learner drivers actually had a higher safe driving knowledge score than HSDE learner drivers, approaching statistical significance ($p=0.05$), which contrasts with earlier findings and may result from the smaller sample comprising only Winnipeg teens;

- Non-DE learner drivers had a slightly lower rating of their driving skills than HSDE learner drivers, but this was not significant at the 0.05 level, and although the significance test result is not shown in the table, HSDE learner drivers rated their driving skills as significantly higher than HSDE pre-drivers (3.76 versus 3.44; p<0.01), suggesting an effect of the MPI driver education program; and,
- More Non-DE learner drivers compared to HSDE learner drivers reported engaging in risk-taking behaviors (p=0.03).

**Table 64: Average mean scores for each scale, by group**

| | Driver Education Status | | | | | |
|---|---|---|---|---|---|---|
| | **Non-DE Pre-Driver** | **HSDE Pre-Driver** | **Non-DE Learners** | **HSDE Learners** | **Non-DE New Driver** | **HSDE New Driver** |
| **Safe Driving Knowledge** | 6.00 n=18 | 5.85 n=48 | 8.15 n=13 | 6.96 n=50 | 7.00 n=4 | 7.35 n=37 |
| | p=0.80 | | p=0.05 | | p=0.72 | |
| **Self-Rated Skills** | 3.42 n=14 | 3.44 n=46 | 3.55 n=11 | 3.76 n=43 | 4.03 n=4 | 3.94 n=35 |
| | p=0.89 | | p=0.10 | | p=0.69 | |
| **Risk Taking Behavior Scale** | 1.40 n=17 | 1.50 n=44 | 1.68 n=13 | 1.31 n=49 | 1.59 n=4 | 1.58 n=37 |
| | p=0.51 | | p=0.03 | | p=0.96 | |
| **Risky Driving Behavior Scale** | – n=0 | – n=0 | 1.40 n=10 | 1.48 n=39 | 1.70 n=4 | 1.58 n=36 |
| | p=n/a | | p=0.42 | | p=0.54 | |
| **Manchester Scale** | – n=0 | – n=0 | 1.34 n=10 | 1.44 n=41 | 1.54 n=4 | 1.46 n=36 |
| | p=n/a | | p=0.31 | | p=0.59 | |
| **Distraction Scale** | – n=0 | – n=0 | 1.65 n=11 | 1.61 n=45 | 2.25 n=4 | 2.03 n=36 |
| | p=n/a | | p= 0.80 | | p=0.54 | |
| **Drink Driving scale** | – n=0 | – n=0 | 1.00 n=10 | 1.13 n=41 | 1.00 n=4 | 1.01 n=36 |
| | p=n/a | | p=0.50 | | p=0.74 | |
| **Risky Driving Attitude Scale** | 1.79 n=16 | 1.75 n=14 | 2.03 n=12 | 1.61 n=50 | 1.80 n=4 | 1.65 n=35 |
| | p=0.85 | | p=0.11 | | p=0.66 | |
| **Lifestyle Scale** | 4.43 n=17 | 4.30 n=46 | 4.32 n=13 | n=49 4.36 | 4.06 n=4 | 4.26 n=36 |
| | p=0.45 | | p=0.84 | | p=0.64 | |

The above pattern of results suggests that the Non-DE and HSDE groups do not differ on person-centered factors which could influence their skill performance. As well, there is some evidence that suggests that the MPI driver education program is associated with higher self-reported driver skills, although it is also possible that more practice driving generated greater confidence in their skills.

### ***Summary***

A major purpose of the Manitoba High School Driver Education Program is to teach safe driving skills and habits that help the students become safe drivers. Accordingly, this evaluation sought to determine if exposure to driver education enhances performance skills.

Results based on scoring driving errors by driver examiners/assistants provide some, albeit weak, evidence of a short-term or proximate training effect on skill performance of the MPI driver education program. Learner drivers who had recently completed the MPI driver education program generally performed better on the simulated drive test than learner drivers who had not taken the MPI program, although these effects were removed by the stronger effects of increased driving experience in the regression analysis. HSDE learner drivers, however, have lower mean driving errors than Non-DE learner drivers, at least for some of the specific performance categories, although these differences may have been chance findings because they did not achieve the 0.01 significance level. The results do not support a longer-term training effect on skill performance, because HSDE new drivers generally did not perform better on the simulated drive test than Non-DE new drivers. Given that new drivers have had several months of independent driving, any benefits of training may have been overridden by the increased driving experience and exposure of both the Non-DE and HSDE groups. As well, driver education effects on driving skills may have been too subtle to have been detected given the small sample sizes. The data could be considered especially suspect among Non-DE new drivers (only four subjects) in this study.

In terms of hazard anticipation skills, the pattern of results suggests that the MPI driver education program may have had a positive influence – i.e., for the HSDE group, hazard anticipation skills improved with license status, which presumably is a proxy measure for increased driving experience. HSDE learner drivers performed better on hazard perception than HSDE pre-drivers, and HSDE new drivers performed best. This conclusion, however, needs to be tempered because statistically significant differences in the number of hazards the driver failed to identify were not found between the Non-DE and HSDE groups at any license status level. This suggests that other factors besides, or in combination with, driver education may have played a role in these improvements for the HSDE group. It is also worthwhile to note that although hazard anticipation skills improved for the HSDE group, they still failed to identify 60 percent of hazards on the simulated drive test, even though they had completed the MPI HSDE program.

The findings based on computer scoring are generally similar to, albeit slightly weaker than, those based on driver examiner/assistant scoring, and further suggest that the MPI driver education program may have a positive training effect on at least some driving performance skills in the short term. No further benefits of the program on driving skills were apparent after a few months of independent driving in the intermediate stage of the GDL program.

Finally, the self-reported results suggest that the Non-DE and HSDE groups do not differ on other factors which could have influenced their skill performance – e.g., the HSDE group was not more computer savvy than the Non-DE group, and both HSDE and Non-DE groups had similar amounts of supervised driving practice on the Learner license.

Results suggest that the MPI driver education program may have increased self-reported driving skills, which is consistent with findings from other parts of this investigation as discussed in previous sections. Accordingly, there is now both subjective (self-report) and at least some, albeit weak, objective (simulated drive test) evidence that the MPI driver education program is associated with better driving performance skills.

## Student Outcomes: Road Test Performance

### *Purpose*

A principal goal of driver education is to teach students how to drive and prepare them to pass the road test. Accordingly, the evaluation has sought to determine if exposure to driver education enhances performance skills on the licensing road test. As described in previous sections, skills have been assessed by comparing the self-reported driving skills and performance on a simulated drive test of Manitoba teens who have and have not taken driver education.

This section focuses on the results from the on-road driver license test (practical "skills" test) that novices are required to pass to move from the learner stage to the intermediate stage of the GDL program in Manitoba. Almost all jurisdictions in North America, Australia, and Western Europe have a basic on-road test (Haire et al. 2011). A shared perspective in these jurisdictions is that the main objective of such testing is safety (Mayhew & Simpson 1990; Mayhew et al. 2001; LTSA 1997; AAMVA 1994; Lynam & Twisk 1995; Haire et al. 2011; Christie 2000). As observed by Seigrist (1999), "the practical test requires a demonstration of adequate skill in car control, adequate performance of basic and special maneuvers and good understanding of traffic regulations" (p. 104). The test is therefore designed to ensure that people who drive motor vehicles on highways are competent drivers and that they are aware of safe driving practices and road laws. Thus, the test sets the minimum standards for "safe" driving and provides a means to ascertain if someone has achieved that standard and can now become licensed.

Those who fail the test are, therefore, unsuited to drive, and consequently are not allowed to operate vehicles on the highways unsupervised. In most jurisdictions, those who fail the on-road test can continue to drive as learners and take training and/or practice under supervision so that they can achieve the minimum competency levels. Typically, in Manitoba and elsewhere, learners can retake the test until they eventually pass. Thus, the test actually screens out relatively few people from driving, but it has a direct influence on the training and practice of learner drivers – i.e., it motivates them to achieve minimum competency standards through practice and/or training (Watson et al. 1996; McKnight 1992; Christie 2000). In this regard, according to the American Association of Motor Vehicle Administrators guidelines (1999), the primary purpose of a skill test is to "…force applicants to acquire requisite skills through instruction and practice and to assure possession of these skills, before they are issued a license to operate unsupervised" (p. 27). Given that the learner driver is demonstrating skills under observation and test conditions, they should be performing to the best of their abilities.

At issue is whether learner drivers who have completed the MPI HSDE program are more likely to pass the road test than those who have not taken the MPI program. Addressing this issue is the primary purpose of this segment of the evaluation.

### *Road Tests*

The basic road test focuses primarily on assessing performance and skills in operating a vehicle. McKnight (1992) observes that the road test assesses skill in the following two ways:

> First and foremost, it assesses performance on those driving tasks that require skill, including accelerating, shifting, steering, braking, judging distance, and selecting gaps. Poor performance in tasks indicates the lack of requisite skills. The second way it assesses skills is by evaluating performance on those tasks that do not require skill but must be performed simultaneously with the tasks that do. Examples of these tasks are selecting the correct lane, operating at safe speed, signaling, and adherence to traffic signs and signals (p.10).

Road tests in Canada, and elsewhere, typically include both of these aspects of skill assessment. Most current on-road tests have been in place for many years and some are based on the Automobile Driver On-Road Performance Test (ADOPT) developed by McPherson and McKnight (1981) for NHTSA. The ADOPT was developed as a model for U.S. jurisdictions to replace older, less valid and reliable tests.

<u>The Road Test in Manitoba:</u> The Manitoba road test has features similar to the ADOPT and other early versions of on-road tests. It consists of three phases: introductory phase, road test phase, and termination phase. The road test phase is taken in the applicant's vehicle on a pre-determined test route and is about 15 minutes in duration. A road test route must consist of at least two stop signs and at least seven left turns and seven right turns in traffic. During the test, applicants are assessed on a range of vehicle control skills, including starting, backing, steering, driving along, intersection/R.R. crossing, turns, parking, stopping, and speed.

Errors are marked on a "Road Test in Traffic Marking Sheet" as they occur and all applicants are given a full road test, unless the test has to be discontinued (for example, because of a collision and/or serious safety concern).

Road tests are marked on a demerit point system weighted proportionately to their seriousness. Non-serious errors are scored five-points. Serious errors are scored 10-points and result in an automatic failure if the applicant places the vehicle in a situation that is dangerous, or if the examiner must assist the applicant in any way. Up to 50 demerit marks are allowed, assuming no automatic failure occurred. Any applicant with more than 50 demerit marks or who has committed an automatic failure will have failed the test and is required to repeat it and pass before being issued an Intermediate license.

The following reasons for failure are taken from the most recent version of the Driver Examiner's manual (2006):

1. **Collision:** During the road test if an applicant is involved in a collision and the driver examiner determines that the applicant is at fault for the collision the road test is discontinued and the applicant receives an automatic failure under "Collision."
2. **Assisted:** Any time during the road test that an examiner must assist the applicant in properly placing the vehicle on the road or help the applicant to correctly operate the vehicle.
3. **Dangerous Action:** This category includes applicants whose driving endangers the safety of others.
4. **Serious Violation:** This category includes those applicants who commit a serious traffic violation.
5. **Interference:** Any time an applicant interferes with other traffic and it does not warrant being marked under dangerous action will result in an automatic failure.
6. **Graduated Reasons:** When an applicant accumulates a score above the allowable demerits (50 demerits) on a road test this results in a test failure and indicates that the applicant needs further training and practice.
7. **Test Discontinued:** This would be marked after the applicant has committed an automatic failure and the driver examiner has determined it is too dangerous to continue with the road test, and immediately returns to the testing center.
8. **Parallel Parking:** When an applicant is unable to adequately parallel-park the vehicle.

### *Method*

Manitoba Public Insurance (MPI) staff recorded road test results from eight MPI Service Centers in the Winnipeg area from July 22 to December 31, 2010. The names of the Service Centers were: Bison, Gateway, King Edward, Main, Nairn, Pacific, Pembina, and Steinbach.

Over the study period, road test results were collected on 2,939 applicants for a Class 5 Intermediate license who were age 16-19. Test results were taken from the traffic marking sheet completed by the driver examiner during the road test. Information on driver education status was extracted from MPI's driver education database.

MPI provided the project team with an MS Excel dataset purged of all confidential identifiers. This dataset included, for each road test applicant in the file, road test date and time, driver education status, Service Center name, age of applicant at time of road test, pass/fail result, demerit points, and the reason for an automatic failure. It was not possible for MPI to include in this dataset whether the test results were the applicants' first attempt or a subsequent attempt to pass.

The project team reviewed the dataset for completeness and any logical inconsistencies. Four anomalous cases were identified and excluded from the analyses: two test failures that do not have any points and do not have a reason for failure marked, and two passes, one with 70 points (a pass is 50 points or less) and the other with no points marked at all, not even a zero. This means that the total sample for the analyses is 2,935 road test applicants.

### *Results*

Group Profiles: Table 65 provides information on the driver education (HSDE) and non-driver education (Non-DE) groups in terms of their age when the road test was taken. Among these applicants, 86 percent had taken the HSDE program and 14 percent had not taken the program. The fact that there were more road test applicants in the HSDE group than the Non-DE group is not surprising, because most teens take the MPI program.

The average age of the HSDE group was 17 years, one month, which was significantly younger than the average age of the Non-DE group of 17 years, 11 months. This difference was found to be statistically significant using both a t-test to assess whether the mean ages of these two groups were statistically different from each other, as well as a Chi-square test to examine differences in the frequency age distributions of the two groups. The table shows that the majority of the HSDE group (61%) was 16 years old, compared to only 22 percent of the Non-DE group. These results suggest that the HSDE group attempts the road test at a much earlier age than the Non-DE group, and this practice might be a result of the features of the GDL program in Manitoba. Under GDL, a teen can obtain a Learner license at age 15 years, six months if they are enrolled in the high school driver education program. Since the Learner license must be held for a minimum of nine months, the earliest age the road test could be attempted is 16 years, 3 months. If a teen decides not to take the high school driver education program, they have to be at least 16 years of age to obtain a Learner's license and hold it for a minimum of nine months. This means that the earliest someone in the Non-DE group could attempt the road test is 16 years, 9 months. This license feature effectively encourages earlier licensing and exposure.

| Table 65: Group Profiles | | | |
|---|---|---|---|
| | Driver Education Status | | Overall |
| | HSDE | Non-DE | |
| **All Teen Drivers** | n= 2,510 (86%) | n= 425 (14%) | n=2,935 |
| **Driver Age** | | | |
| **16** | 61% | 22% | 55% |
| **17** | 27% | 35% | 28% |
| **18** | 8% | 26% | 11% |
| **19** | 4% | 18% | 6% |
| **Mean Age** | 17 years, 1 month | 17 years, 11 months | |
| **p-value** | p<0.01 | | |

<u>Pass Rates:</u> As described previously, any applicant with more than 50 demerit marks or who has committed a serious driving error will receive an automatic failure. Table 66 shows the pass rate for the HSDE and Non-DE groups overall and according to driver age. The analysis did not reveal any statistically significant difference in the pass rates of the two groups. On average (across test centers) slightly over half passed the road test. Further analysis showed that the pass rates did not differ significantly between the two groups regardless of the service centers conducting the road tests (results discussed but not shown in table).

| Table 66: Road Test Pass Rates | | | | |
|---|---|---|---|---|
| | Total | Driver Education Status | | p-value |
| | | HSDE | Non-DE | |
| **All Teen Drivers** | 52% | 52% | 51% | p=0.73 |
| **Driver Age** | | | | |
| **16** | 57% | 57% | 52% | p=0.37 |
| **17** | 45% | 44% | 52% | p=0.06 |
| **18** | 46% | 46% | 47% | p=0.82 |
| **19** | 45% | 40% | 53% | p=0.10 |
| | p<0.01 | p<0.01 | p=0.81 | |

A further examination of the table reveals that among the HSDE group there is a statistically significant difference in the pass rates for drivers of different ages – almost 60 percent of drivers age 16 passed the road test, compared to about 40 to 45 percent of older drivers ages 17, 18, and 19. Such is not the case among the Non-DE group, in which about half in each age group passed the road test. A comparison of the pass rates for the HSDE and Non-DE groups in each age category found only one difference that approached statistical significance at the 0.05 level. Non-DE teens age 17 had a higher pass rate than HSDE teens age 17 – a pass rate of 52 percent versus 44 percent, respectively. However, this difference was just short of being significant (p=0.06).

Logistic regression analysis did not find a significant effect of driver education status on the pass rate after controlling for age effects.

<u>Mean Error Scores:</u> The Manitoba road test is scored on a demerit point system with non-serious errors scored five points and serious errors scored 10 points. In this regard, a lower mean score demonstrates better driving performance.

Table 67 shows the mean scores for the HSDE and Non-DE groups overall and then for driver age. The results of t-tests on group means show that the HSDE group actually had significantly lower scores than the Non-DE group (42 versus 49). This suggests that even though both these groups had a similar pass rate, the HSDE group scored better than the Non-DE group on the road test. Further analyses revealed that this pattern of results was the case for those who failed the test as well as those who passed the test. Among teens failing the test, the HSDE group had fewer deductions than the Non-DE group – mean scores of 60 and 68, respectively; and among those passing the road test, the HSDE group also had fewer deductions than the Non-DE group – mean scores of 25 and 30, respectively. These differences in means were statistically significant.

**Table 67: Road Test Mean Scores**

| | Total | Driver Education Status | | p-value |
|---|---|---|---|---|
| | | HSDE | Non-DE | |
| **Test Result** | | | | |
| **Overall** | 42.64 | 41.64 | 48.58 | p<0.01 |
| **Test Failure** | 60.95 | 59.73 | 67.99 | p<0.01 |
| **Test Pass** | 25.46 | 24.74 | 29.79 | p<0.01 |
| **Driver Age** | | | | |
| **16** | 39.04 | 38.63 | 45.71 | p=0.02 |
| **17** | 47.10 | 46.36 | 50.41 | p=0.12 |
| **18** | 47.08 | 45.77 | 49.59 | p=0.28 |
| **19** | 46.97 | 46.92 | 47.04 | p=0.98 |
| | p<0.01 | p<0.01 | p=0.66 | |

An analysis of variance (ANOVA) was used to determine whether the means of the various subgroups were significantly different. The results for the HSDE group showed that mean scores differed significantly by driver age. For example, HSDE teens age 16 had a lower mean error score (38.6) than older HSDE teens age 17 (46.4), 18 (45.8) and 19 (46.9).

Further analyses used t-tests to determine whether the mean scores of the HSDE and Non-DE group were statistically different for each of the subgroups. As can be seen, the HSDE group had significantly lower mean error scores than the Non-DE group for drivers age 16 (38.6 versus 45.7).

These analyses revealed that the HSDE group performs better on the road test than the Non-DE group in terms of mean error scores. This is difficult to interpret given the findings in the previous section showing pass rates do not differ significantly between these two groups.

<u>Reasons for Road Test Failure:</u> Having over 50 demerit points on the road test is not the only reason for a test failure. Applicants can also fail the road test for serious driving errors such as collisions, dangerous actions, serious violations, interference with other traffic, and needing the assistance of the driver examiner in the vehicle. Table 68 shows, for the HSDE and Non-DE groups, the percentages that failed the test for points only (points >50) and the percentages that failed for other reasons divided into two categories: points >50 and points ≤50. The second of these

categories would have failed the test anyway on points but also committed one or more serious driving errors; the second might have passed based on points if they had not committed one or more serious driving errors.

| Table 68: Reasons for Failure: Points or Serious Driving Errors | | | |
|---|---|---|---|
| | Total | Driver Education Status | |
| | | HSDE | Non-DE |
| **Points only (>50)** | 13% | 12% | 17% |
| **Points (>50) + Other Reasons** | 47% | 47% | 48% |
| **Points (≤50) + Other Reasons** | 41% | 41% | 35% |
| | | p=0.25 | |

As can be seen, there is no statistically significant difference between the HSDE group and the Non-DE group in terms of these three reasons for failure. Overall, about 13 percent failed the road test for error points alone, almost half failed for other reasons including high error points (> 50), and about two out of five failed for other reasons despite having low error points (≤ 50). These results also suggest that most of the HSDE (88%) and Non-DE groups (84%) who failed the road test do so because they committed one or more serious driving errors and not for the accumulation of points for less severe driving errors.

Table 69 shows the percentages of the HSDE group and the Non-DE group that failed the road test for one reason, two reasons, and three or more reasons. This analysis excludes applicants that failed the road test due to points alone.

| Table 69: Number of Failure Reasons | | | |
|---|---|---|---|
| | Total | Driver Education Status | |
| | | HSDE | Non-DE |
| **1 Failure Reason** | 26% | 26% | 25% |
| **2 Failure Reasons** | 39% | 39% | 42% |
| **3 or More Failure Reasons** | 35% | 35% | 33% |
| | | p=0.74 | |

As can be seen, there is no statistically significant difference between the two groups in the number of reasons that resulted in a road test failure. For both groups, about 25 percent had one reason for failure marked, 40 percent had two reasons for failure marked, and 35 percent had three or more reasons for failure of the road test marked by the driver examiner. This suggests that when road test failures for both groups are not for error points alone, the majority (75%) result from the commission of multiple serious driving errors.

The results in Table 70 show, for each reason for test failure, the percentages of the HSDE and the Non-DE groups who committed that driving error. For example, a serious violation was marked as a reason for failure for 34 percent of the applicants who failed the road test. Similar to the previous table, this analysis excludes applicants that failed the road test for points only. As can be seen, there is no statistically significant difference between the HSDE and Non-DE groups for any of these reasons for test failure. For both groups, the need for the driver examiner to assist the applicant (assisted), dangerous actions, and serious violations were the most common reasons for test failure. The need for the driver examiner to assist the applicant (assisted) was higher for the HSDE group, but did not reach significance at the 0.05 level (p=0.09). The least common reasons were when the driver examiner had to discontinue the test (less than one percent for both groups), and when the applicant interfered with other traffic. As well, during these road tests, no applicants had a collision.

| Table 70: Types of Automatic Failures | | | | |
|---|---|---|---|---|
| | Total | Driver Education Status | | p-value |
| | | HSDE | Non-DE | |
| **Assisted** | 38% | 40% | 32% | p=0.09 |
| **Dangerous Action** | 30% | 31% | 29% | p=0.71 |
| **Serious Violation** | 34% | 33% | 31% | p=0.53 |
| **Interference** | 10% | 10% | 7% | p=0.18 |
| **Test Discontinued** | 1% | 1% | 1% | p=0.79 |
| **Parallel Parking** | 18% | 18% | 17% | p=0.85 |

These results suggest that the HSDE and Non-DE groups failed the road test for similar reasons, and the majority of these failures resulted from automatic failures due to one or more serious driving errors. The types of serious driving errors were also similar for both the HSDE and Non-DE groups.

### *Summary*

The Manitoba road test, similar to road tests elsewhere, encourages learner drivers to acquire requisite skills and knowledge through instruction and practice. The primary objective of the MPI High School Driver Education Program is to teach safe driving skills and habits that help the students become safer drivers. In this regard the MPI HSDE Program, similar to programs elsewhere, helps prepare the learner to pass the road test. Accordingly, it is reasonable to expect that driver education graduates should perform better on the road test – e.g., demonstrate better skills by making fewer driving errors and more often pass – than those who learn how to drive through informal practice only or by completing private training programs. On the one hand, the analysis did not reveal any statistically significant difference in the pass rates of the HSDE and Non-DE groups – slightly over half of both groups passed the road test. On the other hand, the HSDE group had significantly lower mean error scores than the Non-DE group, and this was the case for both those that failed the test and those that passed the test. This latter finding suggests that the MPI driver education program may have a positive effect in that the HSDE group had lower mean error scores for minor errors than the Non-DE group for both those that pass and fail the test.

## Summary and Discussion

The driver education program evaluated in Manitoba in this investigation is delivered by Manitoba Public Insurance (MPI) and this program is available to high school students in nearly all areas of the province, with the exception of remote areas. Indeed, one of the major challenges for this investigation was to recruit teen participants who either did not intend to take, or did not take, the MPI HSDE program, because it is so widespread, available at low cost, and popular.

The primary objective of this part of the investigation was to determine the extent to which the Manitoba HSDE program influences student outcomes measured in terms of knowledge, attitudes, skills, and behaviors, all factors relevant to driving safely and collision involvement. In doing so, it was also possible to examine the extent to which there were pre-existing differences between MPI HSDE teens and Non-DE teens in terms of person-centered attributes and characteristics, as well as factors associated with collision involvement – e.g., age, gender, risk taking attitudes and behaviors, and lifestyle factors. Major differences in teen attributes between these two groups would support the concern in previous studies about the problem of self-selection biases, in that teens who choose to take or not take driver education may likely be different in ways related to crash involvement.

### *New Driver Surveys: Waves 1 and 2 Results*

As can be seen in Table71, the baseline comparisons using bivariate analyses revealed that students who planned on taking driver education were similar to those who did not plan on doing so on most of the factors investigated. Differences were apparent on only a few factors, including age, gender, support for GDL, tolerance of deviance, parental monitoring, and time perspective. Further multivariate analysis using logistic regression revealed that even fewer factors measured at the time of the baseline survey were significantly (at 0.05 level) associated with being in the group that planned on taking driver education – age, support for GDL, and tolerance of deviance. No other variables in the model were found to have significant effects. The same model was also run for males and females, separately, and results were similar for both genders.

This pattern of results suggests that even though teens volunteer to take the HSDE program in Manitoba, those that plan on taking this program differ little from those that do not plan on taking it, at least on the factors that were included as important in this investigation.

The longitudinal comparisons provided further insights into this issue of pre-existing differences as well as on whether being exposed to driver education is associated with changes in such things as safe driving knowledge and attitudes, relative to any changes that occurred in the group not exposed to driver education. For purposes of these comparisons, the two groups were defined in terms of whether they had or had not completed driver education when the survey was administered again several months after the first survey administration. Table 72 summarizes the results of these comparisons.

| Table 71: Summary Survey Results: Baseline Comparisons (HSDE group) | | |
|---|---|---|
| **Factors** | **Bivariate Analysis** | **Logistic Regression** |
| Mean Age | Younger | Younger |
| Gender | More females | No effect |
| License Status | No license | No effect |
| GDL Knowledge | No difference | No effect |
| GDL Overall Support | Greater support | Greater support |
| GDL Support-Specific | Greater support | No effect |
| GDL Influence | Greater influence | No effect |
| Safe Driving Knowledge | No difference | No effect |
| Self-rated Skills | No difference | No effect |
| Perceived Likelihood of Crash | No difference | No effect |
| Risk Taking Behavior | No difference | No effect |
| Risky Driving Behaviors | Not examined | No effect |
| Risky Driving Attitude | No difference | No effect |
| Risk Taking Attitude | No difference | Higher risky attitudes |
| Lifestyle | No difference | No effect |
| Tolerance of Deviance | Less tolerant | Less tolerant |
| Parental Monitoring | More accepting | No effect |
| Exposure | Not examined | Not examined |
| Time Perspective | More future oriented | No effect |
| Responsibility When Driving | No difference | No effect |

| Table 72: Summary Survey Results: Wave 1 & 2 Comparisons (Inter-Group Differences) | | |
|---|---|---|
| **Factors** | **Paired** | **Independent** |
| GDL Knowledge | No change | Greater knowledge waves 1 & 2 |
| GDL Overall Support | No change | No difference waves 1 & 2 |
| GDL Support-Specific | No change | No difference waves 1 & 2 |
| GDL Influence | No change | Greater influence waves 1 & 2 |
| Safe Driving Knowledge | No change | Greater knowledge waves 1 & 2 |
| Self-rate Skills | Greater skills | Greater skills waves 1 & 2 |
| Perceived Likelihood of Crash | No change | No difference waves 1 & 2 |
| Risk Taking Behavior | Less risk taking | Less risk taking wave 2 |
| Risky Driving Behaviors | No change | Less risky driving waves 1 & 2 |
| Risky Driving Attitude | No change | Less risky driving attitudes wave 1 |
| Risk Taking Attitude | No change | No difference waves 1 & 2 |
| Lifestyle | No change | No difference waves 1 & 2 |
| Tolerance of Deviance | No change | Less tolerant wave 2 |
| Parental Monitoring | No change | No difference waves 1 & 2 |
| Exposure | No change | No difference waves 1 & 2 |
| Time Perspective | No change | No difference waves 1 & 2 |
| Responsibility When Driving | No change | No difference waves 1 & 2 |

As can be seen, the key findings from these analyses were that the Manitoba HSDE program was associated with greater self-reported driving skills and less risk taking behavior after controlling for age and gender differences. Exposure to the driver education program did not appear to be associated with changes in any other factors compared to changes in the group that had not completed this program from the first and second administration of the survey.

A further review of the table reveals that the HSDE group differed from the Non-DE group on some of the factors when comparing their responses in Wave 1 as well as in Wave 2 – e.g., the HSDE group was more informed about both GDL and safe driving than the Non-DE group in both Wave 1 and Wave 2. This suggests that some of the pre-existing differences between the HSDE group and Non-DE group, such as their level of knowledge, were relatively stable over the few months between survey administrations. Moreover, as suggested above, exposure to driver education was not associated with an increase in GDL and safe driving knowledge compared to those who do not take the course. It is possible that because the MPI HSDE program is so widely available, Non-DE teens may be accessing MPI driver education materials from other sources such as family friends or MPI websites. This may help explain why driver education was not associated with increases in GDL and safe driving knowledge scores. However, even after teen drivers are exposed to the MPI driver education program, there is still a relatively low level of safe driving knowledge. This could be because they are not retaining knowledge taught in the program, or the program does not effectively cover all important knowledge items.

### *Teen Driver and Parent Survey Results*

This investigation also examined whether there were differences between HSDE and non-HSDE teens several months after they had passed their road test and were driving independently on an intermediate license. This part of the investigation also obtained information from the parents of these teen drivers. Survey results for teen drivers showed that those in the HSDE group, in comparison to the Non-DE group:

- were slightly younger (about 3-4 months);
- were more likely to live in a city;
- had an overall knowledge score that was slightly but not significantly higher (at the 0.05 level);
- more often answer correctly on nine of the 14 knowledge items, but more than half failed to answer correctly on nine knowledge items;
- rated their driving skills higher;
- were less likely to say they drove after drinking, but reported no other behavior differences; and,
- estimated they took fewer trips and spent less time driving.

The results suggest that the HSDE group differed little from the Non-DE group, which is generally consistent with the findings discussed above based on the repeated administration of the New Driver Questionnaire. The primary difference between the groups across surveys was that those exposed to the MPI HSDE program rated their driving skills higher than those not exposed to this program. This provides further evidence that the MPI HSDE program may be associated with higher self-reported driving skills, even though the HSDE group estimated they took fewer trips and spent less time driving, which suggests driving exposure may be a less important factor in driving skill ratings.

The relatively low level of safe driving knowledge for the HSDE group was also a consistent finding across surveys. This could be because they did not learn or did not retain information provided in the program. Teens who take driver education thought they had higher levels of driving skills, despite indicating they actually had less practice as a learner and currently drove less than teens who had not taken the HSDE program. It is possible that Non-DE teens are practicing more to compensate for the fact that they did not take driver education. As well, HSDE teens may be practicing less if they think they have obtained adequate driving practice from the course. Mothers were also found to play a slightly more predominate role in the learning to drive experience of teen drivers who took the HSDE program than those that did not.

Results for parents of teen drivers also revealed the predominant role of mothers in practicing, but differed from the HSDE teens in that parents reported significantly more practice by parents of HSDE teens during the learner stage. This could mean that parents and teens interpret the meaning of driving practice differently. Results also showed that parents of teens who had taken driver education:

- were slightly older;
- had higher education levels;
- more often lived in cities;
- had more difficulty finding time to practice driving with their teen; and,
- identified convenience, affordability, and improving skill and safety as reasons for their teen taking driver education.

The primary reasons identified by parents for their teen not taking the HSDE program included that the program was not necessary because others could teach their teens just as well; they couldn't fit the classes into their teen's schedule; and they couldn't register for or take the program when they wanted to. These all suggest practical constraints and alternatives to taking the HSDE program rather than fundamental differences between teens who take and do not take driver education.

### *Simulated Test Drive Results*

A major purpose of the Manitoba High School Driver Education Program is to teach safe driving skills and habits that help the students become safe drivers. Accordingly, this evaluation sought to determine if exposure to driver education enhances performance skills. Certainly, the survey results suggest that driver education is associated with higher self-reported ratings of driving skills. At issue is whether this is indeed the case using more objective measures of driving skills on a simulated drive test.

Results based on scoring driving errors by driver examiners/assistants provide some, albeit weak, evidence of a short-term or proximate training effect on skill performance of the MPI driver education program. Learner drivers who had recently completed the MPI driver education program generally performed better on the simulated drive test than learner drivers who had not taken the MPI program, although these effects were removed by the stronger effects of increased driving experience in the regression analysis. HSDE learner drivers, however, had lower mean driving errors than Non-DE learner drivers, at least for some of the specific performance categories, although these differences may have been chance findings because they did not achieve significance at the 0.01 level. The results do not support a longer-term training effect on skill performance, but this portion of the data could be considered especially suspect among Non-DE new drivers (only four subjects) in this study. HSDE new drivers did not perform better on the simulated drive test than Non-DE new drivers, but any possible driver education effects on driving skills after a period of independent driving may have been too subtle to have been detected given the small sample sizes.

In terms of hazard anticipation skills, the pattern of results suggests that the MPI driver education program may have had a positive influence – i.e., for the HSDE group, hazard anticipation skills improved with license status, which presumably is a proxy measure for increased driving experience. HSDE learner drivers performed better on hazard perception than HSDE pre-drivers, and HSDE new drivers performed best. This conclusion, however, needs to be tempered because statistically significant differences in the number of hazards the driver failed to identify were not found between the Non-DE and HSDE groups at any license status level. This suggests that other factors besides, or in combination with, driver education may have played a role in these improvements for the HSDE group. It is also worth noting that, although hazard anticipation skills improved for the HSDE group, participants still failed to identify 60 percent of hazards on the simulated drive.

The findings based on computer scoring are generally similar to, albeit slightly weaker than, those based on driver examiner/assistant scoring, and further suggest that the MPI driver education program may have a positive training effect on at least some driving performance skills in the short-term. No further benefits of the program on driving skills were apparent after a few months of independent driving in the intermediate stage of the GDL program, subject to the sample size limitations addressed above.

Finally, the self-reported results suggest that the HSDE and Non-DE groups do not differ on other factors which could have influenced their skill performance – e.g., the HSDE group was not more computer savvy than the Non-DE group, and both HSDE and Non-DE groups had similar amounts of supervised driving practice on the Learner license.

Results suggest that the MPI driver education program may have increased self-reported driving skills, which is consistent with findings from other parts of this investigation as discussed previously. Accordingly, there is now both subjective (self-report) and at least some, albeit weak, objective (simulated drive test) evidence that the MPI driver education program is associated with better driving performance skills.

### ***Road Test Results***

The Manitoba road test, similar to road tests elsewhere, encourages learner drivers to acquire requisite skills and knowledge through instruction and practice. The primary objective of the MPI High School Driver Education Program is to teach safe driving skills and habits that help the students become safer drivers. Accordingly, it is reasonable to expect that driver education graduates should perform better on the road test – e.g., demonstrate better skills by making fewer driving errors and more often pass – than those who learn how to drive through informal practice only or by completing private training programs. On the one hand, the analysis did not reveal any significant difference in the pass rates of the HSDE and Non-DE groups – on average slightly over half of both groups passed the road test. On the other hand, the driver education group had significantly lower mean error scores than the Non-DE group, and this was the case for both those that failed the test and those that passed the test. This latter finding suggests that the MPI driver education program may have a positive effect, in that the HSDE group had lower mean error scores for minor errors than the Non-DE group for both those that passed and failed the test.

# Oregon Driver Education

## Program Overview

### *Administration, Setting, and Scope*

Oregon was identified as a desirable evaluation site because of the well-established, state-approved driver education program, which is not found in many U.S. states (Chaudhary et al. 2011). This program is also highly regarded in the driver education community nationally, although it has not been included in a comparative assessment with other state driver education programs. Oregon, however, was the second U.S. driver education program reviewed by an expert panel under the National Highway Traffic Safety Administration (NHTSA) program assessment process. This involves assessing a state's current DE program structure and operations against the recent U.S. Novice Teen Driver Education and Training Administration Standards.

The Oregon state-approved driver education program is currently administered by the Transportation Safety Division (TSD) of the Oregon Department of Transportation (ODOT). Prior to 2000 the program was the responsibility of the Department of Education. TSD now has responsibility for:

- coordinating DE course and instructor curricula;
- certifying public and private DE providers;
- providing public information, education programs, and resources;
- overseeing the student driver training fund for school reimbursement; and,
- coordinating train-the-trainer curriculum development.

The certified program is encouraged but not required of teens. It is offered primarily in high schools as well as in community colleges (public providers) and in commercial driving schools (private providers). Both public and private providers of approved programs are subject to Oregon Administrative Rules and audits to ensure compliance with laws and rules pertaining to the operation of the approved provider's program and instructor certification. Providers receive a reimbursement of $210 per student. The teen must have a learner permit before the start of the first driver education class and complete the program in order for the school to be eligible for this student reimbursement.

The program includes a "Parent Involvement Resource Guide" and a Driver Education Risk Prevention Curriculum, a resource that includes classroom and in-car lesson plans, homework assignments, and entrance and exit exams.

Public providers must submit to TSD a traffic safety education curriculum guide for review and approval every three years from the date of the last submission. Private vendors must submit their curriculum to TSD for pre-approval on a two-year cycle. This includes a written drive route that supports each behind-the-wheel lesson plan with specific driving behaviors to be practiced, as well as directions and strategies to improve student performance and habit development. The drive route cannot duplicate the DMV drive test route.

Driver education courses are also offered by commercial vendors who have not been approved by TSD but are still licensed by DMV. These vendors are not authorized to provide graduates with a certificate of course completion, which reduces the number of supervised hours of driving practice required to obtain a provisional license (see below for details on this requirement).

Table 73 provides information on teen drivers and the driver education program in Oregon from 2005 to 2009. As can be seen, in 2009, DMV issued 24,823 licenses to novices aged 16-17. A total of 7,972 students, or 32 percent, of licensed teens aged 16-17 completed an ODOT-approved driver education program.

The number of teens completing driver education offered by the non-approved commercial vendors is not known.

**Table 73: Driver Education in Oregon 2005-2009**

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| **DMV Licenses Issued (Ages 16-17)** | 27,731 | 28,688 | 27,215 | 26,115 | 24,823 |
| **Students completing an ODOT-approved DE program before licensing** | 9,542 | 9,327 | 8,989 | 8,343 | 7,972 |
| **Students that did not complete an ODOT-approved DE program before licensing** | 18,189 | 19,361 | 18,226 | 17,772 | 16,851 |

### *Relation to Graduated Driver License (GDL) Program*

The state-approved driver education program is directly related to the graduated licensing system. To qualify for a provisional license, learner permit holders under the age of 18 must complete an ODOT-approved traffic safety education course and complete 50 hours of supervised driving practice, OR complete an additional 50 hours of supervised driving practice (total of 100 hours) certified by a parent or legal guardian. Accordingly, the approved-driver education program is not mandated, but there is an incentive for taking it tied to a lower requirement in the number of hours of supervised driving practice. Despite this incentive, only a minority (about 30%) of licensed teens ages 16-17 completed an ODOT-approved driver education program in 2009 (see Table 73). The reasons more teens do not take the ODOT-approved driver education program are not well known.

People who delay licensure until age 18 or older are not subject to these requirements, so they may choose to take or not take driver education and become licensed regardless of the number of hours of supervised driving practice they have accumulated.

Oregon implemented a graduated driver licensing program in 2000. The features of the program are summarized below:

Learner Stage (Provisional instruction permit)

- **Entry Age.** A minimum entry age of 15.
- **Holding period.** The minimum period of time the novice is required to spend in the learner stage ("holding period") is six months.
- **Supervised practice.** A requirement of 50 hours if the person also takes driver education, or 100 hours if they do not.
- **Restrictions.** None

Provisional Stage (Provisional license)

- **Entry Age.** The minimum starting age of 16.
- **Night Restriction.** A prohibition on unsupervised driving during late night hours, from midnight to 5 a.m.
- **Passenger restriction.** A passenger restriction that for the first six months prohibits the transport of passengers younger than 20 (other than immediate family members), and for the second six months prohibits more than three passengers younger than 20 (other than immediate family members).
- **When restrictions end.** Both the night and passenger restrictions end after one year, or at age 18, whichever comes first.

In the learner and provisional stage, the novice driver is also restricted to a zero BAC limit, but this requirement arises from zero tolerance laws for drivers under 21, which are not considered a part of GDL programs. Oregon also has a driver improvement program for new drivers. If the driver is under age 18 and has two convictions, or two accidents, or a combination of one conviction and one accident, they are restricted for 90 days to drive only for work purposes with no passengers except their parent, step-parent or guardian. A conviction for violation of a GDL restriction could result in a suspension or revocation of their driving privileges. Oregon's GDL restrictions, however, involve secondary enforcement – i.e., new drivers already stopped for some other reason.

### Goals and Objectives

"The goal of Oregon's Driver Education (DE) program is to develop a system that results in measurably safer new drivers with fewer injuries and deaths. The program seeks to develop safe and efficient drivers who understand that all young drivers should become competent, caring, productive and responsible traffic safety citizens, committed to continually improving their driving skills" (ODOT 2013).

### Content

The approved driver education program includes classroom instruction, behind-the-wheel instruction, practice driving observation (activity done in back seat while another student drives), and a requirement for parental involvement. The features of each of these parts of the program are described below.

The program must include a minimum of 30 hours of classroom instruction not exceeding six hours per week and three hours per day. According to Oregon Administrative rules, the curriculum must include:

- instructing students about driving on all types of Oregon roads to enable the student to acquire knowledge about driving techniques and experiences and sharing the road with other highway users such as bicycles, motorcycles, pedestrians, trains, cars, trucks, and rail in a positive and courteous manner;
- driver responsibility of automobile maintenance, fuel efficient driving, potential distractions, safety restraint (belt) use, and legal and moral responsibilities;
- preparing and controlling the vehicle;
- identification and proper use of signs, signals, markings, roadway types and variations such as county, city, expressways, freeways, and interstates;
- how to enter, use, and exit different types of intersections;
- basic automobile maneuvers and traffic flow;
- management of time and space using accepted and current practices, including targeting, line of sight, path of travel, model driving habits, and reference point concepts;
- defensive driving practices;
- rules of the road;
- how the laws of physics and natural laws affect driving;
- how physical, emotional, and psychological conditions such as personal attitudinal traits affect driving;
- how alcohol and other drugs affect driving; and,
- emergency situations and vehicle malfunctions.

The driver education program also requires a minimum of six hours of behind-the-wheel instruction not exceeding 90 minutes of driving per day per student that includes:

- the rules and procedures of operating an automobile;
- the visual skills to obtain correct information and make reduced-risk decisions about driving maneuvers;
- vehicle movement in a precise and timely manner to avoid conflict with others;
- pre-drive procedures that include use of vehicle controls, door locks and head restraints, having headlights on at all times, and use of safety (belt) restraints;
- basic maneuvers that include starting, stopping, backing, vehicle control, speed control, parking, pulling to and from the curb, right-of-way, and push/pull and hand-over-hand steering;
- complex maneuvers that include entering and exiting an intersection, entering and exiting curves, lane changes, merging, passing, turns in traffic, city driving, and three-point turns; and,
- visual skills, including automobile mirror usage, using current and accepted practices, including targeting, line of sight, path of travel, model driving habits, and reference point concepts.

Driving simulation may also be used, with four hours of simulation equal to one hour of behind-the-wheel instruction. However, simulation instruction cannot exceed more than one-half the required hours specified for behind-the-wheel instruction. As well, driving simulation may not precede classroom instruction.

The program also allows a minimum of six hours of practice driving observation not exceeding three hours of observation per day per student. This involves the instructor engaging the back seat passengers in discussion of the student driver's operation of the motor vehicle. The student observer must demonstrate awareness of cars, motorcycles, trucks, and pedestrians; they must also show sign, signal, and road marking recognition.

As well, there is a requirement for the involvement of a parent, legal guardian, or supervising adult that includes participating in a parent meeting held the first day of class. The meeting is attended by the parent, legal guardian, or supervising adult and the student, and it typically covers policies, procedures, curriculum, and questions regarding the program. Parents are also required to submit documentation, in the form of a log or other means, demonstrating to the provider that a minimum of five hours of supervised home practice was conducted prior to the completion of the course. This supervised home practice is not counted as a part of the classroom, behind-the-wheel, or practice driving observation of the provider course.

The Administrative rules also require a skill assessment for each student driver that covers, at a minimum:

- positioning a vehicle based on visual referencing skills, space management, fender judgment, and road position control;
- procedures and sequencing for vehicle operations from the simple to the complex skill based on vehicle operation control, vehicle maneuvering, vehicle control options, and vehicle balance;
- processing traffic and vehicle information into speed and position changes based on visual skills, space management, vehicle speed control, and control of the road; and,
- precision movements for maintaining vehicle control and balance in expected and unexpected situations based on vehicle speed control, vehicle balance, collision avoidance, traction control, response to mechanical failures, and traction loss.

Classroom and in-vehicle instruction are delivered concurrently, which means that no less than four and no more than 10 hours of classroom instruction will be completed before starting behind-the-wheel instruction. The intention is to ensure that the classroom and behind-the-wheel instruction are integrated and coordinated. According to the Administrative Rules, no program will be completed in less than 35 days and no more than 180 days. However, an extension beyond the 180 days may be provided if there is compelling reason dealing with school, family, or medical circumstances and has been agreed upon between provider and student before the completion of the course.

## The Oregon New Driver Survey

### *Background*

This investigation used a quasi-experimental pre-post design with a comparison group to identify differences between teens who had taken and not taken the ODOT-approved driver education program, and to determine the extent to which completion of this driver education program influenced student outcomes – e.g., changes in safety knowledge, attitudes, driving skills, and behaviors. This was accomplished by repeated surveys of two groups of teen drivers – one completed the ODOT-approved driver education program (DE group) and the other did not (Non-DE group). The initial survey of these two groups was administered shortly after they had obtained their provisional instruction permit; the survey was then repeated with a subset of the same teen drivers several months later after those in the DE group had completed driver education.

### *Survey Method*

The principle research tool used in this study to measure differences in teen attributes and changes in student outcomes – safety knowledge, attitudes, beliefs/opinions, motivations, skills, and behaviors/behavioral intentions – was a questionnaire called The New Driver Survey. The development, pilot testing, content, and administration of this survey questionnaire in Manitoba were described in previous sections of this report. Copies of the New Driver Survey tailored for Oregon with ODOT input are contained in Appendix P (used in first administration, or Wave 1) and Appendix Q (used in second administration, or Wave 2). It takes approximately 30 minutes to administer.

Survey Administration and Sample: The repeated survey of Oregon teens, who had and had not completed the ODOT-approved driver education program, was conducted by Prairie Research Associates (PRA), a research firm with headquarters in Winnipeg, Manitoba. The Project team supplied PRA with the survey. PRA programmed the questionnaire into an online survey form. Both print-formatted hardcopies and an online version were used to survey teens initially, shortly after they obtained their instruction permit.

Oregon Department of Transportation (ODOT) supplied weekly databases of Oregon teen drivers who had obtained their instruction permit. This weekly sample included names and addresses, but not phone numbers. PRA then linked the names and addresses with a telephone number.

Pre-Tests and Wave 1 Recruitment: Several pretests were conducted prior to adopting an acceptable procedure to yield the highest response rate in the most cost-effective method. The initial pre-testing revealed that traditional survey recruitment methods do not work well any more. For example, it was difficult to link names and addresses with telephone numbers because many households no longer have a home telephone, preferring to use cell phones, or they have unlisted phone numbers. Also, raffles as incentives for survey participations were found to be less attractive than a modest direct payment, such as providing $5 in a mail out of a survey questionnaire. Based on the pretest results, the methodology that yielded the highest response rate at the most cost-effective method was to mail teens a letter that included a $5 bill, and offer a second $5 for completion of the survey online (along with parental consent).

Letters were mailed beginning April 20, 2011, and continued weekly for 19 weeks until the targeted number of completes – 5,000 – had been reached. The invitation letter can be found in Appendix R. A sample size of 5,000 completions had been determined as providing adequate statistical power to detect significant differences in collisions between the Non-DE and DE groups. Letters were mailed to a total of 12,181 teen drivers, yielding 5,496 completed questionnaires (for a response rate of 45%). An additional 303 teens had completed the questionnaire during pretesting. In total, 5,007 teens completed the questionnaire and had parental consents.

<u>Pretests and Wave 2 Recruitment:</u> To pretest Wave 2, the second administration of the survey several months later to the same teens, PRA sent a link for the online survey to respondents who had participated in pretesting Wave 1 and had provided their email address. The goal of pretesting the Wave 2 survey was to determine the potential completion rate for Wave 2, as well as to identify the optimal time for conducting the survey to allow for those who had not yet taken driver's education (but said they planned to in Wave 1) to have completed the training.

In total, 79 teens who had completed the pretest of the survey in Wave 1 were emailed a link to the survey as part of the Wave 2 pretest. PRA sent an initial email to ask teens to complete the survey, and followed that with up to two reminder emails to those who had not yet completed the survey. In total, 52 of the 79 pretest respondents completed the Wave 2 survey, yielding a 66 percent completion rate.

Based on the pretest, eight months from the Wave 1 survey completion date was identified as the optimal time for contacting respondents, primarily because many of those who said they would take driver education had done so by this time.

To survey Oregon teens for Wave 2, PRA used the following methodology:

- Approximately eight months after teens had completed the Wave 1 survey (and received parental consent), PRA emailed respondents a link to the online survey. The invitation email can be found in Appendix S.
- Approximately one week after the initial email, PRA sent a reminder email to all respondents who had not yet completed the survey and whose emails did not bounce back. PRA followed up with a second and final reminder approximately one week after the first reminder.
- For participating in the Wave 2 survey, participants received $10, which was mailed to participants approximately one month after they had completed the survey.

The research design called for surveying all 5,000 Wave 1 participants to achieve an estimated 3,750 completions in Wave 2. However, due to funding and time constraints, the targeted number of completions for Wave 2 was set at 1,425 teens. A sample size of this magnitude was adequate to detect differences and changes in intermediate student outcomes (as opposed to crashes) between the two groups.

The first email was sent on January 12, 2012, and the survey closed on June 4, 2012. In order to reach the goal of 1,425 completed questionnaires, 3,170 teens from Wave 1 were contacted, of which 96.4 percent provided a working email address in Wave 1. Overall, the Wave 2 survey yielded responses from 1,437 teens (including 52 from the pretest), achieving a response rate of 47 percent.

### *Data Treatment*

To capture responses, PRA created an electronic version of the survey, using their survey software, which allowed them to program the skips and logic checks. This ensured that for questions where responses were not required, this information was not collected. Other than enforcing skips in the survey, PRA did not impose any other logic checks for out-of-bounds responses.

Linking driver data with driver information: Each teen was assigned a unique ID number, as well as a survey number. To link the Wave 1 and Wave 2 surveys with the information provided by ODOT-DMV (e.g., birthdate, license issue date, gender), PRA matched the ID numbers. PRA spot-checked the dataset to ensure that the information from the appropriate ID had been matched correctly (100% matched correctly).

The data for each subject includes: demographic information; their status with respect to driver education/training; knowledge about the graduated driver licensing program, as well as their support for it and how it has influenced them; safe driving knowledge; self-rated driving skills and abilities; driving behavior; and information regarding peer pressure, risk taking, and lifestyle.

Final N and Missing Data: PRA provided the linked database to the Project team, which made additional logic checks for data inconsistencies and data entry errors – e.g., ensuring values were in the range of acceptable values and, for continuous variables, that there were no values that were logical outliers.

A total of 5,007 teens completed the survey in the first wave and had parental consents. This sample is used in the baseline comparisons. Since the intention was to survey teens recently issued a provisional instruction permit, those who did not have a provisional instruction permit issue date (n=21) were dropped from the sample, because the length of time on the permit was unknown. Teens issued an instruction permit rather than a provisional instruction permit because they were 18 years of age and over, or who had previously been issued a provisional instruction permit that had, for example, expired and then been issued again, were also excluded from the sample (n=297). These teens could not be identified until the end of the study period when ODOT provided the complete driver licensing data for teen survey participants.

Teens who said they had already completed driver education at the time of the first wave of the survey were also excluded from the analyses – as they would have been already influenced by DE (n=192) – along with those students who had reported they were currently enrolled in a DE program, but for whom there was no official DE program completion date according to the driver education data provided by ODOT (n=88). Finally, those teens who had been enrolled in a DE program for more than seven days when they had completed the survey were excluded, as they would have also been exposed to DE instruction/training (n=137). Those teens who had just enrolled within the last seven days were unlikely to have been influenced by DE at the time of the survey, so they were included in the final sample.

The final sample used for the baseline analyses comprised 4,272 teens that met the criteria established for group assignment – 1,000 teens in the DE group, and 3,272 teens in the Non-DE group. Although some unknown biases may have been introduced with the assignment procedures, the teens in the final sample should be representative of teens who have and have not completed the ODOT-approved driver education program. These teens had been issued their first provisional instruction permit within six months from their survey date, and on average they had completed the survey about two months after having obtained their permit. Three teens had been identified as deceased. Records for these drivers were examined up until their licensing stop date rather than the data extraction date.

In the second wave, a total of 1,437 teens completed the survey. Two groups were created for the Wave 1 and Wave 2 analyses to determine if changes in student outcome measures were associated with completion of Oregon's approved driver education program. One group had completed driver education at the time of the second wave of the survey; the other group had not taken it. The questionnaires for these teens were matched to their questionnaires from the first wave. It was possible to match all of the 1,437 surveys returned. However, not all of these met the post-treatment criterion for this analysis; for example, 63 were currently taking driver education at the time the Wave 2 survey was administered; 254 were still planning on taking driver education at the time of the Wave 2 survey was administered; 72 reported completing or planning on taking a driver education program that was not ODOT-approved and were excluded, since the focus of this study was on the impact of the ODOT-approved driver education course; 11 teens did not have parental consent and were excluded; and, 10 had missing data at the time the Wave 1 was administered so were also excluded.

This left a balance of 1,027 teens who met the criteria established for the analysis. This included 286 teens who had not enrolled in driver education when they completed the New Driver Survey for the first time but had completed driver education when they took the survey the second time (referred to as the DE group). In addition, there were 741 teens who had not taken driver education at the time of the first or second waves of the survey (referred to as the Non-DE group).

The 286 teens in the DE group included 270 teens who were planning on taking driver education when Wave 1 was administered (and subsequently had done so prior to Wave 2), as well as 16 who said they were not going to take driver education but did in fact complete it.

The 741 teens in the Non-DE group included 519 who said they did not plan on taking driver education in Wave 1 and again in Wave 2. As well, there were 222 teens who initially said they were planning to take driver education, but by the second wave said they had not taken it and did not plan to take it.

The comparative analyses are, therefore, based on these two groups: 286 teens in the DE group, and 741 teens in the Non-DE group. A comparison of teen attributes and student outcome measures between Wave 1 and Wave 2 for the DE group provides an indication of changes associated with exposure to driver education. A comparison of teen attributes and the student outcome measures between Waves 1 and 2 for the Non-DE group provides an indication of teen attributes and changes associated with other extraneous variables, and, therefore, serves as a control for changes occurring in the DE group.

Not all teens in the two groups created for the analysis answered all the items in the survey. In the data analysis, missing data were excluded – in the case of knowledge items, missing answers were treated as incorrect. As a consequence, the "n" varies slightly from item to item, as indicated in the following section.

### *Data Analysis*

Group characteristics of driver education and non-driver education teens were initially compared using bivariate analyses. Comparisons of means, including mean age at survey and average number of months holding a license, of DE and Non-DE teens were conducted using two-group mean comparison t-tests. Comparisons of the DE and Non-DE teens for categorical variables, such as race, grade level, place of residence, or license type were performed using the Chi-squared statistic.

Logistic regression was also used to investigate whether various factors shown in the bivariate analyses differentiate between teens who had taken driver education and those who had not, after accounting for the influence of other factors.

The study also intended to determine if there were meaningful changes in knowledge, driving-related behaviors, and lifestyle associated with exposure to driver education. Accordingly, the hypothesis was that exposure to driver education should have a positive and salutary effect on knowledge, attitudes, driving skills, and behavior. Accordingly, the primary analysis compared mean scores obtained in Wave 1 to those obtained in Wave 2 for both the DE and Non-DE groups. These paired (within group) comparisons examine changes from Wave 1 to Wave 2 in both groups. In these paired comparisons, the number of participants in each comparison is identical since these are the same teens in Wave 1 and Wave 2. However, the number of cases for each of the measures varies because not all participants answered all these items in both Wave 1 and Wave 2.

A t-test for paired (within group) comparisons was used to determine if the change was statistically significant. If the t-tests for paired comparisons revealed a statistically significant result at the 0.05 level for either the DE or Non-DE group, a Two-way factorial ANOVA was used to determine if exposure to DE was in fact associated with a significantly different change in the dependent variable (e.g., knowledge scores) than was observed in the Non-DE group from Wave 1 to Wave 2. To account for any change in outcomes from Wave 1 to Wave 2 that may be due to other factors, gender and age have also been included in these models.

A secondary purpose of the analysis was to compare the DE and Non-DE groups in both Waves 1 and 2. For these independent comparisons, the number of participants in the DE and the Non-DE groups are different, because they are comparing Wave 1 DE to Wave 1 Non-DE and separately comparing Wave 2 DE to Wave 2 Non-DE. A t-test for independent samples was used to determine if the differences between the DE and Non-DE groups in both Waves 1 and 2 were significant.

The numbers for the paired comparisons and independent comparisons do not correspond since the paired comparisons are based only on teens who responded to each specific measure in both Wave 1 and Wave 2. The independent comparisons are based on any student who responded to the appropriate items in Wave 1 and Wave 2. Therefore, the n is always equal or larger in the independent comparisons.

Table 74 below provides a brief description of the 17 different measures analyzed in this section of the report. This table is similar but not identical to Table 2 for Manitoba, because some of the question items were reorganized in the Oregon version of the questionnaire (see Appendix P and Appendix Q).

**Table 74: Dimension/Outcome Being Measured by Various Scales/Items in The New Driver Survey**

| Dimension | Location in Survey | Scale Origin | # of Items |
|---|---|---|---|
| **1. GDL Knowledge**<br>response 1= yes<br>response 2= no<br>response 3= don't know | Section B; Q1 & Q2 | no pre-existing scale used; developed by research team and advisory panel | 18 |
| **2. GDL Overall Support**<br>response 1= strongly oppose<br>response 5= strongly support | Section B; Q3 | no pre-existing scale used; developed by research team and advisory panel | 1 |
| **3. GDL Support- Specific Requirements**<br>response 1= strongly oppose<br>response 5= strongly support | Section B; Q4 | no pre-existing scale used; developed by research team and advisory panel | 7 |
| **4. GDL Influence**<br>response 1= strongly disagree<br>response 5= strongly agree | Section B; Q7 | no specific scale used; developed by research team and advisory panel | 3 |
| **5. Safe Driving Knowledge**[1] | Section C; Q1-14 | no pre-existing scale used; developed by research team and advisory panel | 14 |
| **6. Self-rated Skills** | Section D; | > Driving Skills and Safety Mindedness: Skill | 16 |

| Table 74: Dimension/Outcome Being Measured by Various Scales/Items in The New Driver Survey | | | |
|---|---|---|---|
| **Dimension** | **Location in Survey** | **Scale Origin** | **# of Items** |
| response 1= very poor<br>response 5= very good | Q1 | items (DQ1: items a, b, c, d, e, i, j, k, m)<br>> Driving Skills and Safety Mindedness: Safety-mindedness items (DQ1: items f, g, h, n, o, p) | |
| **7. Perceived Likelihood of Accident or Injury**<br>response 1= very unlikely<br>response 5= very likely | Section D; Q2 | no pre-existing scale used; developed by research team and advisory panel | 2 |
| **8. Risk Taking Behavior**<br>response 1= never<br>response 5= very frequently | Section E; Q1 | Donovan Risk-Taking (EQ1: items a-h) | 8 |
| **9. Risky Driving Behavior**<br>response 1= never<br>response 5= very frequently | Section E; Q4 & Q5 | > Manchester Driving Behavior Questionnaire (DBQ): Errors subscale (EQ2: items a-d, j-l)<br>> Manchester DBQ: Highway Code Violations Subscale (EQ2: items e, f, g, m-o)<br>> Drink/Driving (EQ2: items i, p-r)<br>> Distraction (EQ3: items a-e) | 23 |
| **10. Risky Driving Attitude**<br>response 1= strongly disagree<br>response 5= strongly agree | Section F; Q1 | Competitive Attitude Toward Driving (FQ1: items d, e, h, i, j) | 10 |
| **11. Risk Taking Attitude**<br>response 1= strongly disagree<br>response 5= strongly agree | Section F; Q2 & Q6 | > Normlessness (FQ2: items c, d, e)<br>> Peer-Pressure (FQ2: items, f-m)<br>> Risk Taking Propensity (FQ6 a-c) | 14 |
| **12. Lifestyle**<br>response 1= strongly disagree<br>response 5= strongly agree | Section F; Q5 | Adolescent Lifestyle Questionnaire (FQ5: items a-h) | 8 |
| **13. Tolerance of Deviance**<br>response 1= very unacceptable<br>response 5= very acceptable | Section F; Q7 | Tolerance of Deviance (FQ7: items a-f) | 6 |
| **14. Parental Monitoring**<br>response 1= never<br>response 5= very frequently | Section F; Q4 | Parental Behavioral Monitoring (FQ4: items a-d) | 4 |
| **15. Exposure**<br>response 1= never<br>response 5= every day | Section E; Q6 | no pre-existing scale used; developed by research team and advisory panel | 13 |
| **16. Time Perspective**<br>response 1= not at all like me<br>response 5= very much like me | Section F; Q3 | Zimbardo Time Perspective Inventory (FQ3: items a-g) | 7 |
| **17. Responsibility when driving**<br>response 1= not at all responsible<br>response 5= extremely responsible | Section E; Q2 | No pre-existing scale use; developed by research team and advisor panel | 3 |

*[1]The knowledge questions were not specifically targeted by the ODOT DE program but were basic safe driving knowledge items.*

### *Teen Attributes – Baseline Comparisons*

Oregon teen drivers voluntarily decide to take the ODOT-approved driver education program. As a consequence, teen drivers who choose to take this program may differ from those that do not on some other factors which may affect their collision involvement independent of the ODOT-approved driver education program. For example, previous research has shown that male teens are more likely than female teens to crash. If, due to self-selection, there are more females among teen drivers who chose to take DE than among those who chose not to, lower crash rates among the DE group may reflect gender differences between groups and not the influence of driver education. Similarly, if teen drivers who have taken DE are more safety-conscious than those who have not, they may be more likely to have lower crash rates, independent of the program. In this regard, due to self-selection biases, there may be other pre-disposing factors or teen attributes influencing crash involvement than program completion itself.

This section examined self-selection bias among teen drivers completing the ODOT-approved driver education program. This was accomplished by using the New Driver Survey, which was completed by a sample of Oregon teens a few months after they obtained their provisional instruction permit. Their survey responses at baseline provided a means to identify pre-existing differences between DE and Non-DE teen drivers. Both bivariate and multivariate analyses are used for this purpose. Missing values are omitted from the following tables; thus, totals Ns may differ slightly from table to table and percentage totals may not always equal 100 percent.

<u>Group Characteristics:</u> Table 75 below shows the demographic characteristics of DE and Non-DE teens including age, gender, race, grade level, and place of residence.

As can be seen, the mean age of the DE (15.55) and Non-DE teens (15.73) differed significantly. The analyses also revealed that the two groups significantly differed with regard to gender, race, grade level, and place of residence.

In terms of gender, 48.6 percent of the DE group were male, as were 44.1 percent in the Non-DE group. Overall, the most frequently self-reported race was white: 75.7 percent for the DE group and 68.2 percent for the Non-DE group. The DE group had fewer Latino/Hispanics than the Non-DE group (1.0% versus 6.4%, respectively).

Most teens were in grade 10 at the time of the survey: 57.2 percent for the DE group and 51.3 percent for the Non-DE group. Finally, with regard to place of residence, the DE group resides more in urban settings than the Non-DE group: 73.5 percent versus 58.5 percent.

| Table 75: Demographics by DE status (All teens) | | |
|---|---|---|
| | Driver Education Status | |
| | DE | Non-DE |
| **Mean age at provisional instruction permit issuance date** | 15.55 | 15.73 |
| | SD=0.60 (n=1,000) | SD=0.76 (n=3,272) |
| | p<0.01 | |
| **Gender** | | |
| **Males** | 48.6% (n=486) | 44.1% (n=1,443) |
| **Females** | 51.4% (n=514) | 55.9% (n=1,829) |
| | p=0.01 | |
| **Race** | | |
| **American Indian/ Alaska Native** | 0.9% (n=9) | 1.3% (n=41) |
| **Asian** | 4.4% (n=44) | 4.1% (n=133) |
| **Black/African American** | 0.6% (n=6) | 1.1% (n=36) |
| **Native Hawaiian/ Pacific Islander** | 0.2% (n=2) | 0.3% (n=11) |
| **White** | 75.7% (n=757) | 68.2% (n=2,231) |
| **Hispanic/ Latino** | 1.0% (n=10) | 6.4% (n=210) |
| **Other** | 0.6% (n=6) | 1.7% (n=57) |
| **Mixed race (2 or more from above)** | 16.5% (n=165) | 16.5% (n=541) |
| | p<0.01 | |
| **Grade level** | | |
| **9** | 20.4% (n=204) | 17.0% (n=555) |
| **10** | 57.2% (n=572) | 51.3% (n=1,678) |
| **11** | 18.3% (n=183) | 20.9% (n=683) |
| **12** | 3.7% (n=37) | 9.4% (n=308) |
| | p<0.01 | |
| **Place of residence** | | |
| **Rural** | 26.5% (n=265) | 41.4% (n=1,535) |
| **Urban** | 73.5% (n=735) | 58.5% (n=1,913) |
| | p<0.01 | |

As an indirect measure of socio-economic status, teens were asked the highest level of education for their father and mother. Table 76 shows the highest level of education of the parents of the DE and Non-DE teens.

| Table 76: Father's and Mother's education by DE status (All teens) | | | | |
|---|---|---|---|---|
| | Driver Education Status | | | |
| | DE | Non-DE | DE | Non-DE |
| **Parent education** | **Father's education** | | **Mother's education** | |
| **High school or less** | 18.9% (n=189) | 31.0% (n=1,013) | 15.4% (n=154) | 27.4% (n=895) |
| **College or university** | 40.1% (n=401) | 38.0% (n=1,241) | 48.4% (n=484) | 47.6% (n=1,555) |
| **Graduate or professional degree** | 32.6% (n=326) | 20.1% (n=657) | 28.8% (n=288) | 16.9% (n=554) |
| **Don't know/ not applicable** | 7.4% (n=74) | 9.1% (n=296) | 6.5% (n=65) | 6.5% (n=214) |
| | p<0.01 | | p<0.01 | |

As can be seen, there was a significant difference between the two groups with regard to both parents' level of education. DE teens reported higher levels of education among parents than Non-DE teens. To illustrate, of those teens who reported their parents had received a graduate or professional degree, 32.6 percent and 28.8 percent of DE teens reported their father and mother respectively, had attained this level of education, compared to only 20.1 percent and 16.9 percent for Non-DE teens.

Graduated Driver Licensing (GDL): Four scales in the questionnaire relate to graduated licensing – knowledge about the program, support for the program in general, support for specific features of the program, and the extent to which students believe it has influenced (or would influence) their driving behavior. The relevant data for the four groups appear in Table 77.

| Table 77: Graduated Licensing Scores by DE Status (All teens) | | | | |
|---|---|---|---|---|
| | # of Items | Driver Education Status | | Meaning of High Score (range) |
| | | DE | Non-DE | |
| **GDL Knowledge** | 17 | n=1,000 | n=3,272 | **Greater knowledge (0-18)** |
| | | 14.20 | 14.34 | |
| | | SD=2.50 | SD=2.24 | |
| | | p=0.09 | | |
| **GDL Overall Support** | 1 | n=999 | n=3,261 | **Greater support (1-5)** |
| | | 4.13 | 4.07 | |
| | | SD=0.78 | SD=0.86 | |
| | | p=0.06 | | |
| **GDL Support-Specific Requirements** | 7 | n=984 | n=3,212 | **Greater support (1-5)** |
| | | 3.95 | 3.83 | |
| | | SD=0.67 | SD=0.73 | |
| | | p<0.01 | | |
| **GDL Influence** | 3 | n=995 | n=3,258 | **Greater influence (1-5)** |
| | | 4.37 | 4.29 | |
| | | SD=0.64 | SD=0.73 | |
| | | p<0.01 | | |

As shown in Table 77, overall, both DE and Non-DE teens had high levels of knowledge about the graduated licensing program. The difference in mean knowledge scores between the DE and Non-DE groups was not statistically significant.

In the baseline survey, both groups were generally supportive of GDL. The DE group was more supportive than the Non-DE group of the specific features of the program. As well, those who took driver education believed more strongly that the GDL program would have a positive impact on their driving behavior.

<u>Safe Driving Knowledge, Self-Rated Driving Skills and Crash Likelihood:</u> Fourteen multiple choice items assessed safe driving knowledge. As shown in Table 78, the DE and Non-DE groups did not significantly differ in terms of their knowledge about safe driving practices at the baseline. However, the average scores indicate that both groups of students had relatively moderate levels of knowledge about safe driving practices.

Teens were asked to rate on a five-point scale how good they thought their driving skills were (or would be when they started driving) for handling 16 different driving maneuvers. Results are shown in Table 78. The two groups were both positive about their skills, with the Non-DE group expressing slightly more favorable views.

<table>
<tr><th colspan="5">Table 78: Safe Driving Knowledge, Skills and Crash Risk Scores by DE Status (All teens)</th></tr>
<tr><th rowspan="2"></th><th rowspan="2"># of Items</th><th colspan="2">Driver Education Status</th><th rowspan="2">Meaning of High Score (range)</th></tr>
<tr><th>DE</th><th>Non-DE</th></tr>
<tr><td rowspan="4">Safe Driving Knowledge</td><td rowspan="4">14</td><td>n=1,000</td><td>n=3,272</td><td rowspan="4">Greater knowledge (0-14)</td></tr>
<tr><td>7.47</td><td>7.37</td></tr>
<tr><td>SD=1.88</td><td>SD=1.84</td></tr>
<tr><td colspan="2">p=0.14</td></tr>
<tr><td rowspan="4">Self-rated Skills</td><td rowspan="4">16</td><td>n=960</td><td>n=3,104</td><td rowspan="4">Better skills (1-5)</td></tr>
<tr><td>3.62</td><td>3.74</td></tr>
<tr><td>SD=0.60</td><td>SD=0.58</td></tr>
<tr><td colspan="2">p<0.01</td></tr>
<tr><td rowspan="4">Perceived Likelihood of Accident or Injury</td><td rowspan="4">2</td><td>n=999</td><td>n=3,267</td><td rowspan="4">More likely (1-5)</td></tr>
<tr><td>2.19</td><td>2.17</td></tr>
<tr><td>SD=0.94</td><td>SD=0.96</td></tr>
<tr><td colspan="2">p=0.62</td></tr>
</table>

Survey respondents were also asked about the likelihood they would be involved in a collision or injured in one while driving during the coming year. Both groups saw this as relatively unlikely, and there was no statistically significant difference between groups.

<u>Problem Behaviors:</u> Table 79 shows the DE and Non-DE scores on five measures of problem behaviors. In regard to risk taking behavior, on average, the two groups both indicated that they would rarely engage in the listed behaviors and differences in scores were not significant. This was also the case for risky driving behavior, attitudes toward risk taking in general, and attitudes toward risky driving.

DE teens were on average slightly less positive about their lifestyle than Non-DE teens, and this difference was statistically significant at the 0.05 level. Finally, the DE teens and Non-DE teens had similar tolerance of deviance ratings.

| Table 79: Problem Behavior Scores by DE Status (All teens) | | | | |
|---|---|---|---|---|
| | # of Items | Driver Education Status | | Meaning of High Score (range) |
| | | DE | Non-DE | |
| **Risk Taking Behavior** | 8 | n=985 | n=3,216 | **Frequent risk taking (1-5)** |
| | | 1.29 | 1.29 | |
| | | SD=0.49 | SD=0.49 | |
| | | p=0.93 | | |
| **Risky Driving Behavior** | 23 | n=870 | n=2,950 | **More risky attitude (1-5)** |
| | | 1.28 | 1.29 | |
| | | SD=0.31 | SD=0.31 | |
| | | p=0.25 | | |
| **Risk Taking Attitude** | 14 | n=971 | n=3,169 | **More risky attitude (1-5)** |
| | | 1.79 | 1.75 | |
| | | SD=0.63 | SD=0.64 | |
| | | p=0.08 | | |
| **Risky Driving Attitude** | 10 | n=976 | n=3,185 | **More risky attitude (1-5)** |
| | | 2.18 | 2.17 | |
| | | SD=0.63 | SD=0.62 | |
| | | p=0.94 | | |
| **Lifestyle** | 8 | n=986 | n=3,216 | **Positive attitude (1-5)** |
| | | 4.32 | 4.37 | |
| | | SD=0.65 | SD=0.67 | |
| | | p=0.05 | | |
| **Tolerance of Deviance** | 6 | n=994 | n=3,235 | **More tolerant of deviant behavior (1-5)** |
| | | 1.40 | 1.37 | |
| | | SD=0.50 | SD=0.48 | |
| | | p=0.11 | | |

Other Teen Attributes: As shown in Table 80, the DE and Non-DE group reported similar levels of parental monitoring (e.g., parents knowing where they are when they are not in school).

| Table 80: Other Teen Attribute Scores by DE Status (All teens) | | | | |
|---|---|---|---|---|
| | # of Items | Driver Education Status | | Meaning of High Score (range) |
| | | DE | Non-DE | |
| **Parental Monitoring** | 4 | n=994 | n=3,245 | **More accepting (1-5)** |
| | | 4.43 | 4.39 | |
| | | SD=0.58 | SD=0.52 | |
| | | p=0.12 | | |
| **Time Perspective** | 7 | n=988 | n=3,203 | **Not future oriented (1-5)** |
| | | 2.41 | 2.40 | |
| | | SD=0.67 | SD=0.69 | |
| | | p=0.86 | | |
| **Responsibility When Driving** | 3 | n=995 | n=3,251 | **More responsible (1-5)** |
| | | 4.57 | 4.60 | |
| | | SD=0.52 | SD=0.55 | |
| | | p=0.16 | | |

There was also no difference between the DE and Non-DE groups in terms of time perspective (i.e, willingness to engage in planning) or responsibility when driving.

Exposure: Exposure was initially assessed using a 13-item scale that asked teens to indicate how often they drove for a variety of reasons (the 5-point scale ranged from never to every day). Only teens who had driven in the past three months were instructed to answer these items, which explains the lower "n." As shown in Table 81, DE teens had significantly less driving exposure compared to Non-DE teens (mean=2.0).

| Table 81: Exposure Scores by DE Status | | | | |
|---|---|---|---|---|
| | # of Items | Driver Education Status | | Meaning of High Score (range) |
| | | DE | Non-DE | |
| **Exposure** | 13 | n=882 | n=2,949 | **More exposure (1-5)** |
| | | 1.81 | 2.00 | |
| | | SD=0.58 | SD=0.62 | |
| | | $p<0.01$ | | |

Teens were also asked about how much time, in minutes, they drove each day for the past three days, beginning with yesterday (see Table 82).

| Table 82: Average time (in minutes) driven in past three days by DE status (All teens) | | |
|---|---|---|
| | DE | Non-DE |
| **Yesterday** | 15.30 | 18.44 |
| | SD=26.42 | SD=34.20 |
| | (n=933) | (n=3,091) |
| | $p=0.01$ | |
| **Two days ago** | 13.82 | 19.95 |
| | SD=23.32 | SD=34.13 |
| | (n=928) | (n=3,086) |
| | $p<0.01$ | |
| **Three days ago** | 18.09 | 22.96 |
| | SD=37.09 | SD=44.57 |
| | (n=929) | (n=3,090) |
| | $p<0.01$ | |

As shown in the table, in the past three days, DE teens on average reported less driving exposure in terms of minutes driving, compared to Non-DE teens, and this difference was found to be significant for each day in the past three days.

Finally, teens were asked the identities of their driving supervisor(s) during the instructional permit phase, and which one person rode/rides with them the most. As seen in Table 83, the most often reported answer for both DE and Non-DE teens was that their mother (86.8% and 87.5%, respectively) or father (85.3% and 80.7%) rode with them as their supervising driver. Not surprisingly, more DE teens reported riding with a driving instructor (17%) compared to Non-DE teens (7.9%). When asked which one person rode with them the most, their mother was more frequently reported for both DE (44.2%) and Non-DE teens (46.3%).

Finally, survey participants were asked how many hours of driving practice they think the "average" teen driver should have before they receive their provisional driver's license. The mean number of hours reported by teens in the DE group was about 75 hours, compared to a mean of 79 hours reported by Non-DE teens. This difference was significant (p=0.05).

| Table 83: Supervising driver by DE status (All teens) | | |
|---|---|---|
| | Driver Education Status | |
| | DE | Non-DE |
| **Who is your supervising driver?*** | | |
| **Mother** | 86.8% (n=868) | 87.5% (n=2,864) |
| **Father** | 85.3% (n=853) | 80.7% (n=2,641) |
| **Older brother or sister** | 13.3% (n=133) | 19.9% (n=652) |
| **Other relative** | 21.7% (n=217) | 27.4% (n=897) |
| **Friend** | 4.7% (n=47) | 5.9% (n=192) |
| **Driving instructor** | 17.0% (n=170) | 7.9% (n=258) |
| **Other** | 5.2% (n=52) | 7.0% (n=230) |
| **Do not have instruction permit yet** | 0.1% (n=1) | 0.1% (n=2) |
| **Who rides with you the most?** | | |
| **Mother** | 44.2% (n=442) | 46.3% (n=1,514) |
| **Father** | 34.0% (n=340) | 29.3% (n=960) |
| **Older brother or sister** | 0.7% (n=7) | 1.7% (n=57) |
| **Other relative** | 2.0% (n=20) | 1.8% (n=58) |
| **Friend** | 0.2% (n=2) | 0.5% (n=187) |
| **Driving instructor** | 0.3% (n=3) | 0.1% (n=4) |
| **Other** | 1.2% (n=12) | 1.2% (n=38) |

**Note percentages do not add to 100%, as respondents were asked to mark all that apply*

### *Teen Attributes – Factors Associated with Driver Education*

Results suggest that more of the DE teens than Non-DE teens are: young, male, white, in grade 10, and reside in an urban location. DE teens, compared to Non-DE teens, also had: more parents with a higher level of education, higher support for specific requirements of GDL, a stronger belief that GDL influenced their driving, a lower rating of their driving skills, less positive attitudes about their lifestyle, and less driving exposure. On the other hand, the DE teens did not differ from the Non-DE teens on other factors, several of which have been shown to be associated with collision involvement. No differences between the two groups were found in terms of: GDL knowledge, overall support for GDL, safe driving knowledge, perceived likelihood of a collision or injury, risk taking behaviors, risky driving behaviors, risk taking attitudes, risky driving attitudes, tolerance of deviance, parental monitoring, time perspective, or responsibility when driving.

Logistic regression was used to investigate which of these teen driver attributes measured in the baseline survey may be associated with having actually completed the ODOT-approved driver education program at a later date. Independent demographic variables included age at provisional instruction permit issuance date, gender, whether the teen lived in a rural or urban location, self-reported race, and father's level of education. All other independent variables were composite scales including GDL knowledge, GDL overall support, GDL support-specific requirements, GDL influence, Safe driving knowledge, Self-rated skills, Perceived likelihood of accident or injury, Risk taking behavior, Risky driving attitudes, Risk taking attitudes, Lifestyle, Tolerance of Deviance, Parental Monitoring, Time Perspective, and Responsibility when Driving. Only those who said they had driven in the past three months answered questions used to form the Risky driving behavior scale and the Exposure scale. To minimize the number of missing values, these were not included in the analyses. Whether teens have driven in the past three months or not was used as a substitute measure of exposure.

Table 84 below shows the factors that were found to have a p-value below 0.10, as there were many variables included in these analyses which would make the tables showing all results cumbersome for readers. Thus, only results with a p-value above this level are not shown, as results with such high p-values would not be considered to be significant or to approach significance, even when less conservative interpretations of statistical significance are used. Only those results with a p-value equal to or below the 0.05 level will be discussed in the text. As can be seen, logistic regression revealed that as age increased, the chances of being in the DE group decreased by 26 percent. It was also found that being male significantly increased the likelihood of having taken DE, by 25 percent. Having reported being Hispanic or Latino significantly decreased the likelihood of being in the DE group, by 80 percent. Living in an urban area significantly increased the likelihood of having taken DE, by 67 percent. If the father of the teen had an undergraduate degree or a higher level of education, the likelihood of the teen having taken DE increased by 89 percent. Having a higher score (indicating a higher level of support) regarding support for specific requirements of GDL also significantly increased the likelihood of having taken DE, by 26 percent. Having a higher score on the self-rated skills scale (a higher score indicating a higher self-rating) decreased the likelihood of having taken DE by 28 percent. Finally, having driven in the past three months at the time of the survey significantly decreased the chances of teens being in the DE group, by 49 percent.

| Table 84: Logistic regression with DE status as dependent variable (All teens): | | | |
|---|---|---|---|
| **Factor (N=3,188)** | **Odds ratio** | **%** | **p-value** |
| **Age at PIP issuance** | 0.74 | -26% | p<0.01 |
| **Gender** | 1.25 | +25% | p=0.01 |
| **Hispanic/Latino** | 0.20 | -80% | p=0.03 |
| **Urban** | 1.67 | +67% | p<0.01 |
| **Father education** | 1.89 | +89% | p<0.01 |
| **GDL support for specific requirements** | 1.26 | +26% | p=0.01 |
| **Self-rated skills** | 0.72 | -28% | p<0.01 |
| **Driven past 3 months** | 0.51 | -49% | p<0.01 |

No other variables in the model were found to have significant effects.

The same model was also run for males and females, separately, and results are also shown in Table 85. As can be seen in Table 85, logistic regression revealed that, for males, as age increased the chances of being in the DE group decreased by 32 percent. Living in an urban area significantly increased the likelihood of males having taken DE, by 85 percent. If the father of the male teen had an undergraduate degree or a higher level of education, the likelihood of having taken DE increased by 98 percent. Having a higher score (indicating a higher level of support) regarding support for specific requirements of GDL also significantly increased the likelihood of having taken DE, by 33 percent. Finally, having a higher score on the self-rated skills scale (a higher score indicating a high self-rating) decreased the likelihood of having taken DE by 38 percent. No other variables in the model were found to have significant effects for males.

| Table 85: Logistic regression with DE status as dependent variable (Males): | | | |
|---|---|---|---|
| **Factor (N=1,396)** | **Odds ratio** | **%** | **p-value** |
| **Age at PIP issuance** | 0.68 | -32% | p<0.01 |
| **Urban** | 1.85 | +85% | p<0.01 |
| **Father education** | 1.98 | +98% | p<0.01 |
| **GDL support for specific requirements** | 1.33 | +33% | p=0.03 |
| **Self-rated skills** | 0.62 | -38% | p<0.01 |

As for females, logistic regression revealed that with each one year increase in age, the chances of being in the DE group decreased by 22 percent (see Table 86). Having reported being Hispanic or Latino significantly decreased the likelihood of being in the DE group, by 89 percent. Living in an urban area significantly increased the likelihood of females having taken DE, by 54 percent. If the father of the female teen had an undergraduate degree or a higher level of education, the likelihood of having taken DE increased by 84 percent. Finally, having driven in the past three months (at the time of the survey) significantly decreased the chances of female teens being in the DE group, by 58 percent. No other variables in the model were found to have significant effects for females.

| Table 86: Logistic regression with DE status as dependent variable (Females): | | | |
|---|---|---|---|
| **Factor (N=1,790)** | **Odds ratio** | **%** | **p-value** |
| **Age at PIP issuance** | 0.78 | -22% | p=0.01 |
| **Hispanic/Latino** | 0.11 | -89% | p=0.04 |
| **Urban** | 1.54 | +54% | p<0.01 |
| **Father education** | 1.84 | +84% | p<0.01 |
| **Self-rated skills** | 0.82 | -18% | p=0.08 |
| **Driven past 3 months** | 0.42 | -58% | p<0.01 |

### *Wave 1 and Wave 2 Comparisons*

This section initially describes group characteristics – gender, age, license status – for the DE and Non-DE teens in Wave 1 and Wave 2. This is followed by a section on changes in student outcomes as a function of exposure to the ODOT-approved driver education program. To simplify the comparisons, and to be similar to the analytic approach taken in Manitoba, demographic factors such as race, place of residence, and parent education are not included in these sections. However, these factors are taken into account in subsequent sections examining the relationship between driver education and safety performance.

Group Characteristics: The DE group comprised slightly fewer males than females (males 44.4% and females 54.6%, respectively). The Non-DE group had slightly more females than males (60.6% versus 38.2%, respectively).

Table 87 provides information of the age of participants in the DE and Non-DE groups during the first and second waves of the survey. As can be seen, the average age of the DE group during Wave 1 was 15 years, 8 months; they were slightly older (16 years, 5 months) during the second wave. The average age of the Non-DE group during the first wave was 15 years, 11 months, and their average age during the second wave was 16 years, 8 months.

| Table 87: Group Characteristics | | | | |
|---|---|---|---|---|
| | **Driver Education Status** | | | |
| | **DE Group Wave 1** | **DE Group Wave 2** | **Non-DE Group Wave 1** | **Non-DE Group Wave 2** |
| **Mean Age** | 15 years, 8 months | 16 years, 5 month | 15 years, 11 month | 16 years, 8 month |
| | SD=0.66<br>7.92 months<br>n=286 | SD=0.66<br>7.92 months<br>n=286 | SD=0.87<br>10.44 months<br>n=741 | SD=0.87<br>10.44 months<br>n=741 |
| **License Status** | | | | |
| **No License** | 0%<br>(n=0) | 0.70%<br>(n=2) | 0%<br>(n=0) | 0.13%<br>(n=1) |
| **Instruction Permit** | 99.30%<br>(n=284) | 68.53%<br>(n=196) | 98.79%<br>(n=732) | 73.55%<br>(n=545) |
| **Provisional License** | 0.70%<br>(n=2) | 19.93%<br>(n=57) | 1.08%<br>(n=8) | 16.73%<br>(n=124) |
| **Full License** | 0%<br>(n=0) | 10.84%<br>(n=31) | 0.13%<br>(n=1) | 9.58%<br>(n=71) |

The license status for both the DE and Non-DE groups during the two waves of the survey can also be seen in Table 87. Nearly all of the teens in the DE group in Wave 1 reported holding an instruction permit (99.3%), and over two-thirds continued to hold an instruction permit in Wave 2 (68.5%). Almost 20 percent held a provisional license. In addition, almost the entire Non-DE group held an instruction permit in Wave 1 (98.8%). Almost three-quarters continued to hold an instruction permit in Wave 2 (73.6%), with nearly 17 percent holding a provisional license. It should be noted that 31 teens (10.8%) of the DE-group and 71 teens (9.6%) of the Non-DE group reported holding a full license in Wave 2. This does not seem possible since about 11 percent of the teens (n=46) were under 17 years of age, which is too young to have graduated to a full license. Thus, some may have reported they were on a full license even though they still had a provisional license.

Graduated Licensing: Four scales in the questionnaire relate to graduated licensing, and the results appear in a series of tables (Tables 88 and 90) – knowledge about the program, support for GDL in general, support for the specific features of the program, and the extent to which teens believe it has influenced or will influence their driving behavior. The first column describes the variable or dimension being measured, and the next column shows the number of items in the questionnaire that make up that scale. The next two columns present the results from the paired comparisons that examine changes from Wave 1 to Wave 2 for both DE and Non-DE groups. The values for each group are means collapsed across the total number of items for the corresponding group. The final two columns present the results from the independent (between groups) comparisons during Wave 1 and Wave 2. In each case, the number of teens in a group is shown, as is the p-value from the t-test.

If paired t-tests revealed significant results for the DE group or the Non-DE group from Wave 1 to Wave 2, the data were examined further using Two-way factorial ANOVA. Where these additional analyses have been conducted, results of the Two-way factorial ANOVA are appended to the bottom of the tables when significant interaction effects were found.

Table 88 presents the results for knowledge about the graduated licensing program. The paired (within group) comparisons show that both the DE group and the Non-DE group had a significant increase in knowledge about the GDL program between Wave 1 and Wave 2. There was also a significant difference in knowledge about the GDL program when comparing the DE and Non DE groups in Wave 2, with the DE group having a higher knowledge score than the Non-DE group.

As mentioned previously, where paired t-tests revealed significant results for the DE group or the Non-DE group from Wave 1 to Wave 2, the data were examined further using Two-way factorial ANOVA (see second part of Table 88). This test measures the effect of two independent variables, and the interaction of these variables, on a continuous dependent variable (e.g., knowledge about the GDL program).

**Table 88: Graduated Licensing Knowledge Scores**

| Measure | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | DE Wave 1 | DE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | DE Wave 1 | Non-DE Wave 1 | DE Wave 2 | Non-DE Wave 2 |
| GDL Knowledge | 18 | n=286 | n=286 | n=741 | n=741 | n=286 | n=741 | n=286 | n=741 |
| | | 14.27 | 15.19 | 14.4 | 14.89 | 14.27 | 14.4 | 15.19 | 14.89 |
| | | SD=2.28 | SD=2.14 | SD=2.06 | SD= 2.07 | SD=2.28 | SD=2.06 | SD=2.14 | SD=2.07 |
| | | p<0.01 | | p<0.01 | | p=0.36 | | p=0.04 | |

| Measure | # of Items | Two-way factorial ANOVA | | | | |
|---|---|---|---|---|---|---|
| | | Factor | df | F | Prob > F | |
| GDL Knowledge | 18 | Model | 3 | 16.09 | p<0.000 | n=2054<br>$R^2$=0.023<br>Adj $R^2$= 0.022 |
| | | DE | 1 | 0.58 | p=0.447 | |
| | | Wave | 1 | 46.56 | p<0.000 | |
| | | Wave*DE | 1 | 4.31 | p=0.038 | |

| Measure | # of Items | Two-way factorial ANOVA (including age and gender) | | | | |
|---|---|---|---|---|---|---|
| | | Factor | df | F | Prob > F | |
| GDL Knowledge | 18 | Model | 8 | 11.14 | p<0.000 | n=2054<br>$R^2$=0.004<br>Adj $R^2$= 0.038 |
| | | DE | 1 | 1.13 | p=0.289 | |
| | | Wave | 1 | 29.46 | p<0.000 | |
| | | Age | 4 | 5.56 | p<0.000 | |
| | | Gender | 1 | 20.37 | p<0.000 | |
| | | Wave*DE | 1 | 3.39 | p=0.066 | |

Results of the Two-way factorial ANOVA reveal that DE status (DE versus Non-DE) does not significantly affect the model (p=0.45). However, the wave of the survey (Wave 1 versus Wave 2) does (p<0.01). More importantly, when combining the effect of both driver education and the wave of the survey, the interaction effect of the two is statistically significant (p=0.04).

This analysis was performed again including both age and gender as additional independent variables (see Table 88). These results revealed that the interaction effect of both driver education and the wave of the survey was no longer significant at the 0.05 level (p=0.07). DE status (DE versus Non-DE) does not significantly affect the model (p=0.29). However, the wave of the surveys (Wave 1 versus Wave 2) does (p<0.01), and gender does (p<0.01). Age also significantly affects the model (p<0.01).

Thus, the increase in mean GDL knowledge from Wave 1 to Wave 2 for the DE group is not significantly larger (at the 0.51 level) than the increase in mean knowledge from Wave 1 to Wave 2 for Non-DE group, after controlling for age and gender. It should be noted that the increase in knowledge for both groups was fairly small (0.92 for the DE group compared to 0.49 for the Non-DE group). On the other hand, the increase in knowledge for the DE group is nearly double that of the Non-DE group, suggesting driver education may have a positive influence. Nevertheless, the magnitude of the influence does not appear to be very large.

It is noteworthy that for three of the 18 knowledge items, on average, teens in both groups either did not know the answer, or answered incorrectly, suggesting that there is a need to consider ways of improving the level of understanding about the graduated licensing program. Even the DE group following exposure to the program obtained an average of three items incorrect. Teen drivers need to understand the features of the program so they can comply with it.

An item-by-item analysis of the GDL knowledge items appears in Appendix T. It shows the percent of respondents who answered the items correctly. The DE group had an increase in knowledge on 17 of the 18 items from the first to second wave of the survey, whereas the Non-DE group had an increase in knowledge on 13 of 18. The differential improvement between the groups is reflected in the magnitude of the changes noted. For example, item 1f shows that in the DE group, approximately 77 percent answered this item correctly during Wave 1, and about 90 percent answered it correctly in the second wave. By contrast, 79 percent of the Non-DE group's responses were correct in Wave 1, with only 86 percent answering correctly in Wave 2.

As a further indication of where improvements are needed in the level of understanding about the graduated licensing program, Table 89 presents the items which 20 percent or more of the DE group in Wave 2 answered incorrectly. The survey question asked the respondent to indicate which of a series of activities were permitted during the provisional instruction permit and provisional licensing phase. It is noteworthy that the majority of errors occurred on items related to the provisional licensing stage. Many of the respondents were still in the provisional instruction permit stage; thus, the requirements of the provisional licensing stage were not yet applicable. As well, the provisional license stage has more nuances and complicated rules, so specific requirements may have been more difficult to recall correctly when taking the survey.

**Table 89: Percent Incorrect for Graduated Licensing Knowledge Items**

| | Graduated Licensing Question<br>Which of the following are permitted? | DE Group Wave 2<br>Percent Incorrect |
|---|---|---|
| **Instruction Permit Phase** | 1b. Driving with a supervising driver who has held a full valid license for one year | 23.4% |
| | 1c. Driving with a supervising driver who has held full valid license for three years | 26.6% |
| **Provisional License Phase** | 2c. Driving home from school with two teenage friends in the front seat of your car in the second six months | 38.8% |
| | 2d. Driving home from school with one teenage friend in the front seat and three in the backseat | 44.1% |
| | 2g. Driving for your job between midnight and 5 a.m. | 22.0% |
| | 2k. Talking on a hands-free cell phone while you are driving. | 32.9% |

Table 90 presents information on overall support for the program, support for the various requirements, and beliefs on the influence of the program on safe driving. Overall support for the program was quite high initially (mean scores near 4 on a scale of 1-5, where 5 represents "strongly support"), and had a significant decrease from Wave 1 to Wave 2 for both DE and Non-DE groups. The reasons for this are not evident.

| Table 90: Support and Influence of Graduated Licensing Scores | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Measure** | **# of Items** | **Driver Education Status** | | | | | | | |
| | | **Paired Comparisons** | | | | **Independent Comparisons** | | | |
| | | **DE Wave 1** | **DE Wave 2** | **Non-DE Wave 1** | **Non-DE Wave 2** | **DE Wave 1** | **Non-DE Wave 1** | **DE Wave 2** | **Non-DE Wave 2** |
| **GDL Overall Support** | 1 | n=285 | n=285 | n=740 | n=740 | n=285 | n=740 | n=286 | n=741 |
| | | 4.07 | 3.84 | 4.04 | 3.92 | 4.07 | 4.04 | 3.84 | 3.92 |
| | | SD=0.80 | SD=0.88 | SD=0.81 | SD=0.85 | SD=0.80 | SD=0.81 | SD=0.89 | SD=0.85 |
| | | p<0.01 | | p<0.01 | | p=0.57 | | p=0.15 | |
| **GDL Support-Specific Req.** | 7 | n=277 | n=277 | n=713 | n=713 | n=282 | n=727 | n=281 | n=727 |
| | | 3.89 | 3.90 | 3.83 | 3.75 | 3.89 | 3.83 | 3.90 | 3.75 |
| | | SD=0.68 | SD=0.70 | SD=0.69 | SD=0.70 | SD=0.69 | SD=0.69 | SD=0.69 | SD=0.70 |
| | | p=0.71 | | p<0.01 | | p=0.21 | | p<0.01 | |
| **GDL Influence** | 3 | n=283 | n=283 | n=734 | n=734 | n=286 | n=738 | n=283 | n=737 |
| | | 4.37 | 4.29 | 4.30 | 4.23 | 4.37 | 4.30 | 4.29 | 4.23 |
| | | SD=0.66 | SD=0.69 | SD=0.69 | SD=0.71 | SD=0.66 | SD=0.69 | SD=0.69 | SD=0.71 |
| | | p=0.08 | | p<0.01 | | p=0.16 | | p=0.20 | |

The difference in the decrease in overall support for the program from Wave 1 to Wave 2 for the DE group compared to the Non-DE group was further investigated using Two-way factorial ANOVA (results discussed but not shown in table). Results revealed that DE status (DE versus Non-DE) does not significantly affect the model (p=0.50), but the wave of the survey (Wave 1 versus Wave 2) does (p<0.01). The interaction of DE status and wave of the survey, however, was not significant (p=0.15).

When including gender and age in the model, DE status still does not significantly affect the model (p=0.62), and the wave of the survey does (p<0.01). Age does not significantly affect the model (p=0.50), but gender does (p<0.01). The interaction of DE and Wave remains insignificant in this model (p=0.13). Therefore, the decrease in overall support for the program from Wave 1 and Wave 2 in the DE group is not significantly different from the decrease in overall support for the program in the Non-DE group.

Support for the specific requirements was also high in both groups during Wave 1 and Wave 2, but there was a significant decrease in support among the Non-DE group. There was also a significant difference in support in Wave 2 between the DE and Non-DE groups (p<0.01), with the DE group more supportive.

The difference in the decrease in support for the specific requirements of the program from Wave 1 to Wave 2 for the DE group compared to the Non-DE group was further investigated using Two-way factorial ANOVA (results discussed but not shown in table). Results revealed that DE status (DE versus Non-DE) significantly affects the model (p<0.01). The wave of the survey (Wave1 versus Wave 2), however, does not (p=0.30). The interaction of the two was not significant (p=0.20).

When gender and age were added to the model, the effect of DE status on the model remained significant (p<0.01), and wave remained insignificant (p=0.32). Age does not significantly affect the model (p=0.29). However, gender does (p<0.01). The interaction between DE and wave remains insignificant (p=0.16). Thus, there is no significant difference from Wave 1 to Wave 2 between the DE group and the Non-DE group in support for the specific requirements of the program.

Both groups strongly believe that the GDL program has a positive impact on their driving behavior, but the Non-DE group had a significant decrease between the first wave and the second wave of the survey.

The difference in beliefs regarding the influence of the GDL program on safe driving behavior from Wave 1 to Wave 2 for the DE group compared to the Non-DE group was further investigated using Two-way factorial ANOVA (results discussed but not shown in table). Results indicate that DE status does not significantly affect the model at the 0.05 level (p=0.06), but the wave of the survey does (p=0.03). Taken together, the interaction of DE versus Non-DE and the wave of the survey was not significant (p=0.97).

Gender and age were added to the model. Here, the effect of DE on the model is significant at the 0.05 level (p=0.03), and so is the effect of the wave of the survey (p=0.03). The effect of age is not significant (p=0.60), but the effect of gender on the model is (p<0.01). Again, the interaction of the wave of the survey and DE status was not significant (p=0.93). Thus, the difference from Wave 1 to Wave 2 in belief that the GDL program has a positive influence on driving behavior is not significantly different in the DE group compared to the Non-DE group.

<u>Safe Driving Knowledge:</u> Fourteen multiple choice items assessed safe driving knowledge. As shown in Table 91, the DE group showed a significant improvement in safe driving knowledge from Wave 1 to Wave 2. The Non-DE group also showed a significant change in safe driving knowledge. As well, the DE group had significantly greater safe driving knowledge than the Non-DE group after driver education during Wave 2, suggesting, that completion of driver education may have had a positive influence on knowledge about safe driving. Recalculating the knowledge scores out of 100 percent shows that the DE group answered 60 percent of the knowledge questions correctly, compared to only 54 percent of the Non-DE group.

Again, Two-way factorial ANOVA was used to further investigate the difference from Wave 1 to Wave 2 for the DE group compared to the Non-DE group (see Table 91). Analyses of the difference in the increase in safe driving knowledge from Wave 1 to Wave 2 revealed that DE status (DE versus Non-DE) significantly affects the model (p<0.01), as does the wave of the survey (Wave 1 versus Wave 2; p<0.01). More importantly, when combining the effect of both driver education and the wave of the survey, the interaction effect of the two is statistically significant (p<0.01).

This analysis was performed again including both age and gender as additional independent variables. The level of significance of both DE status and the wave of the survey, independently, remained the same (p<0.01). Age does not significantly affect the model (p=0.68). However, gender does (p<0.01). These results revealed that the interaction effect of both driver education and the wave of the survey remains significant (p<0.01).

| Table 91: Safe Driving Knowledge Scores | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Measure | # of Items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | DE Wave 1 | DE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | DE Wave 1 | Non-DE Wave 1 | DE Wave 2 | Non-DE Wave 2 |
| Safe Driving Knowledge | 14 | n=286 | n=286 | n=741 | n=741 | n=286 | n=741 | n=286 | n=741 |
| | | 7.50 | 8.43 | 7.36 | 7.58 | 7.50 | 7.36 | 8.43 | 7.58 |
| | | SD=1.88 | SD=1.79 | SD=1.79 | SD=1.88 | SD=1.88 | SD=1.79 | SD=1.79 | SD=1.88 |
| | | $p<0.01$ | | $p=0.01$ | | $p=0.27$ | | $p<0.01$ | |
| Measure | # of Items | Two-way factorial ANOVA | | | | | | | |
| | | Factor | | df | F | | Prob > F | | |
| Safe Driving Knowledge | 14 | Model | | 3 | 23.8 | | $p<0.000$ | n=2054<br>$R^2=0.034$<br>Adj $R^2= 0.032$ | |
| | | DE | | 1 | 29.85 | | $p<0.000$ | | |
| | | Wave | | 1 | 39.97 | | $p<0.000$ | | |
| | | Wave*DE | | 1 | 15.46 | | $p<0.001$ | | |
| Measure | # of Items | Two-way factorial ANOVA (including age and gender) | | | | | | | |
| | | Factor | | df | F | | Prob > F | | |
| Safe Driving Knowledge | 14 | Model | | 8 | 10.14 | | $p<0.000$ | n=2054<br>$R^2=0.0382$<br>Adj $R^2= 0.034$ | |
| | | DE | | 1 | 26.37 | | $p<0.000$ | | |
| | | Wave | | 1 | 33.73 | | $p<0.000$ | | |
| | | Age | | 4 | 0.57 | | $p=0.682$ | | |
| | | Gender | | 1 | 7.49 | | $p=0.006$ | | |
| | | Wave*DE | | 1 | 15.79 | | $P=0.001$ | | |

Thus, the improvement in safe driving knowledge in the DE group from Wave 1 to Wave 2 is significantly larger than the increase in mean knowledge from Wave 1 to Wave 2 for Non-DE group. It should be noted, however, that although this difference may be significant, statistically speaking, the increase in safe driving knowledge for both groups was fairly small (0.93 for the DE group compared to 0.22 for the Non-DE group). On the other hand, the increase in safe driving knowledge for the DE group is more than four times that of the Non-DE group, suggesting that driver education may have a positive influence, albeit of a small magnitude.

Regardless of the greater level of knowledge among the DE group, their average scores on the safe driving knowledge scale are far from perfect. They either failed to answer or answered incorrectly nearly half of the 14 items. At the same time, the knowledge items were difficult, since easy ones (those that most teens answered correctly) had been dropped from the questionnaire as a result of pre-testing.

An item-by-item analysis of responses to the safe driving knowledge questions is contained in Appendix U. It shows the percent of respondents in each of the groups during the first and second waves of the survey that selected each of the multiple choice alternative answers. There was an increase in the percent correct among the DE group on 10 of the 14 items from the first to the second wave; by contrast, the Non-DE group showed an increase in the percent correct for only seven of the items.

Table 92 provides a summary by listing those items which 20 percent or more of the respondents in the DE group during Wave 2 answered incorrectly (refer to Appendix U for the complete wording of the item). As can be seen, some of the items were answered incorrectly by over 60 percent of the teens in the DE group, even after completing driver education. The percentages shown in Table 92 include incorrect and unanswered responses, so they do not correspond directly to the percentages shown in Appendix U.

| Table 92: Percent Incorrect for Safe Driving Knowledge | | |
|---|---|---|
| **Safe Driving Knowledge Question** | | **DE Group Wave 2 Percent Incorrect** |
| **1.** | **When changing lanes, you can check your blind spot by:** | 68.1% |
| **3.** | **What is the most common cause of minor accidents among teens?** | 55.2% |
| **4.** | **A car going twice as fast as another would strike an object how much harder?** | 28.3% |
| **8.** | **To safely drive into a curve, you should:** | 53.9% |
| **9.** | **Which of the following best describes where you should be looking when driving:** | 45.1% |
| **10.** | **What is the most common cause of serious injury accidents among teens?** | 56.6% |
| **11.** | **The most common type of accident at entrances to freeways (expressways) is:** | 73.4% |
| **12.** | **Because of their faster reaction time, teens deal with which of the following situations better than typical 40 year old drivers:** | 67.5% |
| **13.** | **Which of the following accident types result in the greatest number of deaths to teenage drivers and their passengers each year?** | 49.7% |
| **14.** | **On a wet road, hydroplaning can be caused by:** | 68.1% |

Self-rated Skills: Teens were asked to rate on a five-point scale how good they thought their driving skills were (or, in the case of the first wave of the survey, how good they would be when they started driving) for handling 16 different driving maneuvers. A higher score (range from 1-5) means better self-rated skills. Results are shown in Table 93. As can be seen, both groups were quite positive about their skills, giving a rating in excess of three on the five-point scale. Of some note, both groups showed a significant change between Wave 1 and Wave 2, rating their skills higher in the second wave.

The analysis also showed that in Wave 1 the DE group had less confidence in their skills than the Non-DE group, which was significant. This pattern of results could be attributable to exposure to the course given that the self-rated confidence changed more in the DE group from Wave 1 to Wave 2.

Two-way factorial ANOVA was used to further investigate the difference in the increase in self-rated skills from Wave 1 to Wave 2 for the DE group compared to the Non-DE group (see Table 93). Analyses of the difference in the increase in safe driving knowledge from Wave 1 to Wave 2 revealed that DE status (DE versus Non-DE) does not significantly affect the model at the 0.05 level ($p=0.06$). The wave of the survey (Wave 1 versus Wave 2) did have a significant effect on the model ($p<0.01$). More importantly, when combining the effect of both driver education and the wave of the survey, the interaction effect of the two is significant ($p=0.02$).

| Table 93: Self-rated Skills Scores | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Measure | # of Items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | DE Wave 1 | DE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | DE Wave 1 | Non-DE Wave 1 | DE Wave 2 | Non-DE Wave 2 |
| Self-Rated Skills | 16 | n=265 | n=265 | n=695 | n=695 | n=274 | n=718 | n=275 | n=717 |
| | | 3.60 | 3.94 | 3.72 | 3.93 | 3.60 | 3.72 | 3.94 | 3.93 |
| | | SD=0.60 | SD=0.50 | SD=0.55 | SD=0.55 | SD=0.60 | SD= 0.55 | SD=0.51 | SD=0.55 |
| | | p<0.01 | | p<0.01 | | p<0.01 | | p=0.77 | |
| Measure | # of Items | Two-way factorial ANOVA | | | | | | | |
| | | Factor | | df | F | | Prob > F | | |
| Self-Rated Skills | 16 | Model | | 3 | 36.02 | | p<0.000 | n=1984 R²=0.0517 Adj R²= 0.050 | |
| | | DE | | 1 | 3.49 | | p=0.062 | | |
| | | Wave | | 1 | 98.78 | | p<0.000 | | |
| | | Wave*DE | | 1 | 5.18 | | p=0.023 | | |
| Measure | # of Items | Two-way factorial ANOVA (including age and gender) | | | | | | | |
| | | Factor | | df | F | | Prob > F | | |
| Self-Rated Skills | 16 | Model | | 8 | 16.49 | | p<0.000 | n=1984 R²=0.038 Adj R²= 0.034 | |
| | | DE | | 1 | 4.37 | | p=0.037 | | |
| | | Wave | | 1 | 87.37 | | p<0.000 | | |
| | | Age | | 4 | 0.65 | | p=0.625 | | |
| | | Gender | | 1 | 19.22 | | p<0.000 | | |
| | | Wave*DE | | 1 | 4.56 | | p=0.033 | | |

Two-way factorial ANOVA analysis was also performed including both age and gender as additional independent variables. The level of significance of both DE status and the wave of the survey shows that, independently, both significantly affect the model (p=0.04 and p<0.01 respectively). Age does not significantly affect the model (p=0.63). However, gender does (p<0.01). More importantly, these results revealed that the interaction effect of both driver education and the wave of the survey is significant (p=0.03).

Thus, the improvement in self-rated driving skills in the DE group from Wave 1 to Wave 2 is significantly larger than the improvement in self-rated driving skills from Wave 1 to Wave 2 for the Non-DE group. The improvement in self-rated driving skills for both groups, however, was fairly small (0.34 for the DE group compared to 0.21 for the Non-DE group), suggesting the magnitude of the influence of exposure to DE on self-rated driving skills is not very large.

<u>Perceived Collision Likelihood:</u> Survey respondents were also asked about the likelihood they would be involved in a collision or injured in one while driving during the coming year. Results are shown in Table 94. In the first wave, both groups saw this as relatively unlikely. Among the paired comparisons, at the second wave of survey administration the DE group reported a significantly higher likelihood of being involved or injured in a collision than they had in Wave 1. There was no comparable change in the Non-DE group, suggesting the change in perceived risk may be associated with exposure to the course. Further analysis, however, did not support this suggestion.

The difference in perceived likelihood of accident or injury from Wave 1 to Wave 2 for the DE group compared to the Non-DE group was further investigated using Two-way factorial ANOVA (see Table 94). Results indicate that DE status does significantly affect the model (p<0.01), as does the wave of the survey (p=0.03). Taken together, however, the interaction of DE versus Non-DE and the wave of the survey was not significant (p=0.23).

Two-way factorial ANOVA analysis was also performed including both age and gender as additional independent variables. Results revealed that DE status and the wave of the survey significantly affect the model (p<0.01 and p=0.03 respectively). Age did not significantly affect the model (p=0.27), but gender did (p=0.02). More importantly, the interaction effect of DE status and the wave of the survey was not significant (p=0.17). Thus, the increase in perceived likelihood of accident or injury from Wave 1 to Wave 2 in the DE group is not significantly different from that of the Non-DE group.

**Table 94: Collision Involvement Scores**

| Measure | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | DE Wave 1 | DE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | DE Wave 1 | Non-DE Wave 1 | DE Wave 2 | Non-DE Wave 2 |
| Perceived Likelihood of Accident or Injury | 2 | n=286 | n=286 | n=738 | n=738 | n=286 | n=740 | n=286 | n=739 |
| | | 2.23 | 2.39 | 2.11 | 2.16 | 2.23 | 2.11 | 2.39 | 2.16 |
| | | SD= 0.95 | SD=1.01 | SD=0.94 | SD=0.96 | SD= 0.96 | SD=0.94 | SD=1.01 | SD=0.96 |
| | | p=0.02 | | p=0.28 | | p=0.08 | | p<0.01 | |

Problem Behaviors: A number of the scales/indices included in the New Driver Survey tapped various dimensions of problem behaviors so that any differences between the DE and Non-DE groups could be identified. Results are summarized in Table 95.

In regard to risk taking behavior in general, on average, prior to and following driver education, the two groups both indicated that they would rarely engage in the listed behaviors. However, the Non-DE group was significantly more likely to say they engaged in the risky behaviors during the second wave of the survey. No such change was detected in the DE groups following exposure to driver education.

Two-way factorial ANOVA was used to further investigate the difference in risk taking behavior from Wave 1 to Wave 2 for the DE group compared to the Non-DE group (not show in Table). Analyses of the difference in the increase in risk taking behavior from Wave 1 to Wave 2 revealed that DE status (DE versus Non-DE) does not significantly affect the model (p=0.76). The wave of the survey (Wave 1 versus Wave 2) did have a significant effect on the model (p=0.03). Of interest, when combining the effect of both driver education and the wave of the survey, the interaction effect of the two is not statistically significant (p=0.50).

Two-way factorial ANOVA analysis was again performed including both age and gender as additional independent variables. Results revealed that DE status did not significantly affect the model (p=0.33) and the wave of the survey does (p=0.03). Age did not significantly affect the model (p=0.11), but gender did (p<0.01). More importantly, the interaction effect of both DE status and the wave of the survey was not significant (p=0.55). Thus, the increase in risk taking behavior from Wave 1 to Wave 2 in the DE group is not significantly different from that of the Non-DE group.

**Table 95: Problem Behavior Scores**

| Measure | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | DE Wave 1 | DE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | DE Wave 1 | Non-DE Wave 1 | DE Wave 2 | Non-DE Wave 2 |
| Risk Taking Behavior | 8 | n=280 | n=280 | n=726 | n=726 | n=281 | n=731 | n=285 | n=736 |
| | | 1.29 | 1.33 | 1.28 | 1.36 | 1.29 | 1.28 | 1.33 | 1.36 |
| | | SD=0.54 | SD=0.57 | SD=0.45 | SD=0.53 | SD=0.54 | SD=0.45 | SD=0.58 | SD=0.54 |
| | | p=0.42 | | p<0.01 | | p=0.75 | | p=0.49 | |
| Risky Driving Behavior | 23 | n=235 | n=235 | n=616 | n=616 | n=249 | n=669 | n=269 | n=677 |
| | | 1.27 | 1.43 | 1.30 | 1.45 | 1.27 | 1.30 | 1.43 | 1.45 |
| | | SD=0.26 | SD=0.34 | SD=0.28 | SD=0.42 | SD=0.26 | SD=0.29 | SD=0.34 | SD=0.42 |
| | | p<0.01 | | p<0.01 | | p=0.16 | | p=0.49 | |
| Risky Driving Attitude | 10 | n=276 | n=276 | n=711 | n=711 | n=281 | n=725 | n=280 | n=727 |
| | | 2.14 | 2.07 | 2.14 | 2.07 | 2.14 | 2.14 | 2.07 | 2.07 |
| | | SD=0.57 | SD=0.58 | SD=0.58 | SD=0.60 | SD=0.57 | SD=0.58 | SD=0.60 | SD=0.59 |
| | | p=0.03 | | p=0.01 | | p=0.93 | | p=0.96 | |
| Risk Taking Attitude | 14 | n=269 | n=269 | n=701 | n=701 | n=274 | n=724 | n=281 | n=717 |
| | | 1.80 | 1.75 | 1.75 | 1.74 | 1.80 | 1.75 | 1.74 | 1.75 |
| | | SD=0.61 | SD=0.66 | SD=0.63 | SD=0.68 | SD=0.62 | SD=0.63 | SD=0.66 | SD=0.69 |
| | | p=0.18 | | p=0.56 | | p=0.27 | | p=0.92 | |
| Lifestyle | 8 | n=277 | n=277 | n=718 | n=718 | n=281 | n=723 | n=284 | n=728 |
| | | 4.32 | 4.29 | 4.36 | 4.33 | 4.32 | 4.36 | 4.28 | 4.33 |
| | | SD=0.60 | SD=0.62 | SD=0.64 | SD=0.69 | SD=0.60 | SD=0.64 | SD=0.62 | SD=0.68 |
| | | p=0.32 | | p=0.21 | | p=0.35 | | p=0.31 | |
| Tolerance of Deviance | 6 | n=280 | n=280 | n=721 | n=721 | n=284 | n=732 | n=282 | n=729 |
| | | 1.41 | 1.45 | 1.41 | 1.43 | 1.40 | 1.40 | 1.45 | 1.43 |
| | | SD=0.51 | SD=0.58 | SD=0.50 | SD=0.53 | SD=0.51 | SD=0.50 | SD=0.58 | SD=0.53 |
| | | p=0.13 | | p=0.28 | | p=0.95 | | p=0.63 | |

A related set of scales on risky and unsafe driving behaviors asked those teens who had driven in the past three months to indicate how often they had engaged in 23 listed behaviors. The lower “n” in some of the cells occurs because some teens had not driven in the past three months. As well, most of those who had driven only had an instruction permit and should have been driving with an adult supervisor in the car. Again, the two groups indicated on average that they rarely engaged in these behaviors. No differences in the groups were detected, but both groups changed from

Wave 1 to Wave 2. In Wave 2 the DE group more often said that they engage in risky driving than in Wave 1 (p<0.01). Similarly, the Non-DE group more often said they would engage in risky driving at Wave 2 (p<0.01). This likely reflects the fact that more teens in both groups are driving unsupervised on a provisional license in Wave 2 than is the case in Wave 1, when almost all teens are driving on an instruction permit under supervision.

The difference in the increase in risky driving behavior from Wave 1 to Wave 2 for the DE group compared to the Non-DE group was further investigated using Two-way factorial ANOVA. Results revealed that DE status does not significantly affect the model (p=0.17), but the wave of the survey (Wave 1 versus Wave 2) does (p<0.01). The interaction of the two factors, however, was not significant (p=0.77). When examining the results of the Two-way factorial ANOVA including gender and age in the model, DE status (DE versus Non-DE) does not significantly affect the model at the 0.05 level (p=0.10). The wave of the survey does significantly affect the model (p<0.01). Age does not significantly affect the model (p=0.64), but gender does (p=0.02). The interaction of DE and Wave is, however, insignificant in this model (p=0.71). Therefore, the increase in risky driving behavior from Wave 1 and Wave 2 in the DE group is not significantly different from the increase in the Non-DE group. Both groups generally disagreed with the listed risky driving behaviors (see Table 95). The DE group showed a change following exposure to driver education that indicated less accepting attitudes of risky driving. However, the Non-DE group also showed a similar change during the second wave (p=0.01).

Two-way factorial ANOVA was used to further investigate the decrease in risky driving attitude from Wave 1 to Wave 2 for the DE group compared to the Non-DE group (results discussed but not shown in table). Results revealed that DE status (DE versus Non-DE) does not significantly affect the model (p=0.97), but wave does (p=0.02). The interaction effect of both the wave of the survey and DE status was not significant (p=0.92).

When examining the results of the Two-way factorial ANOVA including gender and age in the model, DE status (DE versus Non-DE) again does not significantly affect the model (p=0.42). The wave of the survey also does not significantly affect the model (p=0.16). Age does not significantly affect the model at the 0.05 level (p=0.06). Finally, gender did have a significant effect on the model (p<0.01). The interaction of DE and Wave is, however, insignificant in this model (p=0.99). Therefore, the decrease in risky driving attitude from Wave 1 and Wave 2 in the DE group is not significantly different from the decrease in risky driving attitude in the Non-DE group.

The difference between the groups in attitudes toward risk taking in general during Wave 1 and Wave 2 was not significant.

Neither group showed any significant change on the lifestyle items from the first to second wave of the survey. The independent comparisons also show that there were no statistically significant differences in lifestyle scores between the DE and Non-DE groups in Wave 1 and in Wave 2. Similarly, the difference in tolerance of deviance scores between the groups during Wave 1 and Wave 2 was not significant; neither group showed any significant change from the first to second wave of the survey.

Parental Monitoring: As shown in Table 96, there was a small but statistically significant change in the extent to which teens said they were likely to follow their parents' values and advice and to accept monitoring by them among the Non-DE group between Wave 1 and Wave 2.

To further investigate the change in parental monitoring from Wave 1 to Wave 2 for the DE group compared to the Non-DE group, Two-way factorial ANOVA was used (not show in Table). Results revealed that DE status (DE versus Non-DE) does significantly affect the model (p=0.04), but the wave of the survey does not (p=0.13). The interaction effect of both the wave of the survey and DE status was not significant (p=0.88).

When examining the results of the Two-way factorial ANOVA including gender and age in the model, DE status (DE versus Non-DE) does not significantly affect the model at the 0.05 level (p=0.07). The wave of the survey does not significantly affect the model (p=0.59). Age significantly affects the model (p=0.01), as does gender (p<0.01). The interaction of DE and Wave, however, is not significant in this model (p=0.82). Therefore, the change in parental monitoring from Wave 1 and Wave 2 in DE group is not significantly different from the change in parental monitoring in the Non-DE group.

**Table 96: Parental Monitoring Scores**

| Measure | # of Items | Driver Education Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | DE Wave 1 | DE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | DE Wave 1 | Non-DE Wave 1 | DE Wave 2 | Non-DE Wave 2 |
| Parental Monitoring | 4 | n=283 | n=283 | n=731 | n=731 | n=285 | n=737 | n=284 | n=734 |
| | | 4.46 | 4.43 | 4.41 | 4.36 | 4.46 | 4.41 | 4.43 | 4.36 |
| | | SD=0.46 | SD=0.56 | SD=0.55 | SD=0.65 | SD=0.46 | SD=0.54 | SD=0.56 | SD=0.65 |
| | | p=0.22 | | p=0.02 | | p=0.13 | | p=0.14 | |

Exposure: As can be seen in Table 97, there was a significant increase in driving exposure estimates in the DE group and the Non-DE group from Wave 1 to Wave 2, likely owing to the fact that many had become licensed and were driving without supervision. The independent comparisons showed that the Non-DE group had significantly more driving exposure than the DE group in Wave 1, but differences between these two groups were not significant in Wave 2.

Two-way factorial ANOVA was used to further investigate the increase in driving exposure from Wave 1 to Wave 2 for the DE group compared to the Non-DE group (see Table 97). Results revealed that DE status (DE versus Non-DE) significantly affects the model (p<0.01), as does the wave of the survey (p<0.01). The interaction effect of both the wave of the survey and completion of DE was not significant at the 0.05 level.

When examining the results of the Two-way factorial ANOVA including gender and age in the model, DE status significantly affects the model (p<0.01), as does the wave of the survey (p<0.01). Age also significantly affects the model (p=0.04), as does gender (p<0.01). More importantly, the interaction of completion of DE and the wave of the survey is significant in this model (p=0.03).

Therefore, the increase in driving exposure from Wave 1 and Wave 2 in the DE group is significantly different from the increase in driving exposure in the Non-DE group. It should be noted, however, that the increase in driving exposure for both groups was fairly small (0.47 for the DE group compared to 0.35 for the Non-DE group), suggesting the magnitude of the influence of DE on driving exposure may not be very large.

**Table 97: Exposure Scores**

| **Measure** | **# of Items** | **Driver Education Status** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Paired Comparisons** | | | | **Independent Comparisons** | | | |
| | | **DE Wave 1** | **DE Wave 2** | **Non-DE Wave 1** | **Non-DE Wave 2** | **DE Wave 1** | **Non-DE Wave 1** | **DE Wave 2** | **Non-DE Wave 2** |
| **Exposure** | 13 | n=240 | n=240 | n=615 | n=615 | n=256 | n=667 | n=266 | n=680 |
| | | 1.77 | 2.24 | 1.95 | 2.3 | 1.76 | 1.95 | 2.24 | 2.3 |
| | | SD=0.56 | SD=0.61 | SD=0.60 | SD=0.67 | SD=0.55 | SD=0.60 | SD=0.63 | SD=0.68 |
| | | p<0.01 | | p<0.01 | | p<0.01 | | p=0.23 | |
| **Measure** | **# of Items** | **Two-way factorial ANOVA** | | | | | | | |
| | | **Factor** | | **df** | **F** | | **Prob > F** | | |
| **Exposure** | 13 | Model | | 3 | 63.49 | | p<0.000 | n=1869 $R^2$=0.093 Adj $R^2$= 0.091 | |
| | | DE | | 1 | 13.49 | | p<0.000 | | |
| | | Wave | | 1 | 160.6 | | p<0.000 | | |
| | | Wave*DE | | 1 | 3.59 | | p=0.058 | | |
| **Measure** | **# of Items** | **Two-way factorial ANOVA (including age and gender)** | | | | | | | |
| | | **Factor** | | **df** | **F** | | **Prob > F** | | |
| **Exposure** | 13 | Model | | 8 | 26.74 | | p<0.000 | n=1869 $R^2$=0.010 Adj $R^2$= 0.099 | |
| | | DE | | 1 | 15.07 | | p<0.000 | | |
| | | Wave | | 1 | 151.47 | | p<0.000 | | |
| | | Age | | 4 | 2.57 | | p=0.036 | | |
| | | Gender | | 1 | 12.81 | | p<0.000 | | |
| | | Wave*DE | | 1 | 4.64 | | p=0.031 | | |

Time Perspective: As shown in Table 98, there were no significant changes in the willingness to engage in planning (time perspective scores) from Wave 1 to Wave 2; there were also no significant differences between the DE and Non-DE groups either before or after driver education.

| Table 98: Time Perspective Scores | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Measure | # of Items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | DE Wave 1 | DE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | DE Wave 1 | Non-DE Wave 1 | DE Wave 2 | Non-DE Wave 2 |
| Time Perspective | 7 | n=282 | n=282 | n=711 | n=711 | n=284 | n=722 | n=284 | n=728 |
| | | 2.40 | 2.41 | 2.36 | 2.32 | 2.40 | 2.36 | 2.41 | 2.32 |
| | | SD=0.67 | SD=0.71 | SD=0.69 | SD=0.70 | SD=0.67 | SD=0.68 | SD=0.71 | SD=0.70 |
| | | p=0.94 | | p=0.07 | | p=0.36 | | p=0.06 | |

<u>Responsibility When Driving:</u> As shown in Table 99, the Non-DE group showed a significant change in responsibility when driving from Wave 1 to Wave 2 ($p<0.01$). Again, Two-way factorial ANOVA was used to further investigate the difference from Wave 1 to Wave 2 for the DE group compared to the Non-DE group (see Table 99). Analyses of the difference in the increase in responsibility when driving scores from Wave 1 to Wave 2 revealed that DE status (DE versus Non-DE) does not affect the model ($p=0.06$), but the wave of the survey does (Wave 1 versus Wave 2; $p=0.02$). More importantly, when combining the effect of both driver education and the wave of the survey, the interaction effect of the two is not statistically significant ($p=0.94$).

This analysis was performed again including both age and gender as additional independent variables. DE status does not affect the model ($p=0.90$), but Wave ($p=0.03$), age ($p=0.01$), and gender ($p<0.00$) do. These results, however, revealed that the interaction effect of both driver education and the wave of the survey remains non-significant ($p=0.97$).

| Table 99: Responsibility When Driving Scores | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Measure | # of Items | Driver Education Status | | | | | | | |
| | | Paired Comparisons | | | | Independent Comparisons | | | |
| | | DE Wave 1 | DE Wave 2 | Non-DE Wave 1 | Non-DE Wave 2 | DE Wave 1 | Non-DE Wave 1 | DE Wave 2 | Non-DE Wave 2 |
| Responsibility When Driving | 3 | n=280 | n=280 | n=726 | n=726 | n=284 | n=737 | n=285 | n=735 |
| | | 1.30 | 1.32 | 1.28 | 1.35 | 4.56 | 4.58 | 4.62 | 4.64 |
| | | SD=0.54 | SD=0.57 | SD=0.45 | SD=0.53 | SD=0.53 | SD=0.56 | SD=0.53 | SD=0.49 |
| | | p=0.42 | | p<0.01 | | p=0.61 | | p=0.50 | |
| Measure | # of Items | Two-way factorial ANOVA | | | | | | | |
| | | Source | | df | F | | Prob > F | | |
| Responsibility When Driving | 3 | Model | | 3 | 2.47 | | p=0.060 | n=2041<br>R²=0.004<br>Adj R²= 0.002 | |
| | | DE | | 1 | 0.70 | | p=0.402 | | |
| | | Wave | | 1 | 5.25 | | p=0.022 | | |
| | | Wave*DE | | 1 | 0.01 | | p=0.942 | | |
| Measure | # of Items | Two-way factorial ANOVA (including age and gender) | | | | | | | |
| | | Source | | df | F | | Prob > F | | |
| Responsibility When Driving | 3 | Model | | 8 | 5.66 | | p<0.000 | n=2041<br>R²=0.022<br>Adj R²= 0.018 | |
| | | DE | | 1 | 0.02 | | p=0.895 | | |
| | | Wave | | 1 | 5.06 | | p=0.025 | | |
| | | Age | | 4 | 3.34 | | p=0.010 | | |
| | | Gender | | 1 | 25.28 | | p<0.000 | | |
| | | Wave*DE | | 1 | 0.00 | | p=0.971 | | |

### *Summary*

Results of the bivariate analyses suggest that more of the DE teens than Non-DE teens at the baseline survey are: young, male, white, in grade 10, and reside in an urban location. DE teens, compared to Non-DE teens, also had: more parents with a higher level of education, higher support for specific requirements of GDL, a stronger belief that GDL influenced their driving, a lower rating of their driving skills, less positive attitudes about their lifestyle, and less driving exposure.

The DE teens did not differ from the Non-DE teens, however, on other factors. Several of these factors have been shown in previous research to be associated with collision involvement. No differences between the two groups were found in terms of: GDL knowledge, overall support for GDL, safe driving knowledge, perceived likelihood of a collision or injury, risk taking behaviors, risky driving behaviors, risk taking attitudes, risky driving attitudes, tolerance of deviance, parental monitoring, time perspective, and responsibility when driving.

Logistic regression revealed that several of the above factors, which were measured at the time of the baseline survey, were significantly (at the 0.05 level) associated with being in the group that later completed the ODOT-approved driver education program:

- as age increases, the chances of having taken DE decreases by 26 percent;
- being male significantly increases the likelihood of having taken DE, by 25 percent;
- having reported being Hispanic or Latino significantly decreases the likelihood of being in the DE group, by 80 percent;
- living in an urban area significantly increases the likelihood of having taken DE, by 67 percent;
- if the father of the teen had an undergraduate degree or a higher level of education, the likelihood of having taken DE increases by 89 percent;
- having a higher score (indicating a higher level of support) regarding support for specific requirements of GDL also significantly increases the likelihood of having taken DE, by 26 percent;
- having a higher score on the self-rated skills scale (a higher score indicating a high self-rating) decreases the likelihood of having taken DE by 28 percent; and,
- having driven in the past three months at the time of the survey significantly decreases the chances of teens being in the DE group, by 49 percent.

No other variables in the model were found to have significant effects.

The same model was also run for males and females, separately, and results were similar for both genders, with a few exceptions. For males, being Hispanic/Latino and having driven in the past three months at the time of the survey were no longer significant attributes. For females, GDL support for the specific requirements and self-rated skills were not significant.

In summary, both the bivariate and multivariate analyses demonstrate that teens who complete the Oregon-approved driver education program differ from those who do not on some important pre-existing attributes, confirming the existence of self-selection bias – teens who voluntarily take driver education differ from teens who do not on these attributes prior to actually taking the program. However, these results also suggest that teens who decide to take the ODOT-approved driver education program were also similar to those that do not in terms of several important attributes presumably related to collision involvement – e.g., risky driving attitudes. This section also examined the extent to which exposure to the ODOT-approved driver education program resulted in changes in student outcomes related to safety knowledge, attitudes, skills, and behaviors at the time of the second wave survey.

Results are shown below:

- Both the DE group and the Non-DE group had a significant increase in knowledge about the GDL program between Wave 1 and Wave 2. There was also a significant difference in knowledge about the GDL program when comparing the DE and Non DE groups in Wave 2, with the DE group now having a higher knowledge score than the Non-DE group.
- Support for specific GDL requirements was high in both the DE and Non-DE groups as was the belief that the GDL program has a positive impact on their driving behavior; however, there were no significant differences in the changes from Wave 1 to Wave 2 in support for the specific GDL requirements or beliefs regarding the GDL program on safe driving knowledge between the DE and Non-DE group.
- The DE group showed a significant increase in knowledge about safe driving practices from Wave 1 to Wave 2. The Non-DE group also showed a significant change in safe driving knowledge. As well, the DE group had significantly greater safe driving knowledge than the Non-DE group after driver education during Wave 2, suggesting driver education does have a positive influence.
- Despite the higher level of safe driving knowledge among the group that took driver education, the results also showed that their overall level of knowledge on the test items in the New Driver Survey was quite low – on a majority of the questions, 60 percent or more of the respondents answered incorrectly.
- Students rated how good they thought their driving skills were (or, for those not driving, how good they would be when they started driving) for handling a variety of maneuvers. Students who took driver education showed a significant change following the program, rating their skills as significantly better than anticipated prior to driver education. Those in the comparison group also showed a significant change. Importantly, the improvement in self-rated driving skills from Wave 1 to Wave 2 for the DE group is significantly larger than the improvement from Wave 1 to Wave 2 for the Non-DE group, suggesting driver education had an effect on self-reported skills.
- The Non-DE group also rated their skills at a higher level in Wave 1 than the DE group, but there was no difference in self-reported skill rating between the Non-DE and DE groups in Wave 2. This could be one reason the DE

group chose to take driver education, and it is possible that the driver education program resulted in them rating their skills at a level similar to the Non-DE group in Wave 2.

- Survey respondents were also asked about the likelihood they would be involved in a collision or injured in one while driving during the coming year. Even in the first wave of the survey, both groups saw this as relatively unlikely. Of considerable note, those who took driver education actually rated their chances as significantly more likely following exposure to driver education. However, this increase from Wave 1 to Wave 2 in the DE group is not significantly different from that of the Non-DE group.
- Risk taking behavior was assessed by asking the students to indicate how often they engaged in various risky behaviors. On average, prior to and following driver education, the two groups both indicated that they would rarely engage in the listed behaviors. However, during the second wave of the survey, the Non-DE group was significantly more likely to say they engaged in the risky behaviors than during Wave 1, but this change was not significantly different from that of the DE group.
- The two groups also indicated on average that they rarely engaged in unsafe driving behaviors. However, changes were detected from Wave 1 to Wave 2. Both groups reported higher risky driving ratings in Wave 2, but no statistically significant differences were found in comparing these increases for the DE and Non-DE groups.
- The DE group became significantly less accepting in their attitudes toward risky driving from Wave 1 to Wave 2, but so did the Non-DE group; the differences in the changes for the DE and Non-DE groups were not significant. Both groups generally disagreed with the listed behaviors.
- The Lifestyle items asked the student to agree/disagree with a series of statements about themselves. The difference between the groups during Wave 1 and Wave 2 was not significant, and there was no significant change from Wave 1 to Wave 2.
- The Tolerance of Deviance scale asked students to indicate how acceptable they viewed a variety of behaviors. The difference between the groups during Wave 1 and Wave 2 was not significant, and there was no change from Wave 1 to Wave 2.
- Parental monitoring assessed the extent to which students said they were likely to follow their parents' values and advice and to accept monitoring by them. There was a significant change among the Non-DE group from Wave 1 and Wave 2 towards less monitoring, but this was not significantly different from the change in the DE group.
- Exposure to risk was assessed by asking students how often they drove for a variety of reasons. Both the DE group and Non-DE group reported an increase in exposure estimates from Wave 1 to Wave 2, likely because more of them had Provisional licenses and were driving without supervision. The Non-DE group had significantly more exposure than the DE group in Wave 1, but the difference between these two groups was not significant in Wave 2. Importantly, the slightly greater increase in driving exposure from Wave 1 to Wave 2 for the DE group was significantly different than the increase in driving exposure for the Non-DE group.

- The Time Perspective Inventory indirectly assessed willingness to engage in planning by determining the extent to which a student is concerned about the present and the future. The DE group was slightly less future-oriented than the Non-DE group during Wave 2, but this does not appear to be due to completion of driver education.

The results also provide some insights regarding the extent to which teen drivers who voluntarily select to take driver education differ from those that do not on factors that have been shown to be related to collision involvement. In this regard, the results showed that the DE group was slightly older than the Non-DE group when surveyed at Wave 1 and Wave 2, and they were more likely to be male. Beyond these demographic characteristics, however, the DE group did not differ significantly from the Non-DE group in Wave 1 and Wave 2 on teen attributes such as risk taking behavior, risk taking attitudes, lifestyle, tolerance of deviance, and parental monitoring (follow their parents' values and advice).

## Safety Performance: Survey Participants

This section examines the safety performance of the DE and Non-DE teen drivers who participated in the baseline survey in terms of how they did on their license tests, and once they obtained a provisional license, whether they had collisions, convictions, and suspensions. The safety performance data for teens participating in this study were provided by ODOT DMV.

In regard to license tests, Oregon has three types of tests that teens need to pass to obtain a provisional instruction permit and a provisional license: teens applying for a provisional instruction permit must pass a knowledge test; those on a provisional instruction permit must pass a safe driving knowledge test and an on-road drive test to obtain a provisional license.

The provisional instruction permit knowledge test in Oregon contains questions about road signs, traffic laws, and other information that Oregon DMV requires teens to know to drive in Oregon. It is a multiple-choice test with 35 questions. Teens are provided a driver handbook, including sample knowledge questions which are also provided online on the DMV website. As examples, sample knowledge questions ask:

What is the single most common cause of traffic crashes?

A. New drivers.
B. Human error.
C. Bad weather.
D. Bad roads.

How many seconds ahead do expert drivers scan the entire driving scene?

A. 10 seconds ahead.
B. 2 seconds ahead.
C. 12 seconds ahead.
D. 5 seconds ahead.

Another car is trying to pass your car. You should:

A. Pull off the road.
B. Signal the other driver when it is safe to pass.
C. Check for oncoming traffic and adjust your speed to allow safe passing.
D. Speed up.

Teens must attain a score of 80 percent or better to pass the test – i.e., 28 of 35 questions correctly answered.

Oregon DMV also requires teens with a provisional instruction permit to pass a safe driving knowledge test and an on-road test to obtain a provisional license. The safe driving knowledge test checks their knowledge of safe driving practices gained through driving experience as well as information covered in the driver's manual. The Oregon on-road drive test assesses the teens driving skills and the extent to which they obey traffic rules, highway signs, and signals. The test includes turning, signaling, backing, lane changes, speed control, situational awareness (watching for other traffic and reacting accordingly), hazard anticipation (looking for unexpected obstacles), road courtesy, and general driving ability. Errors and areas to be improved are marked on the test score sheet by the examiner during the behind-the-wheel test. New drivers begin with 100 points at the start of the test. Points are taken off for driving mistakes that the examiner observes. Test results are explained after the test ends.

Errors are scored on a range from 5-30 depending on the seriousness of the errors. Less serious errors can include signal errors or stopping on crosswalks (5-10 points), and more serious errors include turning from the wrong lane (5-25) or proceeding through a sign or signal, and being stopped by the examiner (10-30). A minimum score of 75 is required to pass the road test.

Grounds for immediate failure as indicated in the drive test score sheet on the ODOT DMV website (http://www.odot.state.or.us/forms/dmv/173fill.pdf) include the following:

1. An accident involving any amount of property damage or personal injury.
2. The applicant refuses to perform any maneuver which is part of the prescribed driving test.
3. Any dangerous action in which:
    a. An accident is prevented by expert driving or action on the part of other drivers.
    b. The examiner is forced to assist the driver in avoiding an accident physically or orally.
    c. The applicant drives or backs over curb or sidewalk.
    d. The applicant creates a serious traffic hazard by stalling or other improper driving behavior.
4. The applicant commits any of the following:
    a. Passes another car that is stopped at a crosswalk, yielding to a pedestrian, or passes a school bus stopped with its red lights flashing.

    b. Makes or starts to make a turn from or into the wrong lane under traffic conditions that render such actions dangerous.
    c. Runs through or has to be stopped from running one red light or one stop sign.
5. Applicant is unable to properly operate vehicle equipment or, after proceeding a short distance on the drive course, it becomes apparent that the applicant is dangerously inexperienced.

If the teen fails the drive test, he or she must wait 28 days after each failure before retaking the test. If the teen fails a fifth test, he or she must wait one year before taking another test.

Oregon DMV driver record system includes reports of collisions and convictions for traffic violations as well as license suspensions. In regard to collisions, Oregon law requires drivers to file an accident report with DMV if there is damage to property of over $1,500, if any vehicle is towed from the scene due to damage from the crash, or there is injury or death resulting from the crash.

Convictions for traffic violations arise from not obeying a rule of the road, driver licensing or registration law, or vehicle equipment law. Penalties for convictions can include a license suspension.

### *Linking Survey Data with Driver Information*

A total of 5,007 Oregon teens completed the baseline survey questionnaire and had parental consent. A list containing the driver license number of these teens was sent to contacts at the Oregon Department of Transportation (ODOT) who provided Department of Motor Vehicles (DMV) driver record and collision information for each survey participant. These files included licensing data, test results data, and driver history data. These data were extracted on October 22, 2012, nearly 13 months after the last survey completion.

<u>Survey Data:</u> The survey data contain information regarding driving attitudes, expectations, beliefs, skills, and behavior. A brief description of the 17 different measures analyzed in this report was previously provided in Table 74.

<u>Licensing Data:</u> The licensing data contain the licensing information for all Oregon teens in the study sample. Information includes the type of license issued (e.g., provisional instruction permit, provisional license, full driver's license) and the date that it was issued. Demographic information, including age (date of birth), gender, and address were included in this file.

<u>Test Results Data:</u> The test results data set contains the type of driver test taken (i.e., knowledge test, safe driving test, and road test), the test results, and the test scores.

The Driver History Data: This data set contains the driver records of teens including collisions, convictions, suspensions, and diversions, as well as the date on which each incident occurred.

Driver Education Data: Driver education information was provided by the ODOT Transportation Safety Division (TSD) for all teens completing driver education over the study period (January 1, 2010 to September 30, 2012). These data were used to determine which teens completed an ODOT-approved DE program – i.e., all teens in the driver education data file had taken the ODOT-approved driver education program. Thus, all cases from this file that were matched to the New Driver Survey data were identified as the driver education group, and all cases from the New Driver Survey data that were not matched to the driver education data were identified as the non-driver education group. A total of 1,283 survey participants were matched to the driver education data (DE group), and 3,724 were not matched to these data (Non-DE group).

Urban/Rural Data: Weekly databases provided by ODOT of Oregon teen drivers who had obtained their provisional instruction permit, used to contact teens for participation in the survey, contained the names and addresses of teens. This information was used to create urban and rural designations for teens at the time they were issued their first provisional instruction permit. Monthly listings of all teens issued a provisional license from January 1, 2010 to October 30, 2012 were also provided from ODOT, containing similar information to that of the weekly listings. Addresses of teens from this file were used to determine the urban/rural split for teens at the time of their first provisional license issuance date. Zip codes were used to distinguish between urban and rural locations as indicated by the Oregon Office of Rural Health according to the U.S. Census Bureau definitions:

- Urbanized Area (UA):
    - Consists of contiguous, densely settled census block groups (BG) and census blocks (at least 500 people per square mile) that together encompass a population of more than 50,000.
- Urban Cluster (UC):
    - Consists of contiguous, densely settled BGs and census blocks (500 ppsm) that together encompasses a population of at least 2,500 people, but less than 50,000 people.
- Rural:
    - All population and territory that is not a UA or UC, or all geographic areas 10 or more miles from the centroid of a population center of 40,000 or more (Oregon Office of Rural Health 2012).

### *Final Sample*

As mentioned previously, 5,007 Oregon teens completed the baseline survey and had parental consent. The final sample used for analyses comprised 4,272 teens – 1,000 teens in the DE group, and 3,272 teens in the Non-DE group. The reasons some teen participants were excluded from this final sample are provided in a previous section of this report (see p. 113). These teens in the final sample had been issued their first provisional instruction permit within six months from their survey date and, on average, they had completed the survey about two months after having obtained their permit. Three teens had been identified as deceased. Records for these drivers were examined up until their licensing stop date rather than the data extraction date.

### *Statistical Analyses*

The safety performance of DE and Non-DE teens were compared in terms of license test pass rates as well as crash, conviction, and suspension rates. These analyses were conducted for all teens in the final sample, as well as for only those teens issued a provisional license before the ODOT driver record data extraction date (October 22, 2012). Teens, for example, who were still on a provisional instruction permit on the extraction date were not included in these later analyses.

Since provisional instruction permit dates varied between December 3, 2009 and July 30, 2011, and the tracking period extended to October 2012, the length of time in which a teen had held a license (and thus can legally drive) may vary greatly from teen to teen. The maximum length of time that a teen in this sample had driven was 34.6 months. Thus, some teens may have only been driving for a few months, whereas others had up to 35 months of driving experience. In regard to teens who had obtained their provisional license during the study period, the average number of months from provisional license issuance dates and the ODOT data extraction date was six months; the range was 0.13 to 24.5 months.

To control for any differences in days of follow-up and to take exposure into account, adjusted per-driver rates were calculated per 100 licensed driver years, thereby controlling for exposure in terms of the total number of driving days.

The analysis focused on overall differences in these adjusted collision, conviction, and suspension rates of teen drivers who have and have not completed the ODOT-approved driver education program.

Poisson regression was used to investigate various factors examined in the New Driver Survey that may be associated with road test pass rates. Although data regarding the collision, conviction, and suspension counts were also available, a Poisson regression could not be used to investigate the effect of various factors on these unsafe driving events because the data were not Poisson distributed. Negative binomial regression was also considered, but the high number of zeros present in the collision, conviction, and suspension counts made this type of analysis inappropriate. For this reason, logistic regression was used, as this particular analysis does not assume such a distribution of the data. This Logistic regression was used to investigate various factors examined in the New Driver Survey that may be associated with teens having had a collision, a conviction, and a suspension. These analyses were performed for these unsafe events occurring from the date the teens were issued their provisional license until the ODOT data extraction date.

### *License Test Results*

Oregon teens attempt the knowledge test to obtain a provisional instruction permit, and they cannot generally enroll in driver education until after they have been issued this permit. Accordingly, knowledge test results reflected the pre-existing level of knowledge teens had prior to some of them enrolling in driver education – driver education had no bearing on knowledge test results.

Oregon teens with a provisional instruction permit attempt the safe driving knowledge test and the on-road drive test to obtain a provisional license. Since teens who chose to take the ODOT-approved driver education program will have completed this program prior to taking these tests, and in many cases have taken the program to prepare for taking these tests, differences between DE and Non-DE teens in test results may reflect exposure to driver education.

Knowledge Test: Test results data provided by ODOT-DMV were used to determine the total number of knowledge test attempts, i.e., the number of times the teens wrote the test to obtain a provisional instruction permit before passing (Passing on the first attempt is coded as 1). Knowledge test attempts in relation to DE status are shown in Table 100.

As can be seen, DE and Non-DE teens differed significantly with regard to the number of provisional instruction permit knowledge tests that were written before the teen passed ($p<0.01$). For example, 55.6 percent of the DE group passed their road test on their first attempt, compared to only 48.7 percent in the Non-DE group. However, the results also suggest that about half of Oregon teens in both groups initially fail the test. Accordingly, many teens do not appear to be well informed about the rules of the road, traffic signs, and road safety on their initial test attempt, despite easy access to the Oregon Driving manual, which contains the information covered in the knowledge test.

**Table 100: Number of knowledge test attempts by DE status (All teens)**

| # of Class C knowledge test attempts | Driver Education Status | |
|---|---|---|
| | DE | Non-DE |
| 1 attempt | 55.6% (n=556) | 48.7% (n=1,592) |
| 2 attempts | 26.2% (n=262) | 27.0% (n=884) |
| 3 or more attempts | 15.5% (n=155) | 20.4% (n=667) |
| | p<0.01 | |

Safe Driver Knowledge Test: The results of Chi-squared analyses comparing DE and Non-DE teens who were issued a provisional license over the study period (n=2,773) with regard to their number of test attempts for the Safe Driver knowledge test are presented in Table 101.

| Table 101: Number of Safe driving knowledge test attempts by DE status (PL teens only) | | |
|---|---|---|
| # of Safe driving knowledge test attempts | Driver Education Status | |
| | DE | Non-DE |
| 1 attempt | 85.3% (n=626) | 73.0% (n=1,489) |
| 2 attempts | 12.8% (n=94) | 20.2% (n=412) |
| 3 or more attempts | 1.8% (n=13) | 6.7% (n=135) |
| | p<0.01 | |

As can be seen, the difference between the DE and Non-DE group with regard to the number of Safe Driver knowledge test attempts was significant ($p<0.01$), with 85.3 percent of DE teens passing on their first attempt, compared to 73 percent for Non-DE teens.

Road Test: The number of road test attempts in relation to DE status for provisional license drivers are shown in Table 102. The difference between the DE and Non-DE group with regard to the number of road test attempts was significant ($p<0.01$), with 90.2 percent of DE teens passing on their first attempt compared to 85.1 percent for Non-DE teens. Again, the analysis suggests that more DE teens than Non-DE teens pass the road test on their first attempt, which may reflect their exposure to the ODOT-approved driver education program, although other factors may play a role.

| Table 102: Number of Class C road test attempts by DE status (PL teens only) | | |
|---|---|---|
| # of Class C road test attempts | Driver Education Status | |
| | DE | Non-DE |
| 1 attempt | 90.2% (n=662) | 85.1% (n=1,736) |
| 2 attempts | 8.2% (n=60) | 13.3% (n=271) |
| 3 or more attempts | 1.6% (n=12) | 1.6% (n=32) |
| | p<0.01 | |

These data also suggest that a very high percentage of teens (85%-90%) pass their road test on their first attempt. To verify that this was not an anomaly of the final sample of teens used in this study, road test data for all teens in Oregon with birthdates between February 15, 1996 and August 27, 1997 (data provided by ODOT) were examined as a comparison (see Table 103).

| Table 103: Number of Class C road test attempts (All Oregon teens) | | |
|---|---|---|
| # of Class C road test attempts | N | % |
| 1 attempt | 10,597 | 84.8% |
| 2 attempts | 1,267 | 10.1% |
| 3 or more attempts | 136 | 1.1% |

As shown in Table 103, road test information for all teens in Oregon born between February 15, 1996 and August 27, 1997 reveal that the majority of teens (84.8%) passed their road test on their first attempt, consistent with the findings for the teen sample in this study as well as for in-vehicle test results reported for Oregon elsewhere (Haire et al., 2011).

Table 104 shows the general passing rates (not specific to first, second, or third attempts) overall and according to driver age. Chi–squared analysis revealed that the passing rate of the DE group (90%) was higher than the pass rate for Non-DE teens (86%), and this difference was significant (p<0.01). Overall, there is a significant difference (p<0.01) in the pass rate for teens 16 years of age (88%) compared to teens who were 17 at the time of the road test (83%). Among the DE group, however, there was no difference (p=0.40) between teens who were 16 at the time of the road test compared to those who were 17 at the time. Among the Non-DE group there was a significant difference between the two age groups (p<0.01), with a pass rate of 87 percent for teens 16 years of age, compared to 82 percent for teens who were 17.

**Table 104: Road Test Pass Rates**

| | Total | DE | Non-DE | p-value |
|---|---|---|---|---|
| **PL teens only** | 87% | 90% | 86% | p<0.01 |
| **Driver Age** | | | | |
| **16** | 88% | 90% | 87% | p=0.02 |
| **17** | 83% | 88% | 82% | p=0.11 |
| **p-value** | p<0.01 | p=0.40 | p=0.01 | |

When comparing the DE and Non-DE groups for each age category, a difference was found between the DE and Non-DE teens who were 16 years of age at the time of the road test (90% versus 87% respectively; p=0.02). No difference was found for teens 17 years of age at the time of the test (p=0.11).

As mentioned previously, new drivers begin with 100 points at the start of the road test, and points are taken off for driving mistakes that the examiner observes. A minimum score of 75 is required to pass the road test.

Table 105 shows the mean scores for the DE and Non-DE groups overall and then for driver age. The results of t-tests on group means show that the DE group had higher scores than the Non-DE group (82.9 versus 80.1; p<0.01). Further analyses revealed that this pattern of results was not the case for those who failed the test, but was for those who passed the test. Among those passing the road test, the DE group had a higher score than the Non-DE group – mean scores of 84.4 and 82.5 respectively (p<0.01).

| Table 105: Road Test Mean Scores | | | | |
|---|---|---|---|---|
| **Test Result** | **Total** | **DE** | **Non-DE** | **p-value** |
| **Overall** | 80.9 | 82.9 | 80.1 | p<0.01 |
| **Test Failure** | 54.0 | 53.5 | 54.1 | p=0.74 |
| **Test Pass** | 83.0 | 84.4 | 82.5 | p<0.01 |
| **Driver Age** | | | | |
| **16** | 81.2 | 83.2 | 80.5 | p<0.01 |
| **17** | 79.2 | 81.8 | 78.5 | p=0.01 |
| **p-value** | p<0.01 | p=0.21 | p<0.01 | |

T-tests also revealed that for the DE group alone there was no difference in mean scores for teens who were 16 at the time of the road test. For Non-DE teens, those who were 16 at the time of the test had higher mean scores (80.5) compared to those who were 17 (79.5; p<0.01).

When comparing the DE and Non-DE groups for only those who were 16 at the time of the test, the DE group had a higher mean test score (83.2) compared to Non-DE 16-year-olds (80.5; p<0.01), and the same pattern was found for 17-year-olds, with a mean test score of 81.8 for the DE group and 78.5 for the Non-DE group.

Mean road test scores were also examined separately for those who passed the test on the first attempt, those who passed on the second attempt, and those who passed on the third attempt or more.

Table 106 shows that the mean road test scores for DE teens were higher than those of Non-DE teens who passed the road test on the first attempt, with DE teens having a score of 84.6 compared to 82.6 for Non-DE teens (p<0.01). T-tests did not reveal significant differences between DE and Non-DE teens who passed the road test on the second or third or more attempts.

| Table 106: Road Test Mean Scores | | | | |
|---|---|---|---|---|
| **Test Result** | **Total** | **DE** | **Non-DE** | **p-value** |
| **Passed first attempt** | 83.2 | 84.6 | 82.6 | p<0.01 |
| **Passed second attempt** | 72.1 | 73.3 | 71.8 | p=0.43 |
| **Passed after 3 or more attempts** | 68.9 | 73.2 | 67.7 | p=0.16 |
| **p-value** | p<0.01 | p<0.01 | p<0.01 | |

An analysis of variance (ANOVA) was used as a statistical test to determine whether teens differed by number of test attempts. Overall results revealed that there is a significant difference in road test scores between teens who passed on the first attempt (83.2), teens who passed on the second attempt (72.1), and teens who passed after three or more attempts (68.9). A similar pattern was found for DE teens and Non-DE teens (see Table 106).

<u>Factors Associated with Road Test Performance:</u> Based on the above bivariate analyses, it could be concluded that more teens that complete the ODOT-approved driver education program pass the safe driving knowledge test and the road test on

their first attempts than is the case for teens who do not complete this program. However, other factors related to self-selection bias may have accounted for the differences in pass rates between the DE and Non-DE groups, independent of the ODOT-approved driver education program. In addition, results from the previous section demonstrated that the DE and Non-DE teen drivers differed on important attributes shortly after they obtained their provisional instruction permit – e.g., age, gender, place of residence (urban-rural), and self-reported driving skill levels. To address this issue further, multivariate analysis was conducted to determine the extent to which driver education status was associated with road test attempts, controlling for pre-existing factors.

Specifically, Poisson regression was used to investigate various factors examined in the New Driver Survey that may be associated with the number of road test attempts. These analyses were performed only for teens who were issued their provisional license.

Independent variables included DE status, gender, whether the teen lived in a rural or urban area, self-reported race, and father's level of education. All other independent variables were composite scales as described in Table 107. Scales included in this analysis are as follows: GDL knowledge, GDL overall support, GDL-support specific requirements, GDL influence, Safe driving knowledge, Self-rated skills, Perceived likelihood of crash, Risk taking behavior, Risky driving attitudes, Risk taking attitudes, Lifestyle, Tolerance of Deviance, Parental Monitoring, Time Perspective, Exposure (driven in the past three months), and Responsibility when Driving.

No variables showed significant effects (lowest p-value was 0.14).

Length of time teens held their provisional instruction permit was added to the above model. As shown in Table 107, these analyses revealed that as the length of time that teens held their provisional instruction permit (in months) increases, the expected number of road test attempts significantly increases, by 1.7 percent ($p=0.02$). This finding is to be expected, as those who fail the test for the provisional license will remain on their provisional instruction permit for a longer period of time. No other variables showed significant effects when this variable was added to the model.

| Table 107: Dependent variable: Number of road test attempts | | | | | |
|---|---|---|---|---|---|
| Variable | Coefficient | Std. Err. | p-value | %-change | %SD |
| DE status | 0.05 | 0.05 | p= 0.25 | 5.5% | 2.4% |
| Gender | -0.02 | 0.04 | p=0.63 | -2.0% | -1.0% |
| Race Asian | 0.03 | 0.24 | p=0.89 | 3.3% | 0.6% |
| Race Black/African American | 0.41 | 0.30 | p=0.17 | 51.2% | 3.3% |
| Race Native Hawaiian/Pacific Islander | 0.40 | 0.42 | p=0.34 | 48.9% | 1.9% |
| Race White | 0.08 | 0.22 | p=0.70 | 8.7% | 3.7% |
| Race Hispanic/Latino | 0.14 | 0.24 | p=0.56 | 14.9% | 2.6% |
| Race Mix Raced (2 or more) | 0.13 | 0.22 | p=0.56 | 13.7% | 4.8% |
| Race Other | 0.09 | 0.28 | p=0.76 | 8.9% | 1.0% |
| Urban | -0.02 | 0.04 | p=0.66 | -1.8% | -0.9% |
| father's level of education | -0.00 | 0.010 | p=0.85 | -0.2% | -0.4% |
| GDL knowledge | 0.00 | 0.01 | p=0.99 | 0.0% | 0.00% |
| GDL overall support | -0.023 | 0.03 | p=0.43 | -2.2% | -1.9% |
| GDL-support specific requirements | 0.01 | 0.04 | p=0.78 | 1.1% | 0.8% |
| GDL influence | -0.07 | 0.04 | p=0.84 | -0.7% | -0.5% |
| Safe driving knowledge | -0.01 | 0.01 | p=0.48 | -0.8% | -1.4% |
| Self-rated skills | 0.01 | 0.04 | p=0.71 | 1.5% | 0.8% |
| Perceived likelihood of crash | 0.000 | 0.02 | p=0.99 | 0.0% | 0.0% |
| Risk taking behavior | -0.04 | 0.05 | p=0.50 | -3.5% | -1.7% |
| Risky driving attitudes | 0.01 | 0.04 | p=0.79 | 1.1% | 0.6% |
| Risk taking attitudes | -0.01 | 0.04 | p=0.89 | -0.6% | -0.4% |
| Lifestyle | -0.02 | 0.04 | p=0.95 | -0.2% | -0.1% |
| Tolerance of deviance | 0.02 | 0.05 | p=0.78 | 1.5% | 0.7% |
| Parental Monitoring | -0.04 | 0.04 | p=0.41 | -3.6% | -1.9% |
| Exposure | 0.01 | 0.11 | p=0.93 | 1.0% | 0.2% |
| Time Perspective | -0.01 | 0.04 | p=0.82 | -0.8% | -0.5% |
| Responsibility when Driving | -0.01 | 0.04 | p=0.86 | -0.7% | -0.4% |
| Length of time held PIP (in months) | 0.02 | 0.01 | p=0.02 | 1.7% | 4.9% |

### *Collisions*

DE and Non-DE teens in the study sample do not differ significantly with regard to the number of collisions they have had while holding a provisional instruction permit (p=0.61), and importantly, only very few teens had a collision while holding this permit (98.7% for the DE group, and 99.0% for the Non-DE group, were collision-free). Similarly, most teens in both groups did not have a collision after they were issued a provisional license over the study period (96.4% for the DE group, and 97.8% for the Non-DE group, were collision-free respectively). However, the small differences in collision involvement between the DE and Non-DE groups was statistically significant ($p<0.01$). The fact that collision involvement differed between the DE and Non-DE teens could be accounted for by teens in one of these groups driving on average for fewer months by the date ODOT extracted the collision data for this study. To control for any differences in days of follow-up and to take exposure into account, adjusted per-driver rates were calculated per 100 licensed driver years, thereby controlling for exposure in terms of the total number of driving days. Results of these adjusted-collision rate calculations for both DE and Non-DE teens are shown in Table 108 below.

As can be seen, both the DE and Non-DE groups had relatively few crashes over the tracking period, although crashes were more frequent among the Non-DE group (62 and 127 crashes, respectively). DE teens, however, had a significantly higher overall collision rate than Non-DE teens after controlling for driving days. Table 108 also shows the adjusted per-driver collision rates for DE and Non-DE teens since issued a provisional license by age over the tracking period – age reflects when this provisional license was issued. When comparing the DE group and Non-DE group, the crash rate of DE teens who are 16 years of age is significantly higher than the crash rate of Non-DE teens of the same age group. This was not the case for teens issued their provisional license at the age of 17 – the DE and Non-DE teen collision rates did not differ significantly. The number of teens who were issued their license at the age of 17 (n=486) was much smaller than the number of teens issued their license at the age of 16 (n=2,287), which may explain why a significant difference was found for those aged 16 and not those aged 17 when the difference in crash rates of the DE and Non-DE groups were similar for these two age categories (difference of 5.9 and 4.7 respectively).

With respect to gender, Table 108 also shows that among males, the DE group had a crash rate significantly higher than the Non-DE group. For females, the crash rate for the DE group was not significantly different than the crash rate for the Non-DE group.

**Table 108: Number of collisions per 100 licensed driver years (adjusted crash rate) among DE and Non-DE teen drivers by driver experience using Oregon DMV collision data, and p-value of two-sample test of proportion**

| Since issued provisional license | DE | Non-DE | p-value |
|---|---|---|---|
| **Overall** | 17.8 | 12.6 | p=0.02 |
| **Licensed at age 16** | 16.6 | 10.7 | p=0.01 |
| **Licensed at age 17** | 25.5 | 20.8 | p=0.48 |
| **Male** | 22.9 | 13.9 | p=0.01 |
| **Female** | 13.2 | 11.6 | p=0.56 |
| **Total number of crashes** | 62 | 127 | |

Analyses were also conducted comparing the adjusted collision rates of DE and Non-DE teens for the length of time that the provisional license restrictions remained in effect. Night and passenger restrictions end after one year, or at age 18 depending on which comes first. As such, collision rates were also examined from the date the teens were issued their provisional license until one year after the provisional license issuance date if still under the age of 18; or if they turned 18 before the one year of restrictions were lifted; or from the provisional license issuance date until the extraction date if the provisional license was held for less than a year.

Table 109 shows there was no significant difference between the collision rates of DE and Non-DE teens while holding their provisional license. Further analyses, however, reveal that the crash rate of DE teens who are 16 years of age is significantly higher than the crash rate of Non-DE teens of the same age group. Among teens who were issued their provisional license at the age of 17, the DE group had a crash rate similar to that of the Non-DE group.

**Table 109: Number of collisions per 100 licensed driver years (adjusted crash rate) among DE and Non-DE teen drivers by driver experience using Oregon DMV collision data, and p-value of two-sample test of proportion**

| On a provisional license | DE | Non-DE | p-value |
|---|---|---|---|
| **Overall** | 15.7 | 12.2 | p=0.11 |
| **Licensed at age 16** | 15.3 | 10.8 | p=0.04 |
| **Licensed at age 17** | 18.2 | 18.4 | p=0.97 |
| **Male** | 17.8 | 12.8 | p=0.12 |
| **Female** | 13.7 | 11.8 | p=0.50 |
| **Total number of crashes** | 52 | 120 | |

With respect to gender, Table 109 shows that among males, the DE group had a higher crash rate than the Non-DE group, but the difference was not significant. For females, the crash rate for the DE group was also not significantly different than the crash rate for the Non-DE group.

Overall, the above analyses suggest that DE teen drivers either have significantly higher adjusted collision rates than Non-DE teen drivers, or that for some of the comparisons there are no differences in the collision involvement of both groups. Other factors related to self-selection biases might account for these differences in rates, independent of the driver education program. Multivariate analyses are used to address this issue.

Logistic regression was used to investigate various factors examined in the New Driver Survey that may be associated with teens having had a collision. In this analysis the dependent variable is the presence (versus absence) of collisions. Independent variables included DE status, age at provisional license issuance date, gender, whether the teen lived in a rural or urban area, self-reported race, father's level of education, length of time holding a provisional instruction permit, and length of time holding a provisional license. All other independent variables were composite scales as described in Table 74. Scales and indices included in this analysis are as follows: GDL knowledge, GDL overall support, GDL-support specific requirements, GDL influence, Safe driving knowledge, Self-rated skills, Perceived likelihood of crash, Risk taking behavior, Risky driving attitudes, Risk taking attitudes, Lifestyle, Tolerance of Deviance, Parental Monitoring, Exposure, Time Perspective, and Responsibility when Driving. Only results with a p-value smaller than 0.10 are displayed in the tables. Only those results with a p-value equal to or below the 0.05 level will be discussed in the text.

Table 110 shows the results of the logistic regression analysis.

**Table 110: Logistic regression with collision vs. no collision as dependent variable**

| Factor | Odds ratio | Std. Err. | % | p-value |
|---|---|---|---|---|
| **DE status** | 1.74 | 0.60 | 74% | p=0.10 |
| **Age at provisional license issuance date** | 0.73 | 0.24 | -27% | p=0.34 |
| **Gender** | 1.34 | 0.43 | 34% | p=0.37 |
| **Race White** | 0.27 | 0.22 | -73% | p=0.10 |
| **Mix Raced (2 or more)** | 0.24 | 0.21 | -76% | p=0.11 |
| **Urban** | 0.92 | 0.30 | -8% | p=0.81 |
| **Father's level of education** | 0.60 | 0.20 | -40% | p=0.13 |
| **GDL knowledge** | 0.97 | 0.07 | -3% | p=0.65 |
| **GDL overall support** | 0.74 | 0.15 | -26% | p=0.13 |
| **GDL-support specific requirements** | 0.72 | 0.21 | -28% | p=0.26 |
| **GDL influence** | 1.23 | 0.33 | 23% | p=0.44 |
| **Safe driving knowledge** | 0.88 | 0.07 | -12% | p=0.12 |
| **Self-rated skills** | 1.03 | 0.30 | 3% | p=0.9 |
| **Perceived likelihood of crash** | 0.93 | 0.16 | -7% | p=0.68 |
| **Risk taking behavior** | 0.66 | 0.26 | -35% | p=0.28 |
| **Risky driving attitudes** | 1.11 | 0.30 | 11% | p=0.71 |
| **Risk taking attitudes** | 1.84 | 0.55 | 84% | p=0.04 |
| **Lifestyle** | 0.90 | 0.24 | -10% | p=0.68 |
| **Tolerance of deviance** | 0.43 | 0.18 | -57% | p=0.05 |
| **Parental Monitoring** | 0.64 | 0.20 | -36% | p=0.16 |
| **Exposure** | 0.93 | 0.96 | -8% | p=0.94 |
| **Time Perspective** | 0.88 | 0.24 | -12% | p=0.63 |
| **Responsibility when Driving** | 1.25 | 0.40 | 24% | p=0.49 |
| **Length of time held PIP (in months)** | 1.00 | 0.07 | -1% | p=0.9 |
| **Length of time on provisional license (in months)** | 1.17 | 0.05 | 17% | p<0.01 |

Logistic regression revealed that having a higher score on the Risk taking attitudes scale (indicating a higher agreement with various statements that tap normlessness, peer pressure, and risk-taking propensity) significantly increases the likelihood of having had a collision, by 84 percent. Having a higher score on the Tolerance of deviance scale (a higher score indicating a higher tolerance of deviant behaviors) decreases the likelihood of having had a collision by 57 percent. Finally, having held a provisional license for a longer period of time significantly increases the likelihood of having had a collision, by 17 percent.

Although one might expect a higher score on Risk taking attitudes to be associated with a higher likelihood of collisions involvement, the finding that a higher Tolerance of deviance score is associated with a lower likelihood of collision involvement is perplexing. Perhaps thinking that certain deviant behaviors are very acceptable is not a good predictor of subsequent collision involvement.

Results of the bivariate analyses had revealed that DE and Non-DE teens did not differ significantly on Risk taking attitudes or with regard to tolerance of deviance, so it is possible that these two factors are better predictors of collision involvement than DE status, as DE status was not found to have a significant effect on collision involvement (odds ratio=1.74; p=0.10).

### *Convictions*

DE and Non-DE teens did not differ significantly with regard to the number of convictions for traffic violations they had while holding a provisional instruction permit (p=0.20), and importantly, most teens did not have a conviction while holding this license (99.9% for the DE group and 99.1% for the Non-DE group). Similarly, most teens in both groups did not have a conviction after they were issued a provisional license over the study period (98.4% for the DE group and 97.9% for the Non-DE group, respectively). The small difference in convictions on the provisional license between the DE and Non-DE groups was not statistically significant (1.3% versus 2.2%; p=0.88). To control for any differences in days of follow-up and to take exposure into account, adjusted per-driver rates were calculated per 100 licensed driver years – i.e., controlling for exposure in terms of the total number of driving days. Results of these adjusted conviction rate calculations for both DE and Non-DE teens are shown in Table 111 below.

Over the entire tracking period, the DE and Non-DE teens had relatively few convictions, although the numbers were almost four times higher among the Non-DE teens (28 versus 106 convictions, respectively). There is, however, no significant difference between the conviction rates of DE and Non-DE teens. The conviction rate of DE teens who are 16 years of age as well as those 17 years of age are also not significantly different from the conviction rate of Non-DE teens of the same age group.

**Table 111: Number of convictions per 100 licensed driver years (adjusted conviction rate) among DE and Non-DE teen drivers by driver experience using Oregon DMV conviction data, and p-value of two-sample test of proportion**

| Since issued a provisional license | DE | Non-DE | p-value |
|---|---|---|---|
| **Overall** | 8.0 | 10.6 | p=0.17 |
| **Licensed at age 16** | 9.6 | 7.4 | p=0.64 |
| **Licensed at age 17** | 17.0 | 23.4 | p=0.35 |
| **Male** | 12.7 | 14.2 | p=0.63 |
| **Female** | 3.9 | 7.6 | p=0.08 |
| **Total number of convictions** | 28 | 106 | |

With respect to gender, Table 111 shows that there were no statistically significant differences in conviction rates for either male or female teens.

Analyses were also conducted comparing the adjusted conviction rates of DE and Non-DE teens for the length of time that the provisional license restrictions remained in effect for each individual. Night and passenger restrictions end after one year or at age 18, depending on which comes first. As such, conviction rates were also examined from the date the teens were issued their provisional license until one year after the provisional license issuance date if still under the age of 18; or if they turned 18 before the one year of restrictions were lifted; or from the provisional license issuance date until the extraction date if the provisional license was held for less than a year. These results are shown in Table 112.

As can be seen, the conviction rate of DE teens is significantly lower than for Non-DE teens during the GDL restricted period. The conviction rate of DE teens who are 16 years of age, however, is not significantly different than the conviction rate of Non-DE teens of the same age group. Among teens who were issued their provisional license at the age of 17, the DE group had a lower conviction rate than for the Non-DE group at age 17, and this difference was significant.

**Table 112: Number of convictions per 100 licensed driver years (adjusted conviction rate) among DE and Non-DE teen drivers by driver experience using Oregon DMV conviction data, and p-value of two-sample test of proportion**

| On a provisional license | DE | Non-DE | p-value |
|---|---|---|---|
| **Overall** | 6.6 | 10.5 | p=0.04 |
| **Licensed at age 16** | 6.6 | 7.6 | p=0.58 |
| **Licensed at age 17** | 6.8 | 22.6 | p=0.02 |
| **Male** | 10.2 | 13.9 | p=0.23 |
| **Female** | 3.4 | 7.8 | p=0.05 |
| **Total number of convictions** | 22 | 103 | |

With respect to gender, Table 112 shows that among males, the DE group had a conviction rate that was not significantly different from the Non-DE group (p=0.23). For females, the conviction rate for the DE group was significantly lower than the conviction rate for the Non-DE group at the 0.05 level.

Overall, the above analyses suggest that DE teen drivers either have significantly lower adjusted conviction rates than Non-DE teen drivers, or for some of the comparisons that there are no differences between both groups. Other factors related to self-selection biases might account for these differences in rates, independent of the driver education program. Multivariate analyses are used to address this issue.

Logistic regression was used to investigate various factors examined in the New Driver Survey that may be associated with teens having had a conviction for a traffic violation. In this analysis the dependent variable is the presence (versus absence) of convictions. Independent variables included DE status, age at provisional license issuance date, gender, whether the teen lived in a rural or urban area, self-reported race, father's level of education, length of time holding a provisional instruction permit, and length of time holding a provisional license. All other independent variables were composite scales as described in Table 74. Scales included in this analysis are as follows: GDL knowledge, GDL overall support, GDL-support specific requirements, GDL influence, Safe driving knowledge, Self-rated skills, Perceived likelihood of crash, Risk taking behavior, Risky driving attitudes, Risk taking attitudes, Lifestyle, Tolerance of Deviance, Parental Monitoring, Exposure, Time Perspective, and Responsibility when Driving.

Table 113 shows the results of the logistic regression analysis. As can be seen, logistic regression revealed that as age at provisional license issuance increases, the likelihood of having had at least one conviction significantly increases (p=0.02). Results also showed that being male significantly increases the likelihood of having had a conviction (p=0.01). Having a higher score (indicating a higher level of support) regarding overall support for GDL significantly decreases the likelihood of having had a conviction, by 41 percent (p=0.03). Finally, a teen having held a provisional license for a longer period of time increased the likelihood of having experienced a conviction by 28 percent. DE status did not have a significant effect on conviction involvement (odds ratio=1.33; p=0.53).

### *Suspensions*

DE and Non-DE teens do not differ significantly with regard to the number of driver license suspensions they have had while holding a provisional instruction permit (p=0.31), and importantly, most teens did not have a suspension while holding this license (99.8% for the DE group and 99.1% for the Non-DE group). Similarly, most teens in both groups did not have a suspension after they were issued a provisional license over the whole tracking period (98.8% for the DE group and 99.1% for the Non-DE group, respectively). The small differences in the numbers of suspensions between the DE and Non-DE groups were not statistically significant (p=0.23).

To control for any differences in days of follow-up and to take exposure into account, adjusted per-driver rates were calculated per 100 licensed driver years, thereby controlling for exposure in terms of the total number of driving days. Results of these adjusted conviction rate calculations for both DE and Non-DE teens are shown in Table 114 below.

As can be seen, both DE and Non-DE teens had relatively few suspensions (16 versus 35, respectively). Over the whole tracking period, there is no significant difference between the suspension rates of DE and Non-DE teens. The suspension rate of DE teens who are 16 years of age as well as those who are 17 years of age are also not significantly different than the suspension rate of Non-DE teens of the same age group.

| Table 113: Logistic regression with conviction vs. no conviction as dependent variable | | | | |
|---|---|---|---|---|
| **Factor** | **Odds ratio** | **Std. Err.** | **%** | **p-value** |
| **DE** | 1.33 | 0.60 | 33% | p=0.53 |
| **Age at provisional license issuance** | 2.01 | 0.62 | 101% | p=0.02 |
| **Male** | 2.63 | 1.03 | 163% | p=0.01 |
| **Race Asian** | 0.76 | 1.33 | -24% | p=0.87 |
| **Race White** | 0.53 | 0.72 | -47% | p=0.64 |
| **Race Hispanic/Latino** | 1.01 | 1.50 | 1% | p=1.00 |
| **Race Mix Raced (2 or more)** | 0.89 | 1.25 | -11% | p=0.93 |
| **Race Other** | 1.50 | 2.61 | 50% | p=0.82 |
| **Urban** | 0.56 | 0.22 | -44% | p=0.13 |
| **father's level of education** | 0.54 | 0.24 | -46% | p=0.17 |
| **GDL knowledge** | 1.00 | 0.08 | 0% | p=0.98 |
| **GDL overall support** | 0.59 | 0.14 | -41% | p=0.03 |
| **GDL-support specific requirements** | 1.30 | 0.46 | 30% | p=0.45 |
| **GDL influence** | 1.79 | 0.64 | 79% | p=0.10 |
| **Safe driving knowledge** | 1.01 | 0.10 | 1% | p=0.92 |
| **Self-rated skills** | 1.14 | 0.39 | 14% | p=0.70 |
| **Perceived likelihood of crash** | 1.03 | 0.21 | 3% | p=0.88 |
| **Risk taking behavior** | 0.92 | 0.42 | -8% | p=0.85 |
| **Risky driving attitudes** | 1.56 | 0.47 | 56% | p=0.14 |
| **Risk taking attitudes** | 0.91 | 0.35 | -9% | p=0.80 |
| **Lifestyle** | 1.05 | 0.38 | 5% | p=0.90 |
| **Tolerance of deviance** | 0.76 | 0.40 | -24% | p=0.60 |
| **Parental Monitoring** | 0.85 | 0.34 | -15% | p=0.69 |
| **Exposure** | 0.80 | 0.70 | -20% | p=0.80 |
| **Time Perspective** | 1.52 | 0.45 | 52% | p=0.16 |
| **Responsibility when Driving** | 1.91 | 0.91 | 91% | p=0.18 |
| **Length of time held PIP (in months)** | 0.96 | 0.07 | -4% | p=0.54 |
| **Length of time on provisional license (in months)** | 1.28 | 0.06 | 28% | p<0.01 |

| Table 114: Number of suspensions per 100 licensed driver years (adjusted suspension rate) among DE and Non-DE teen drivers by driver experience using Oregon DMV suspension data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Since issued a provisional license** | **DE** | **Non-DE** | **p-value** |
| **Overall** | 4.6 | 3.5 | p=0.35 |
| **Licensed at age 16** | 3.3 | 3.1 | p=0.86 |
| **Licensed at age 17** | 12.8 | 5.1 | p=0.06 |
| **Male** | 7.2 | 7.1 | p=0.95 |
| **Female** | 2.2 | 0.1 | p=0.05 |
| **Total number of suspensions** | 16 | 35 | |

With respect to gender, Table 114 shows that among males, the DE group had a suspension rate that was not significantly different from the Non-DE group. For females, the suspension rate for the DE group was significantly higher than the suspension rate for the Non-DE group at the 0.05 level.

Analyses were also conducted comparing the adjusted suspension rates of DE and Non-DE teens for the length of time that the provisional license restrictions remained in effect. Results are shown in Table 115.

As can be seen, there is no significant difference between the suspension rates of DE and Non-DE teens. The suspension rate of DE teens who are 16 years of age is not significantly different than the suspension rate of Non-DE teens of the same age group. Among teens who were issued their provisional license at the age of 17, the DE group had a significantly higher suspension rate than the Non-DE group, and the difference was significant at the 0.05 level.

With respect to gender, Table 115 shows that among males, the DE and Non-DE groups had suspension rates that did not differ significantly. For females, the suspension rate for the DE group was significantly higher than the suspension rate for the Non-DE group at the 0.05 level.

**Table 115: Number of suspensions per 100 licensed driver years (adjusted suspension rate) among DE and Non-DE teen drivers by driver experience using Oregon DMV suspension data, and p-value of two-sample test of proportion**

| On a provisional license | DE | Non-DE | p-value |
|---|---|---|---|
| **Overall** | 4.8 | 3.6 | p=0.31 |
| **Licensed at age 16** | 3.4 | 3.1 | p=0.83 |
| **Licensed at age 17** | 13.3 | 5.2 | p=0.05 |
| **Male** | 7.4 | 7.1 | p=0.91 |
| **Female** | 2.2 | 0.5 | p=0.05 |
| **Total number of suspensions** | 16 | 35 | |

Logistic regression was used to investigate various factors examined in the New Driver Survey that may be associated with teens having had a suspension. In this analysis the dependent variable is the presence (versus absence) of suspensions. Independent variables included DE status, age at provisional license issuance date, gender, whether the teen lived in a rural or urban area, self-reported race, father's level of education, length of time holding a provisional instruction permit, and length of time holding a provisional license. All other independent variables were composite scales as described in Table 74. Scales included in this analysis are as follows: GDL knowledge, GDL overall support, GDL-support specific requirements, GDL influence, Safe driving knowledge, Self-rated skills, Perceived likelihood of crash, Risk taking behavior, Risky driving attitudes, Risk taking attitudes, Lifestyle, Tolerance of Deviance, Parental Monitoring, Time Perspective, and Responsibility when Driving.

Table 116 below shows the results of the logistic regression analysis.

| Table 116: Logistic regression with suspension vs. no suspension as dependent variable | | | | |
|---|---|---|---|---|
| **Factor** | **Odds ratio** | **Std. Err.** | **%** | **p-value** |
| **DE status** | 1.62 | 1.10 | 62% | p=0.47 |
| **Age at provisional license issuance** | 2.60 | 1.24 | 160% | p=0.05 |
| **Male** | 8.60 | 6.33 | 761% | p<0.01 |
| **Race White** | 0.69 | 0.47 | -31% | p=0.59 |
| **Race Hispanic/Latino** | 1.50 | 1.83 | 50% | p=0.74 |
| **Urban** | 0.41 | 0.24 | -59% | p=0.13 |
| **father's level of education** | 1.06 | 0.62 | 6% | p=0.92 |
| **GDL knowledge** | 0.94 | 0.12 | -6% | p=0.61 |
| **GDL overall support** | 1.36 | 0.51 | 36% | p=0.41 |
| **GDL-support specific requirements** | 0.69 | 0.35 | -31% | p=0.47 |
| **GDL influence** | 0.75 | 0.32 | -25% | p=0.50 |
| **Safe driving knowledge** | 1.22 | 0.19 | 22% | p=0.21 |
| **Self-rated skills** | 2.82 | 1.47 | 182% | p=0.05 |
| **Perceived likelihood of crash** | 0.45 | 0.17 | -55% | p=0.03 |
| **Risk taking behavior** | 0.52 | 0.33 | -48% | p=0.30 |
| **Risky driving attitudes** | 0.86 | 0.43 | -14% | p=0.76 |
| **Risk taking attitudes** | 7.81 | 4.18 | 682% | p<0.01 |
| **Lifestyle** | 0.31 | 0.12 | -69% | p<0.01 |
| **Tolerance of deviance** | 0.50 | 0.33 | -50% | p=0.29 |
| **Parental Monitoring** | 0.86 | 0.41 | -14% | p=0.75 |
| **Time Perspective** | 0.18 | 0.10 | -82% | p<0.01 |
| **Responsibility when Driving** | 0.62 | 0.33 | -38% | p=0.37 |
| **Length of time held PIP (in months)** | 0.97 | 0.11 | -3% | p=0.82 |
| **Length of time on provisional license (in months)** | 1.19 | 0.09 | 19% | p=0.03 |

As shown in the table, logistic regression revealed that as age at provisional license issuance increased, the likelihood of having had at least one suspension significantly increased ($p<0.05$). Results also showed that being male significantly increased the likelihood of having had a suspension ($p<0.01$). Having a higher score on the self-rated skills scale (a higher score indicating a high self-rating) increased the likelihood of having had a suspension by 182 percent. Having a higher perceived likelihood of experiencing an accident or injury significantly decreased the chances of having at least one suspension, by 55 percent. A higher score on the Risk taking attitudes scale significantly increased the chances of having a suspension, by 681 percent. Having a higher score on the Lifestyle scale (indicating a positive attitude about their lifestyle) significantly decreased the likelihood of having at least one suspension. Finally, having held a provisional license for a longer period of time increased the likelihood of having a suspension by 19 percent. DE status did not have a significant effect on suspension involvement (odds ratio=1.62; $p=0.47$).

### ***Summary***

The safety performance of the ODOT-approved driver education program was examined in terms of license test attempts, collisions, convictions, and suspensions using both bivariate and multivariate analyses.

<u>License Tests:</u> The bivariate analyses found that more teens that completed the ODOT-approved driver education program passed the safe driving knowledge test and the road test on their first attempt than is the case for teens who had not completed this program. However, other factors related to self-selection bias may have accounted for the differences in pass rates between the DE and Non-DE groups, independent of the ODOT-approved driver education program. Multivariate analyses addressed this possibility using the number of road test attempts as the dependent variable.

Poisson regression revealed that none of the independent variables included in the model showed significant effects. However, when length of time teens held their provisional instruction permit was added to the model, the analyses revealed that as this length of time (in months) increases, the expected number of road test attempts significantly increases. This finding is to be expected as those who fail the test for the provisional license will remain on their provisional instruction permit for a longer period of time. No other variables showed significant effects when this variable was added to the model, which suggests that driver education status was not associated with the number of road test attempts after controlling for these other variables.

<u>Collisions:</u> The results of the bivariate analyses showed that DE and Non-DE teens do not differ significantly with regard to the number of collisions they have had while holding a provisional instruction permit and, only very few teens had a collision while holding this permit. Most teens in both groups also did not have a collision after they were issued a provisional license over their first few months of independent driving. However, DE teens had more collisions than Non-DE teens over this study period, and this difference was statistically significant.

To control for the effects of driving exposure, the collision counts were standardized per 100 licensed driver years. These adjusted per driver rates showed that, overall, the DE group had a higher collision rate than the Non-DE group, and this was the case for those acquiring their provisional license at age 16 years, and males, but not for 17-year-olds or females. Further analyses focusing on only the time period the provisional license restrictions remained in effect found a significantly higher adjusted-collision rate for 16-year-old DE teens when compared to 16-year-old Non-DE teens, but no significant differences were found overall or for those licensed at age 17, or for males or females between DE and Non-DE teens.

Logistic regression was used to determine the influence of driver education on collision involvement controlling for the potential influences of pre-existing factors/attributes measured in the baseline survey. Results showed that:

- a higher score on the Risk-taking attitudes scale increases the likelihood of collision involvement;
- a higher score on Tolerance of deviance scale decreases the likelihood of collisions involvement; and,
- the length of time on a provisional license (i.e., an indicator of more driving exposure) increases the likelihood of collision involvement.

None of the other independent variables entered into the model, including DE status, were associated with collision involvement.

<u>Convictions:</u> The results of the bivariate analyses showed that DE and Non-DE teens do not differ significantly in regard to the number of convictions for traffic violations they have had while holding a provisional instruction permit, and most teens did not have a conviction while on this permit. Most teens in both groups also did not have a conviction after they were issued a provisional license over their first few months of independent driving.

Comparisons of adjusted conviction rates revealed that there were no significant differences between DE and Non-DE teens overall or by the age they obtained their provisional license or by gender. Further analyses, however, focusing on only the time period the provisional license restrictions remained in effect, revealed lower adjusted conviction rates for DE teens licensed at age 17 and for female DE teens (compared to Non-DE teens).

Logistic regression found that:

- as age increases, so does the likelihood of having a conviction;
- being male increases the likelihood of a conviction;
- being more supportive of GDL decreases the likelihood of having a conviction; and,
- the length of time on a provisional license (i.e., an indicator of more driving exposure) increases likelihood of having a conviction.

None of the other independent variables entered into the model, including DE status, were associated with having had a conviction for a traffic violation.

<u>Suspensions:</u> The results showed that DE and Non-DE teens do not differ significantly in regard to the number of license suspensions they had while holding a provisional instruction permit, and most teens did not have a suspension while on this permit. Most teens in both groups also did not have a suspension after they were issued a provisional license over their first few months of independent driving.

Comparisons of adjusted suspension rates revealed significantly higher rates among female DE teens than Non-DE females. Further analyses focusing on the time period the provisional license restrictions remained in effect showed higher suspension rates for 17-year-old DE teens, as well as for female DE teens (compared to Non-DE).

Logistic regression found that:

- as age increases, so does the likelihood of experiencing a suspension;
- being male increases the likelihood of suspension;
- having a higher score regarding self-rated driving skills increases the likelihood of having had a suspension;
- having a higher perceived likelihood of accident or injury decreases the likelihood of having had a suspension;
- a higher score on Risk-taking attitudes scale increases the likelihood of suspension involvement;
- having a higher score on the Lifestyle scale (indicating positive view about their lifestyle) decreases the likelihood of having at least one suspension;
- having a higher score on the Time perspective scale (willingness to engage in planning) decreases the likelihood of having a suspension; and,
- the length of time on a provisional license (an indicator of more driving exposure) increases the likelihood of having a suspension.

None of the other independent variables entered into the model, including DE status, were associated with having had a license suspension.

## Safety Performance: Historical Records

The previous section described an in-depth, prospective, longitudinal study of a sample of 5,000 teen drivers that compared the safety performance of teens who have taken the ODOT-approved driver education program with that of those who have not taken this driver education program over their first few months of independent driving. This section describes a retrospective study of a much larger population that has been driving for a greater length of time, including those that have and have not taken the ODOT-approved driver education program. Historical records are used to examine the effects of the ODOT-approved driver education program on collision and conviction rates.

### *Method*

The safety impacts of driver education in Oregon were evaluated using a retrospective study design with a large population of teen drivers. For this purpose, official driver records maintained by ODOT were used to compare the per-driver crash rates of teens who have (DE group) and who have not taken the ODOT-approved driver education program (Non-DE group).

<u>Study Sample:</u> The study sample included Oregon teens issued their provisional instruction permit between January 1, 2005 and December 31, 2008; this was defined as the data intake period. The driver and crash records of these teens were tracked from their intake or selection date – i.e., when they were issued an instruction permit – to September 17, 2009, the date ODOT extracted the data for this investigation. The total number of teen drivers in this sample is 94,342.

Data Sources: Four separate data sets were provided by ODOT to the evaluation team: a driver licensing data file, a driver education data file, a driver history data file, and a test results data file.

*Licensing Data.* The licensing data contain the licensing information for all Oregon teens in the study sample who may or may not have taken the ODOT-approved driver education program. Information includes the type of license issued (e.g., provisional instruction permit, provisional license, full driver's license) and the date that it was issued. Demographic information, including age, gender, and address were included in this file. Zip codes were used to distinguish between urban and rural locations as indicated by the Oregon Office of Rural Health according to the U.S. Census Bureau definitions:

- Urbanized Area (UA):
  - Consists of contiguous, densely settled census block groups (BG) and census blocks (at least 500 people per square mile) that together encompass a population of more than 50,000.
- Urban Cluster (UC):
  - Consists of contiguous, densely settled BGs and census blocks (500 ppsm) that together encompasses a population of at least 2,500 people but less than 50,000 people.
- Rural:
  - All population and territory that is not a UA or UC, or all geographic areas 10 or more miles from the centroid of a population center of 40,000 or more (Oregon Office of Rural Health 2012)

If licenses were issued to teens whose address was listed as being outside the state of Oregon, these cases were dropped from the analyses. Note there were only 204 such cases after the data had been merged.

*Driver Education Data.* The driver education data contain teens that have been recorded in ODOT files as having completed ODOT-approved driver education, indicating the date the program was completed. This data set contains official records of all teens having completed driver education between June 30, 2004 and June 30, 2009.

Because teens in Oregon must first obtain their provisional instruction permit before enrolling in a driver education program, if they had completed driver education in 2004 or in 2005, they may have attained their provisional instruction permit before the data intake period start date (January 1, 2005). Additionally, those who completed driver education in 2009 may not have received their provisional instruction permit before the intake period end date (December 31, 2008). These cases from the driver education file could not be matched to the licensing data file. The total number of ODOT-approved driver education graduates that were matched to the licensing data file and used in the analyses was 20,932.

All teens in the driver education data file had taken the ODOT-approved driver education program. Thus all cases from this file that were matched to the licensing data (containing both driver education and non-driver education teens) were identified as the driver education group, and all cases coming from the licensing data that were not matched to the driver education data were identified as the non-driver education group.

*The Driver History Data.* This data set contains the driver records of teens including, collisions, convictions, and suspensions, as well as the date on which each incident occurred.

Data and Statistical Analyses: Analyses comparing the crash and conviction rates of teens who took ODOT-approved driver education and those who have not were conducted for a specific study population, including teens issued a provisional instruction permit in the intake period (January 1, 2005 and December 31, 2008) and who were issued a provisional license before the extraction date (September 17, 2009). Teens, for example, who were still on a provisional instruction permit on the extraction date were not included in these analyses.

Collision and conviction rates of teens in this study population were first examined from the date the teens were issued their provisional instruction permit up until the extraction date.

Collisions and conviction rates were then also examined from the date the teens were issued their provisional license until the extraction date.

Finally, collision and conviction rates were examined for the length of time that the provisional license restrictions remained in effect. Night and passenger restrictions end after one year, or at age 18 depending on which comes first. Collision and conviction rates were also examined from the date the teens were issued their provisional license until one year after the provisional license issuance date if still under the age of 18; or if they turned 18 before the one year of restrictions were lifted; or from the provisional license issuance date until the extraction date if the provisional license was held for less than a year.

Rate Calculations and Comparisons: Since data were collected for all teens issued a provisional instruction permit between January 1, 2005 and December 31, 2008, and the tracking period extended to September 2009, the length of time in which a teen had held a license (and thus can legally drive) may vary greatly from teen to teen. The earliest issuance date is January 3, 2005. Since the extraction date is September 17, 2009, the maximum length of time that a teen had driven was 1,718 days, or roughly 56 months. Thus, some teens may have only been driving for a few months, whereas others had up to 56 months of driving experience. To control for any differences in days of follow-up and to take exposure into account, adjusted per-driver crash rates were calculated per 100 licensed driver years, thereby controlling for exposure in terms of the total number of driving days.

The analysis focused on overall differences in these adjusted collision and conviction rates of teen drivers who have and have not completed the ODOT-approved driver education program, as well as differences during specific time blocks – e.g., for the first six months of licensure, for the second six months of licensure, and so on. This allows for examining the effects of driver education by driving experience – i.e., during the initial few months of driving and later on, after the novice has accumulated more on-road experience driving unsupervised.

Multivariate Analyses: Poisson regression was used to determine whether driver education is associated with collisions and convictions after taking into account other factors such as demographic characteristics (age, gender), place of residence (urban versus rural), and length of time on a provisional instruction permit as well as on a provisional license. For these analyses, the number of crashes or convictions since obtaining a provisional license was used as the dependent variable, and length of time since obtaining a provisional license was used as the exposure variable.

### *Results*

This section describes the demographic characteristics of the study population and then presents results based on collision and conviction rate comparisons.

Demographic Characteristics: Table 117 shows the age and gender of teen drivers who were issued a provisional instruction permit and then a provisional license over the tracking study period. As can be seen, there are a total of 94,342 drivers in this study population, and 22 percent had completed the ODOT-approved driver education program.

Both the DE and Non-DE groups are very similar in gender – 49 percent of the DE group and 51 percent of the Non-DE group are male. The DE group, however, is younger than the Non-DE group, with 81 percent of the DE group obtaining a provisional instruction permit at age 15 compared to only 70 percent of the Non-DE group.

**Table 117: Demographic Characteristics of Study Population**

**Study population: since issued provisional instruction permit**

| | DE | | Non-DE | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| **All drivers** | 20,932 | 22.2% | 73,410 | 77.8% | 94,342 | 100% |
| **Gender** | | | | | | |
| **Female** | 10,700 | 51.1% | 35,687 | 48.6% | 46,387 | 49.2% |
| **Male** | 10,232 | 48.9% | 37,723 | 51.4% | 47,955 | 50.8% |
| **Age at issuance** | | | | | | |
| **15** | 16,959 | 81% | 51,414 | 70% | 68,373 | 72.5% |
| **16** | 3,367 | 16.1% | 17,509 | 23.9% | 20,876 | 22.1% |
| **17** | 606 | 2.9% | 4,487 | 6.1% | 5,093 | 5.4% |

Per-Driver Collision Rate Comparisons: This section examines the collision rates of the DE and Non-DE groups initially since their provisional instruction permit issuance date and then since their provisional license issuance date.

Analyses were first conducted comparing the adjusted collision rates of teens who have taken driver education (DE group) and teens who have not taken driver education (Non-DE group) from the date they were issued their provisional instruction permit until the extraction date (tracking period). Table 118 shows months grouped into six-month blocks up to 54 months. Over this 54-month tracking period, both the DE and Non-DE groups would have moved from the provisional instruction stage into the provisional license stage, and for some into a full license. Since the provisional instruction permit has to be held for a minimum of six months, a period when learners are driving under supervision, the adjusted collision rates for both the DE and Non-DE groups are lowest in the first six-month period, and these rates begin to increase as teens move from a provisional instruction license to their provisional license and independent driving.

As can be seen in Table 118, the DE and Non-DE groups had 2,724 and 11,096 crashes, respectively, over the tracking period. The absolute number of crashes is much higher for the Non-DE group than for the DE group because there are more of them and they have accumulated more driving days over the tracking period. After standardizing collision counts for these differences by calculating collision rates per 100 licensed driver years, the DE group has a statistically significant lower adjusted collision rate than Non-DE teens (4.6 vs. 5.2; $p<0.01$) over the entire tracking period. The adjusted crash rate for teens in the DE group is also significantly lower than that of Non-DE group in the first 18 months of driving. For example, after 7-12 months of driving, teens who have taken DE have an adjusted crash rate of 2.9, compared to 4.4 for Non-DE teens ($p<0.001$). Beyond 18 months of driving, the crash rates of DE teens are similar to that of Non-DE teens in each of the six-month periods. To illustrate, after 31-36 months of driving, the adjusted crash rate of DE teens is 5.9, compared to 5.8 for Non-DE teens ($p=0.74$).

Table 119 shows the adjusted per-driver collision rates for DE and Non-DE teens since being issued a provisional instructions permit by age over the tracking period – age reflects when this permit was issued. When comparing the DE group and Non-DE group, Table 119 reveals that the crash rate of DE teens who are 15 years of age is significantly lower than the crash rate of Non-DE teens of the same age group, although this difference does not appear to be very large (difference of 0.6). When comparing the crash rates of teens who were 16 or 17 years of age at the date of issuance, there is no significant difference between DE and Non-DE teens. The number of teens who were issued their license at the age of 17 (n=5,093) was much smaller than the number of teens issued their license at the age of 15 (n=68,373), which may explain why a significant difference was found for those aged 15 and not those aged 17 when the difference in crash rates between the DE and Non-DE groups were similar for these two age categories (0.6 and 0.7 respectively).

| Table 118: Number of collisions per 100 licensed driver years (adjusted crash rate) among DE and Non-DE teen drivers (since issued a provisional instruction permit) by driver experience (in months) using Oregon DMV collision data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Months since issued provisional instruction permit** | **DE** | **Non-DE** | **p-value** |
| **0-6 months** | 0.7 | 1.0 | p<0.01 |
| **7-12 months** | 2.9 | 4.4 | p<0.01 |
| **13-18 months** | 6.5 | 7.7 | p<0.01 |
| **19-24 months** | 7.2 | 7.3 | p=0.64 |
| **25-30 months** | 6.4 | 7.0 | p=0.07 |
| **31-36 months** | 5.9 | 5.8 | p=0.74 |
| **37-42 months** | 4.6 | 5.0 | p=0.30 |
| **43-48 months** | 3.4 | 4.3 | p=0.06 |
| **49-54 months** | 2.5 | 3.6 | p=0.18 |
| **Tracking period** | 4.6 | 5.2 | p<0.01 |
| **Total number of collisions** | 2,724 | 11,096 | |

| Table 119: Number of collisions per 100 licensed driver years (adjusted crash rate) by age among DE and Non-DE teen drivers (since issued a provisional instruction permit) by driver experience (in months) using Oregon DMV collision data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Age when issued provisional instruction permit** | **DE** | **Non-DE** | **p-value** |
| **15** | 4.3 | 4.9 | p<0.01 |
| **16** | 5.8 | 6.0 | p=0.55 |
| **17** | 7.0 | 6.3 | p=0.36 |

With respect to gender, Table 120 shows that the crash rate of males in the DE group is significantly lower than the crash rate of the Non-DE group. Similarly for females, the crash rate for the DE group is significantly lower than Non-DE group.

| Table 120: Number of collisions per 100 licensed driver years (adjusted crash rate) by gender among DE and Non-DE teen drivers (since issued a provisional instruction permit) by driver experience (in months) using Oregon DMV collision data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Gender** | **DE** | **Non-DE** | **p-value** |
| **Male** | 4.4 | 5.3 | p<0.01 |
| **Female** | 4.8 | 5.2 | p=0.01 |

Analyses were also conducted comparing the adjusted collisions rates of teens who have taken driver education and teens who have not taken driver education from the date they were issued their provisional license until the extraction date (tracking period).

Results shown in Table 121 reveal that in the first six months of independent driving experience, DE teens have a significantly lower adjusted per-driver collision rate compared to the Non-DE group (8.5 versus 9.7, respectively; p<0.001). The difference between the DE and Non-DE group was not significant after 7-12 months of driving, but was significant after 13-18 months of driving. The only other significant difference between the DE and Non-DE group was after 37-42 months of driving.

| **Table 121: Number of collisions per 100 licensed driver years (adjusted crash rate) among DE and Non-DE teen drivers (since issued a provisional license) by driver experience (in months) using Oregon DMV collision data, and p-value of two-sample test of proportion** | | | |
|---|---|---|---|
| **Months since issued provisional license** | **DE** | **Non-DE** | **p-value** |
| **0-6 months** | 8.5 | 9.7 | p<0.01 |
| **7-12 months** | 7.7 | 8.2 | p=0.07 |
| **13-18 months** | 6.1 | 7.1 | p<0.001 |
| **19-24 months** | 5.6 | 6.0 | p=0.28 |
| **25-30 months** | 5.3 | 4.9 | p=0.41 |
| **31-36 months** | 3.3 | 4.2 | p=0.09 |
| **37-42 months** | 1.6 | 3.9 | p=0.01 |
| **43-48 months** | 0.0 | 3.1 | p=n/a |
| **49-54 months** | 0.0 | 2.5 | p=n/a |
| **Tracking period** | 7.3 | 7.8 | p<0.01 |
| **Total number of crashes** | 2,715 | 11,055 | |

Note that there were no recorded collisions for the DE group in the 43-48 month and 49-54 month time blocks, so tests of significance between the DE group and Non-DE group for these time periods could not be calculated independently. There were also relatively few DE and Non-DE teens in these time blocks. It is also worth noting that for both the DE and Non-DE groups, adjusted collision rates decreased with increases in months of driving.

Overall, it was found that the collision rate for the tracking period of the DE group was significantly lower than that of the Non-DE group (7.3 versus 7.8, respectively; p<0.01).

Table 122 shows the adjusted per-driver collision rates for DE and Non-DE teens since being issued a provisional license over the tracking period – age reflects when the license was obtained.

As shown in Table 122, the collision rates for DE teens is significantly lower among teens who were issued their provisional license at the age of 16 compared to Non-DE teens of the same age group. A significant difference between the DE and Non-DE group was not found for teens issued their provisional license at the age of 17.

| Table 122: Number of collisions per 100 licensed driver years (adjusted crash rate) by age among DE and Non-DE teen drivers (age issued a provisional license) by driver experience (in months) using Oregon DMV collision data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Age when issued provisional license** | **DE** | **Non-DE** | **p-value** |
| **16** | 7.0 | 7.5 | p<0.01 |
| **17** | 8.4 | 8.6 | p=0.59 |

With respect to gender, Table 123 reveals that among males, the collision rate of the DE group is significantly lower than the Non-DE group. This was not the case for females, as similar rates were found for females in the DE group and Non-DE group.

| Table 123: Number of collisions per 100 licensed driver years (adjusted crash rate) by gender among DE and Non-DE teen drivers by driver experience (in months since issued a provisional license) using Oregon DMV collision data, and p-value of two-sample test of proportion. | | | |
|---|---|---|---|
| **Gender** | **DE** | **Non-DE** | **p-value** |
| **Male** | 7.0 | 7.9 | p<0.01 |
| **Female** | 7.6 | 7.8 | p=0.49 |

Analyses were conducted to examine collision rates of DE and Non-DE teens for the length of time that the provisional license restrictions remained in effect for each driver. As mentioned above, night and passenger restrictions end after one year, or at age 18 depending on which comes first. Adjusted collision rates were examined from the date the teens were issued their provisional license until one year after the provisional license issuance date if still under the age of 18; or if they turned 18 before the one year of restrictions were lifted; or from the provisional license issuance date until the extraction date if the provisional license was held for less than a year. Thus, the maximum amount of time that a teen may hold a provisional license is 12 months (provisional license tracking period). Results are shown in Table 124 and, for these analyses, adjusted collision rates are provided for three-month rather than six-month time blocks.

Table 124 reveals that during the first three months of driving on a provisional license, the collision rate for the DE group is significantly lower than that of the Non-DE group. During four-six months of driving, the rates for the DE group and Non-DE group are similar, and this difference was not significant. After seven-nine months of driving exposure the collision rate for the DE group is again significantly lower than that of the Non-DE group. After 10-12 months of driving exposure (and the last few months that the provisional license restrictions are in effect), the difference between the DE group and Non-DE group is not significant. Overall, when looking at the entire provisional license tracking period, the DE group has a significantly lower collision rate than the Non-DE group (8.5 versus 9.6; p<0.01).

| Table 124: Number of collisions per 100 licensed driver years (adjusted crash rate) among DE and Non-DE teen drivers (while provisional license restrictions in effect) by driver experience (in months) using Oregon DMV collision data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Months provisional license restrictions in effect** | **DE** | **Non-DE** | **p-value** |
| **0-3 months** | 9.0 | 11.3 | p<0.01 |
| **4-6 months** | 8.8 | 9.2 | p=0.39 |
| **7-9 months** | 8.1 | 9.3 | p=0.01 |
| **10-12 months** | 7.9 | 8.2 | p=0.61 |
| **Provisional license tracking period** | 8.5 | 9.6 | p<0.01 |
| **Total number of collisions** | 1,539 | 5,756 | |

Table 125 shows the adjusted per-driver collision rates for DE and Non-DE teens while provisional license restrictions are in effect – age reflects when the license was obtained.

For teens who were issued their provisional license at the age of 16, the DE group had a significantly lower collision rate while provisional license restrictions were in effect compared to the Non-DE group. Similar results were found for teens issued their provisional license at the age of 17.

| Table 125: Number of collisions per 100 licensed driver years (adjusted crash rate) by age among DE and Non-DE teen drivers (while provisional license restrictions in effect) by driver experience (in months) using Oregon DMV collision data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Age provisional license restrictions came into effect** | **DE** | **Non-DE** | **p-value** |
| 16 | 9.0 | 10.2 | p<0.01 |
| 17 | 11.5 | 12.8 | p=0.02 |

Results for gender (see Table 126) indicate that among males, the DE group has a significantly lower collision rate than the Non-DE group. Similar results were found among females, as the DE group had a significantly lower collision rate while provisional license restrictions were in effect compared to the Non-DE group.

| Table 126: Number of collisions per 100 licensed driver years (adjusted crash rate) by gender among DE and Non-DE teen drivers (while provisional license restrictions in effect) by driver experience (in months) using Oregon DMV collision data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Gender** | **DE** | **Non-DE** | **p-value** |
| **Male** | 8.9 | 11.0 | p<0.01 |
| **Female** | 10.2 | 11.1 | p=0.02 |

Poisson regression was employed to examine collision counts from the date the teens were issued their provisional license until the extraction date (September 17, 2009) using several independent variables, including driver education status (DE vs. Non-DE), gender, age when issued provisional license, residence in an urban or rural setting, and the length of time a provisional instruction permit was held (in months). The length of time from the provisional license date of issuance to the extraction date was used as an exposure variable. Results are summarized in Table 127.

| Table 127: Results from Poisson analysis of collision since issued provisional license | | | | |
|---|---|---|---|---|
| **Dependent variable: crash count since issued provisional license** | | | | |
| **Independent Variable** | **Coefficient** | **p-value** | **%-change** | **%SD** |
| **DE status** | -0.04 | P<0.05 | -4.3% | -1.8% |
| **Gender** | -0.01 | p=0.45 | -1.3% | -0.6% |
| **Age** | 0.16 | p<0.01 | 17.0% | 7.5% |
| **Urban** | 0.05 | p<0.01 | 5.4% | 2.6% |
| **PIP length (in months)** | -0.01 | p<0.01 | -1.1% | -4.9% |

*%-change indicates the percent change in expected collision count for a unit increase in the independent variable; %SD indicates the percent change in expected collision count for a standard deviation increase in independent variables.*

As shown in Table 127, having completed a driver education course significantly decreases the expected number of collisions, by 4.3 percent ($p<0.05$). Gender did not have a significant effect on collision rates, but all other variables in the model did show significant results. With regard to age, being one year older (17 vs. 16 years of age) significantly increases the expected number of collisions, by 17.0 percent ($p<0.01$), and residing in an urban area significantly increases the expected number of collisions, by 5.4 percent ($p<0.01$). It was also found that an increase of one month in the length of time under a provisional instruction permit results in a decrease of 1.1 percent in the expected number of crashes ($p<0.01$). If time under provisional instruction permit is re-scaled to an increase of six months, the percentage decrease in expected crashes is 6.6 percent.

<u>Per-Driver Conviction Rate Comparisons:</u> This section examines the conviction rates of the DE and Non-DE groups initially since their provisional instruction permit issuance date and then since their provisional license issuance date.

Analyses were first conducted comparing the adjusted conviction rates of teens who have taken driver education (DE group) and teens who have not taken driver education (Non-DE group) from the date they were issued their provisional instruction permit until the extraction date (tracking period). Note that in Table 128, months were grouped into six-month blocks up to 54 months. Adjusted conviction rates are lowest for both groups in the initial six months of driving, likely because these teens are learners driving under supervision. As DE teens and Non-DE teens move from a provisional instruction permit to a provisional license, conviction rates increase.

| Table 128: Number of convictions per 100 licensed driver years (adjusted conviction rate) among DE and Non-DE teen drivers (since issued a provisional instruction permit) by driver experience (in months) using Oregon DMV conviction data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Months since issued provisional instruction permit** | **DE** | **Non-DE** | **p-value** |
| **0-6 months** | 0.6 | 3.2 | p<0.01 |
| **7-12 months** | 3.8 | 11.3 | p<0.01 |
| **13-18 months** | 9.0 | 21.1 | p<0.01 |
| **19-24 months** | 12.3 | 23.8 | p<0.01 |
| **25-30 months** | 15.7 | 27.8 | p<0.01 |
| **31-36 months** | 18.0 | 29.2 | p<0.01 |
| **37-42 months** | 19.5 | 30.2 | p<0.01 |
| **43-48 months** | 17.9 | 27.6 | p<0.01 |
| **49-54 months** | 12.5 | 23.1 | p<0.01 |
| **Tracking period** | 9.8 | 19.6 | p<0.01 |
| **Total number of convictions** | 5,806 | 41,558 | |

As can be seen in Table 128, the adjusted conviction rate for teens in the DE group is significantly lower than that of Non-DE group in every six-month block. For example, after 37-42 months of driving, teens who have taken DE have an adjusted conviction rate of 19.5 compared to 30.2 for Non-DE teens (p<0.01). When looking at the entire tracking period, a significant difference was also found between the conviction rates of DE and Non-DE teens (9.8 vs. 19.6; p<0.01).

Table 129 shows the adjusted per-driver conviction rates for DE and Non-DE teens since being issued a provisional instruction permit by age over the tracking period – age reflects when the license was issued.

| Table 129: Number of convictions per 100 licensed driver years (adjusted conviction rate) by age among DE and Non-DE teen drivers (since issued a provisional instruction permit) by driver experience (in months) using Oregon DMV conviction data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Age when issued provisional instruction permit** | **DE** | **Non-DE** | **p-value** |
| **15** | 8.6 | 15.3 | p<0.01 |
| **16** | 15.2 | 28.5 | p<0.01 |
| **17** | 16.9 | 34.5 | p<0.01 |

When comparing the DE group and Non-DE group, Table 129 reveals that the conviction rate of DE teens in all three age categories (15, 16, and 17 years of age) is significantly lower than the conviction rate of Non-DE teens of the same age group. The largest difference is among teens 17 years of age, with the DE group having a conviction rate of 16.9, compared to 34.5 for the Non-DE group (a difference of 17.6; p<0.01).

With respect to gender, Table 130 shows that the conviction rate of males in the DE group is significantly lower than the conviction rate of the Non-DE group. Similarly for females, the conviction rate for the DE group is significantly lower than for the Non-DE group.

| Table 130: Number of conviction per 100 licensed driver years (adjusted conviction rate) by gender among DE and Non-DE teen drivers (since issued a provisional instruction permit) by driver experience (in months) using Oregon DMV convictions data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Gender** | **DE** | **Non-DE** | **p-value** |
| **Male** | 12.3 | 25.7 | p<0.01 |
| **Female** | 7.5 | 13.0 | p<0.01 |

Analyses were conducted comparing the adjusted conviction rates of teens who have taken driver education and teens who have not taken driver education from the date they were issued their provisional license until the extraction date (tracking period) – see Table 131.

Results reveal that in each of the six-month time blocks, DE teens have a significantly lower adjusted per-driver conviction rate compared to the Non-DE group. For example, in the first six months of driving, the DE group had a conviction rate of 10.7, compared to 22.3 for the Non-DE group. Note that there were no recorded convictions for the DE group in the 43-48 months and 49-54 months exposure time blocks, so tests of significance between the DE group and Non-DE group for these time periods could not be calculated independently. Overall, it was found that the conviction rate for the tracking period of the DE group was significantly lower (15.6) than that of the Non-DE group (29.3; p<0.01).

| Table 131: Number of conviction per 100 licensed driver years (adjusted conviction rate) among DE and Non-DE teen drivers (since issued a provisional license) by driver experience (in months) using Oregon DMV driver record data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Months since issued provisional license** | **DE** | **Non-DE** | **p-value** |
| **0-6 months** | 10.7 | 22.3 | p<0.01 |
| **7-12 months** | 13.9 | 25.8 | p<0.01 |
| **13-18 months** | 15.7 | 27.4 | p<0.01 |
| **19-24 months** | 19.4 | 30.9 | p<0.01 |
| **25-30 months** | 19.0 | 31.2 | p<0.01 |
| **31-36 months** | 18.6 | 30.3 | p<0.01 |
| **37-42 months** | 13.4 | 27.0 | p<0.01 |
| **43-48 months** | 0.0 | 22.7 | p=n/a |
| **49-54 months** | 0.0 | 10.2 | p=n/a |
| **Tracking period** | 15.6 | 29.3 | p<0.01 |
| **Total number of convictions** | 5,799 | 41,384 | |

Table 132 shows the adjusted per-driver conviction rates for DE and Non-DE teens since being issued a provisional license over the tracking period – age reflects when the license was obtained. As can be seen, the conviction rate for DE teens is significantly lower among teens who were issued their provisional license at the age of 16 compared to Non-DE teens of the same age group. A significant difference between the DE and Non-DE group was also found for teens issued their provisional license at the age of 17.

| Table 132: Number of convictions per 100 licensed driver years (adjusted conviction rate) by age among DE and Non-DE teen drivers (since issued a provisional license) by driver experience (in months) using Oregon DMV driver record data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Age when issued provisional license** | **DE** | **Non-DE** | **p-value** |
| **16** | 13.9 | 24.4 | p<0.01 |
| **17** | 21.6 | 40.3 | p<0.01 |

With respect to gender, Table 133 reveals that among males, the conviction rate of the DE group is significantly lower than the Non-DE group. This was also the case for females comparing the DE group and Non-DE group.

| Table 133: Number of convictions per 100 licensed driver years (adjusted conviction rate) by gender among DE and Non-DE teen drivers (since issued a provisional license) by driver experience (in months) using Oregon DMV driver record data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Gender** | **DE** | **Non-DE** | **p-value** |
| **Male** | 19.6 | 38.4 | p<0.01 |
| **Female** | 11.9 | 19.6 | p<0.01 |

Analyses were conducted to examine conviction rates of DE and Non-DE teens for the length of time that the provisional license restrictions remained in effect. Conviction rates were examined from the date the teens were issued their provisional license until one year after the provisional license issuance date if still under the age of 18; or if they turned 18 before the one year of restrictions were lifted; or from the provisional license issuance date until the extraction date if the provisional license was held for less than a year. Thus, the maximum amount of time that a teen may hold a provisional license is 12 months (tracking period).

Table 134 reveals that in every three-month block after being issued a provisional license while the provisional license restrictions remain in effect, the conviction rate for the DE group is significantly lower than that of the Non-DE group. For example after four-six months of driving, the rates for the DE group (12.4) are lower than those of the Non-DE group (27.8), and this difference was significant ($p<0.01$). Overall, when looking at the entire provisional license tracking period, the DE group has a significantly lower conviction rate than the Non-DE group (13.5 versus 27.7, respectively; $p<0.01$).

| Table 134: Number of convictions per 100 licensed driver years (adjusted conviction rate) among DE and Non-DE teen drivers (while provisional license restrictions in effect) by driver experience (in months) using Oregon DMV driver record data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Months provisional license restrictions in effect** | **DE** | **Non-DE** | **p-value** |
| **0-3 months** | 11.1 | 23.5 | p<0.01 |
| **4-6 months** | 12.4 | 27.8 | p<0.01 |
| **7-9 months** | 14.1 | 29.0 | p<0.01 |
| **10-12 months** | 17.0 | 31.6 | p<0.01 |
| **Tracking period** | 13.5 | 27.7 | p<0.01 |
| **Total number of convictions** | 2,314 | 15,257 | |

Table 135 shows the adjusted per-driver conviction rates for DE and Non-DE teens while provisional license restrictions are in effect – age reflects when the license was obtained. As can be seen, for teens who were issued their provisional license at the age of 16, the DE group had a significantly lower conviction rate compared to the Non-DE group. Similar results were found for teens issued their provisional license at the age of 17.

| Table 135: Number of convictions per 100 licensed driver years (adjusted conviction rate) by age among DE and Non-DE teen drivers (while provisional license restrictions in effect) by driver experience (in months) using Oregon DMV driver record data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Age provisional license restrictions in effect** | **DE** | **Non-DE** | **p-value** |
| **16** | 12.4 | 25.8 | p<0.01 |
| **17** | 23.8 | 51.7 | p<0.01 |

Results for gender (see Table 136) indicate that among males, the DE group has a significantly lower conviction rate than the Non-DE group. Similar results were found among females, although not as large a difference, since the DE group had a significantly lower conviction rate compared to the Non-DE group.

| Table 136: Number of convictions per 100 licensed driver years (adjusted conviction rate) by gender among DE and Non-DE teen drivers (while provisional license restrictions in effect) by driver experience (in months) using Oregon DMV driver record data, and p-value of two-sample test of proportion | | | |
|---|---|---|---|
| **Gender provisional license restrictions in effect** | **DE** | **Non-DE** | **p-value** |
| **Male** | 19.4 | 46.6 | p<0.01 |
| **Female** | 11.2 | 20.9 | p<0.01 |

Poisson regression was employed to examine the convictions from the date the teens were issued their provisional license until the extraction date (September 17, 2009) using various independent variables, including driver education status (DE vs. Non-DE), gender, age when issued provisional license, residence in an urban or rural setting, and the length of time a provisional instruction permit was held (in months). The length of time from the provisional license date of issuance to the extraction date was used as an exposure variable.

As shown in Table 137, having completed a driver education course significantly decreases the expected number of convictions, by 39.3 percent ($p<0.01$). Results also revealed that being male increases the expected number of convictions by 88.1 percent ($p<0.01$). With regard to age, being one year older (17 vs. 16 years of age) also significantly increases the expected number of convictions, by 64.6 percent ($p<0.00$). Residing in an urban area does not significantly increase the expected number of convictions at the .05 level. It was also found that an increase of one month in the length of time under a provisional instruction permit results in a decrease of 4.0 percent in the expected number of convictions. If this is re-scaled to an increase of six months, the percentage decrease in expected convictions is 21.7 percent.

**Table 137: Results from Poisson analysis of convictions since issued provisional license**

| Dependent variable: conviction count since issued provisional license | | | | |
|---|---|---|---|---|
| **Variable** | **Coefficient** | **p-value** | **%-change** | **%SD** |
| **DE status** | -0.499 | p<0.01 | -39.3% | -18.7% |
| **Gender** | 0.632 | p<0.01 | 88.1% | 37.1% |
| **Age** | 0.498 | p<0.01 | 64.6% | 25.7% |
| **Urban** | 0.017 | p=0.07 | 1.7% | 0.8% |
| **PIP length (in months)** | -0.041 | p<0.01 | -4.0% | -17.4% |

*%-change indicates the percent change in expected conviction count for a unit increase in the independent variable; %SD indicates the percent change in expected conviction count for a standard deviation increase in independent variables.*

### *Summary*

Results of bivariate analyses showed that DE teens had lower adjusted collision and conviction rates over the tracking period, and for collisions, this was especially the case for teens issued a provisional instruction permit at age 15 and for both genders. Lower adjusted collision rates were more apparent within the first two years of driving. In regard to convictions, DE teens had lower rates than Non-DE teens overall, for all of the time blocks, and for younger and older teens as well as for both males and females.

Poisson regression was employed to determine if driver education was still associated with a lower incidence of collisions and convictions taking into account other factors, including age, gender, length of time with a provisional instruction permit, and place of residence (urban versus rural), and including length of time since being issued a provisional license as an exposure variable. In regard to collision counts, results showed that having completed the ODOT-approved driver education course does significantly decrease the expected number of collisions at the 0.05 level. This suggests that driver education significantly decreases the expected number of collisions, by 4.3 percent. In regard to conviction counts, having completed a driver education course significantly decreases the expected number of convictions, by 39.3 percent ($p<0.01$).

## Safety Performance: The Influence of Confounding Factors

The two studies on DE safety effects discussed in the previous sections produced mixed results: one study focusing on a small sample of survey participants suggested that driver education was not associated with fewer collisions, convictions, and suspensions; the second one focusing on a much larger state-wide sample suggests that driver education was associated with fewer collisions and convictions. Due to the small sample size in the first study, the teen survey participants may not have been representative of all teen drivers in the state with respect to crash involvement. This may be especially the case because the teen drivers in the small sample who had completed driver education had nearly double the adjusted crash rate of those in the larger sample. Although the larger sample of teen drivers produced results suggesting a positive effect of driver education on collisions and convictions, only a few factors could be controlled in the analyses.

To address whether the relationship between collisions/convictions and driver education may have been biased because important teen attributes derived from the survey in the first study were omitted from the regression models for the larger sample in the second study, sensitivity analyses were conducted. For the small sample of teen drivers, this involved examining three models:

Model 1: crash involvement, adjusted for time since issuance of provisional license only, with DE status.

Model 2: crash involvement with DE, age, sex, urban/rural, length of time on provisional license, and length of time on provisional instruction permit (all variables controlled in the regression model used with the larger sample).

Model 3: crash involvement with Model 2 variables and all the other questionnaire-based variables, which were not available for the larger sample.

For more direct comparison, the models for the larger sample were restricted to 24 months since being issued a provisional license, which was more comparable to the tracking period for the smaller sample of teen drivers. The analyses with the larger sample involved producing Model 1 and Model 2, as described above.

Table 138 and Table 139 show the results of the models for collisions and for convictions. The results show that controlling versus not controlling for the variables in the questionnaire does not cause the coefficient of DE to change much. As can be seen in the tables, any results regarding DE that were significant remain significant after controlling for additional sets of variables, and any results regarding DE that were not significant remain non-significant after controlling for additional sets of variables, both for models using collisions as well as convictions.

In addition to considering potential changes to levels of significance when comparing models with and without control variables, it can be argued that for those models with significant effects, coefficients for DE should be compared to see if they differ from one another. For example, in Table 138 the state-wide retrospective restricted results for collisions show that the coefficient for DE is significant both in the model with and without control variables. The question, then, is whether coefficients for DE are different between both models, i.e., is 0.935 (s.e.=0.020) different from 0.957 (s.e.=0.021)? Both statistical significance as well as the actual magnitude of the effect are important in this regard. It is perhaps not surprising that both coefficients turned out to be significantly different (Chi-square=42.01; df=1; p<0.0001) given the large sample size of these state-wide retrospective analyses (n=94,117). More importantly, the actual magnitude of the difference between both coefficients is nominal, one suggesting there is a 6.5 percent reduction in collisions, whereas the other one suggests a 4.3 percent reduction. Essentially, this means there is no meaningful difference between the two models.

Similar conclusions can be drawn about all models in that levels of significance of coefficients for DE do not change, and when results are significant, no meaningful differences regarding magnitude or direction of effects are found between DE coefficients from models with or without control variables.

This suggests that controlling for all those questionnaire-based variables might not be too important to draw inferences about the safety performance of the Oregon driver education program. Thus, there is some limited evidence suggesting that the results from the simple retrospective analysis using the larger sample probably are not biased by not controlling for these other potentially confounding variables. Of course, other factors associated with self-selection not controlled in the analysis may also influence the relationship between driver education and safety performance.

The additional analysis also revealed two other important findings. First, as previously discussed in the results section for the first study, Table 108 showed that the adjusted crash rates (per 100 licensed driver years) for the DE and Non-DE groups were 17.8 and 12.6, a statistically significant difference, with p = 0.02. These results suggest that the DE group had a significantly higher adjusted-collision rate than the Non-DE group based on a test of different proportions. However, the logistic regression showed in Table 138 above estimates that the covariate DE is not statistically significant (p-value=0.107, 0.086 and 0.105, respectively) to predict the occurrence of crashes. These non-significant differences between the DE and Non-DE groups from this more sophisticated logistic regression model suggest that driver education is not associated with higher collision involvement.

| Table 138: Influence of Confounding Factors on Collisions | | | | | | |
|---|---|---|---|---|---|---|
| **Samples** | **Potential confounders in model for COLLISIONS** | **OR/RR (for DE)** | **SE(OR)** | **p-value** | **coefficient** | **%** |
| **Study Subjects** | None | 1.5236/ 1.5066 | .3982744 | 0.107 | 0.42108 | 52.4 |
| | Age, Sex, Urban, PIP length | 1.5860 / 1.5662 | .4264788 | 0.086 | 0.46122 | 58.6 |
| | Age, Sex, Urban, PIP length, NDS variables | 1.74, 1.8256/ 1.7963 | .5956708 | 0.105 | 0.55473 | 74.1 |
| | | **IRR (for DE)** | **SE(IRR)** | | | |
| **State-wide Retrospective** | None | .9346088 | .0200187 | 0.002 | -.0676272 | -6.5 |
| | Age, Sex, Urban, PIP length | .9574815 | .0208123 | 0.046 | -0.04345 | -4.3 |
| **State-wide Retrospective Restricted (24 months)** | None | .8971727 | .020805 | <0.001 | -0.10851 | -10.3 |
| | Age, Sex, Urban, PIP length | .9170248 | .0215365 | <0.001 | -0.08662 | -8.3 |

*OR: odds ratio, RR: risk rate; SE: standard error; IRR: incidence rate ratio*

| Table 139: Influence of Confounding Factors on Convictions | | | | | | |
|---|---|---|---|---|---|---|
| **Samples** | **Potential confounders in model for CONVICTIONS** | **OR/RR (for DE)** | **SE(OR)** | **p-value** | **coefficient** | **%** |
| **Study Subjects** | None | 0.7288/ 0.7330 | .2453852 | 0.347 | -0.31641 | -27.1 |
| | Age, Sex, Urban, PIP length | 1.0326/ 1.0319 | .3604287 | 0.927 | 0.03206 | 3.3 |
| | Age, Sex, Urban, PIP length, NDS variables | 1.33, 1.2834/ 1.2770 | .5962632 | 0.531 | 0.28175 | 32.5 |
| | | **IRR (for DE)** | **SE(IRR)** | | | |
| **State-wide Retrospective** | None | .5334959 | .5334959 | <0.001 | -.6283038 | -46.7 |
| | Age, Sex, Urban, PIP length | .607047 | .0086182 | <0.001 | -.4991491 | -39.3 |
| **Whole State Retrospective Restricted (24 months)** | None | .5462046 | .0088163 | <0.001 | -0.60476 | -45.4 |
| | Age, Sex, Urban, PIP length | .618501 | .0100977 | <0.001 | -0.48046 | -38.1 |

*OR: odds ratio, RR: risk rate; SE: standard error; IRR: incidence rate ratio*

The second important finding is that the additional regression models for the larger sample of state-wide teen drivers show that when the analysis is restricted to 24 months since obtaining a provisional license, rather than the entire 54-month tracking period, the percent reduction is almost doubled – from 4.3 to 8.3 – which means that having completed a driver education course significantly decreases the expected number of collisions, by 8.3 percent ($p<0.001$). Thus, the positive effects of driver education on collisions, after controlling for key variables, are greater several months to 24 months following obtaining a provisional license than over a longer period of time, although benefits are still apparent after 54 months. If driver education has a positive effect on collisions, it would be expected to be apparent shortly after graduation and then dissipate over time as other factors influence driving behaviors and potentially overwhelm DE effects, and these results are consistent with this expectation.

## Summary and Discussion

The driver education program evaluated in Oregon in this investigation is administered by the Transportation Safety Department of ODOT, and this program is available through both public and private providers. Approximately 30 percent of teen drivers complete the ODOT-approved driver education program.

The primary objective of this part of the investigation was to determine the extent to which the ODOT-approved driver education program influences student outcomes measured in terms of knowledge, attitudes, skills, and behaviors, all factors relevant to driving safely and collision involvement. In doing so, it was also possible to examine the extent to which there were pre-existing differences between DE teens and Non-DE teens in terms of person-centered attributes and characteristics, also factors associated with collision involvement – e.g., age, gender, risk taking attitudes, and behaviors. Major differences in teen attributes between these two groups would support the concern in previous studies about the problem of self-selection biases – teens who choose to take or not take driver education are likely different in ways related to crash involvement.

This part of the investigation also focused on the safety performance of DE and Non-DE teens who participated in the survey in terms of how they did on the license tests, as well as whether they differed on collisions, convictions, and license suspensions. A related study examined the collisions and convictions of a much larger population of Oregon teens who had and had not completed the ODOT-approved driver education program.

### *New Driver Surveys: Waves 1 and 2 Results*

As can be seen in Table 140, the baseline comparisons using bivariate analyses revealed that Oregon teens who had taken the ODOT-approved driver education program were similar to those who had not taken it on many of the factors investigated. Important differences, however, were apparent on several factors, including age, gender, race, grade level, place of residence (rural versus urban), parent education, support for GDL, self-rated skills, lifestyle, and driving exposure.

Further multivariate analysis using logistic regression to determine which of the factors had a significant effect on DE status controlling for other factors revealed the importance of age, gender, race, place of residence, father's education, GDL support for specific requirements, self-rated driving skills, and having driven in the past three months. No other variables in the model were found to have significant effects. The same model was also run for males and females, separately, and the pattern of results was slightly different. For example, having reported being Hispanic or Latino significantly decreases the likelihood of being in the DE group for females but not for males.

**Table 140: Summary Survey Results: Baseline Comparisons (DE vs. others)**

| Factors | Bivariate Analysis | Logistic Regression |
|---|---|---|
| Mean Age | Younger | Younger |
| Gender | Male | More likely male |
| Race | White | Less likely Hispanic/Latino |
| Grade level | Grade 10 | Not examined |
| Place of residence | Urban residence | Urban residence |
| Father education | Higher Education | Higher Education |
| GDL Knowledge | No difference | No effect |
| GDL Overall Support | Higher support | No effect |
| GDL Support-Specific | Higher support | Higher support |
| GDL Influence | Higher influence | No effect |
| Safe Driving Knowledge | No difference | No effect |
| Self-rate Skills | Less skills | Less skills |
| Perceived Likelihood of Crash | No difference | No effect |
| Risk Taking Behavior | No difference | No effect |
| Risky Driving Behaviors | No difference | No effect |
| Risky Driving Attitude | No difference | No effect |
| Risk Taking Attitude | No difference | No effect |
| Lifestyle | Less positive | No effect |
| Tolerance of Deviance | No difference | No effect |
| Parental Monitoring | No difference | No effect |
| Exposure | Less exposure | Less exposure |
| Time Perspective | No difference | No effect |
| Responsibility When Driving | No difference | No effect |

This pattern of results suggests that the DE and Non-DE group differed at baseline on demographic variables – e.g., age, gender, and race – as well as self-reported skills, but they were similar on factors related to safe driving knowledge and attitudes.

The longitudinal comparisons provided further insights into this issue of pre-existing differences as well as on whether being exposed to driver education is associated with changes in such things as safe driving knowledge and attitudes, relative to any changes that occurred in the group not exposed to driver education. As can be seen in Table 141, the key findings from these analyses were that the ODOT-approved driver education program was associated with increases in knowledge about the GDL program and safe driving issues, greater self-reported driving skills, and more driving exposure. Exposure to the driver education program did not appear to be associated with changes in any other factors, compared to changes in the group that had not completed this program from the first and second administration of the survey.

**Table 141: Summary Survey Results: Wave 1 & 2 Comparisons**

| Factors | Paired | Independent |
|---|---|---|
| GDL Knowledge | Greater knowledge | Greater knowledge wave 2 |
| GDL Overall Support | No change | No difference waves 1 & 2 |
| GDL Support-Specific | No change | Greater support wave 2 |
| GDL Influence | No change | No difference waves 1 & 2 |
| Safe Driving Knowledge | Higher knowledge | Higher knowledge wave 2 |
| Self-rate Skills | Greater skills | Lower skills wave 1 |
| Perceived Likelihood of Crash | No change | Higher in waves 1 & 2 |
| Risk Taking Behavior | No change | No differences waves 1& 2 |
| Risky Driving Behaviors | No change | No differences waves 1 & 2 |
| Risky Driving Attitude | No change | No differences in waves 1 & 2 |
| Risk Taking Attitude | No change | No difference waves 1 & 2 |
| Lifestyle | No change | No difference waves 1 & 2 |
| Tolerance of Deviance | No change | No differences wave 1 & 2 |
| Parental Monitoring | No change | No difference waves 1 & 2 |
| Exposure | Increased exposure | Lower exposure wave 1 |
| Time Perspective | No change | No difference waves 1 & 2 |
| Responsibility When Driving | No change | Less planning wave 2 |

A further review of the table reveals that the Oregon DE group differed from the Non-DE group on some of the factors when comparing their responses in Wave 1 as well as in Wave 2 – e.g., the DE group was more informed about both GDL and safe driving than the Non-DE group in Wave 2. However, when teen drivers are exposed to the ODOT-approved driver education program, there is still a relatively low level of GDL and safe driving knowledge. This could be because they are not retaining knowledge taught in the program, or the program does not effectively cover all important knowledge items.

### *Safety Performance: Survey Participants*

This part of the overall investigation examined the safety performance of the ODOT-approved driver education program, defined in terms of license test attempts, collisions, convictions, and suspensions. Results revealed that more teens that completed the ODOT-approved driver education program passed the safe driving knowledge test and the road test on their first attempt than is the case for teens who had not completed this program. However, further multivariate analysis suggests that driver education status was not associated with the number of road test attempts after controlling for other variables. The results are also consistent with previous evaluations which consistently report that driver education fails to reduce collisions, convictions, and suspensions. Although the comparison of adjusted collision rates suggested that, overall, the DE group had higher collision rates than the Non-DE group, logistic regression analysis controlling for other independent variables revealed that DE status was not associated with collision involvement. Additional logistic regression analyses also revealed that DE status was not associated with having had a conviction or a license suspension.

Given these findings, it may be the case, as others have concluded, that it is "unrealistic" to expect that driver education as now constituted, by itself will improve safety performance measured in terms of fewer collisions, convictions, and suspensions (Williams et al. 2009; Thomas et al. 2012). Such a conclusion, however, may not be warranted based on these finding because of study limitations. The sample of teen survey participants was small, less than 5,000 teen drivers, and relatively few of them had collisions. In this regard Peck (2010), in a recent review of the literature on the effectiveness of driver education, had shown that as many as 35,000 drivers would be required in a two group design to reliably detect a 10 percent reduction in crashes. The fact that the collision data of the teen survey participants did not fit a Poisson distribution, which is typically the case with count data of uncommon or rare events such as collisions, also suggests that this sample of teens may not have been representative with respect to crash involvement. This may be the case even though the sample was the population of all teens obtaining a provisional instruction permit over the study period and there was a very high response rate, with over 40 percent of these teens participating in the survey. It is also possible that although the regression analysis controlled for key teen attributes, there were unknown biases because other pre-existing factors that differentiate DE from Non-DE teens and influence collision involvement were not included in the model.

It is possible that if this study had used a larger sample of teen drivers, tracked their driver record over a longer period of time, and collected self-reported collisions rather than relying on less-frequently reported collisions from official records, the results might have been different. Although the original research design had proposed a longer tracking period as well as capturing self-reported data on collisions, both practical and cost constraints precluded doing so, and these are now important limitations of this study, which should be the focus of follow-up research.

### *Safety Performance: Historical Records*

To address some of the limitations mentioned above, this study did use a much larger population of Oregon teen drivers and a retrospective design to examine the safety performance of the ODOT-approved driver education program. This study found that this program has safety-related benefits, in terms of being associated with lower incidences of collisions and convictions. This investigation also took into account important self-selection factors by controlling for age, gender, driving exposure, and place of residence (urban/rural). These are all factors shown in this current study to differentiate between teens who voluntarily take the ODOT-approved driver education program and those that do not. However, the related study used only official records, so it was not possible to control for other pre-existing factors that could potentially account for differences in the collisions of DE and Non-DE teens.

### *Safety Performance: The Influence of Confounding Factors*

Sensitivity analyses were conducted using the smaller sample of teen survey participants and the larger sample of state-wide teen drivers to determine whether the relationship between collisions/convictions and driver education observed for the larger sample may have been biased because important teen attributes derived from the survey were omitted from the regression models for the larger sample. The results suggest that controlling for all those questionnaire-based variables might not be too important to draw inferences about the safety performance of driver education. Thus, there is some limited evidence suggesting that the results from the simple retrospective analysis using the larger sample probably are not biased by not controlling for these other potentially confounding variables. Of course, other factors associated with self-selection not controlled in the analysis may also influence the relationship between driver education and safety performance.

Finally, the additional analyses also suggest that the positive effects of driver education on collisions, after controlling for key variables in the larger sample, are greater several months to 24 months following obtaining a provisional license than over a longer period of time, although benefits are still apparent over a 54-month period.

# Discussion and Implications

## Discussion

The overall investigation involves a multi-site, multi-level evaluation of beginner driver education programs in the United States (Oregon) and Canada (Manitoba). The driver education program evaluated in Manitoba is delivered by Manitoba Public Insurance (MPI), and this program is available to high school students in nearly all areas of the province, with the exception of remote areas. Indeed, one of the major challenges for the studies in Manitoba was to recruit teen participants who either did not intend to take, or did not take, the MPI High School Driver Education program, because it is so widespread, available at low cost, and popular. The driver education program evaluated in Oregon is administered by the Transportation Safety Division of Oregon's Department of Transportation, and this program is available through both public and private providers. Unlike the situation in Manitoba, where most teens complete the MPI HSDE program, about 30 percent of Oregon teen drivers complete the ODOT-approved DE program.

Although the Manitoba and Oregon DE programs have important differences in terms of administration, content features, and delivery methods, they are similar to traditional driver education programs in that they both offer about 30 hours in-class education and six to eight hours of in-car instruction. They are delivered in a single stage, before teens are licensed to drive independently, and although they have introduced some improvements over traditional teaching methods, they use little or no interactive electronic instructional technology. These programs, while similar in form to those in most other North American jurisdictions, do not meet the standards that most experts now think must be met for driver education to achieve its potential positive safety effects.

This investigation evaluated the MPI HSDE and the ODOT-approved DE program to demonstrate more comprehensive evaluation and showcase how evaluation might better support program development in driver education. The project was not intended to provide the definitive answer to the question of whether driver education, in its current common forms "works" or if it could "work" in some future form. The primary objectives of the project were to:

- generate new knowledge about the safety and operational effectiveness of driver education;
- provide new information about how to improve the delivery and content of driver education to enhance its safety impact;
- demonstrate implementation of the AAA Foundation's *Comprehensive Guidelines* for evaluating driver education; and,
- showcase more effective and constructive methods to evaluate driver education.

These were ambitious objectives and there were significant challenges in fully addressing each of them over the course of this study. All four of these objectives, however, have been met to a greater or lesser extent.

First, the multiple studies in the project have generated new knowledge about the safety and operational effectiveness of the driver education programs in both Manitoba and Oregon. The primary focus has been to determine whether these programs influence student outcomes, measured in terms of knowledge, attitudes, skills, and behaviors, all of which are factors relevant to safe driving and collision involvement. In doing so, it was possible to examine pre-existing differences and the extent to which DE teens differ from Non-DE teens in terms of person-centered attributes and characteristics that also are factors associated with collision involvement (e.g., age, gender, risk taking attitudes and behaviors, lifestyle factors). Studies examined the effectiveness of the MPI HSDE program and the ODOT-approved DE program in terms of license test performance and, in Oregon, also in terms of collisions, convictions, and suspensions.

Second, this research was intended to provide new information useful to improving the delivery and content of driver education to enhance its safety impact. It was not possible in Manitoba and Oregon, however, to conduct detailed formative or process evaluations as part of this project. Consequently, results on the safety and operational effectiveness of driver education could not be directly linked to the content and delivery of the MPI or ODOT driver education programs. The results emerging from this investigation, however, provided some insights into needs for improving the driver education programs in Manitoba and Oregon, as well as driver education programs delivered in other jurisdictions in Canada, the United States, and elsewhere.

Third, this investigation relied on the AAA Foundation's *Comprehensive Guidelines* for evaluating driver education and, in particular, demonstrated the importance of examining intermediate measures such as safe driving knowledge, skills, and attitudes, and not just focusing on safety outcomes such as collision reductions. The thrust of the Guidelines was to help driver education evaluation research become more sophisticated and comprehensive so that it could play a constructive role in making DE more effective. One of the goals of the present study was to demonstrate some aspects of a more comprehensive, constructive approach to evaluation in this field.

Finally, the investigation employed more effective and constructive methods to evaluate driver education than has typically been the case in the past. Previous evaluations of driver education have been fraught with methodological issues which often threaten the veracity of the findings in relation to the safety benefits of driver education. This investigation attempted to improve on previous evaluation efforts and to learn from its own challenges so that evaluations in the future can be strengthened to provide better clarity regarding the current results of driver education and directions for improvement. In doing so, insights were generated for future evaluations of driver education and management of driver education programs.

### *Key Findings*

Pre-existing Factors: Baseline Survey Comparisons: Results about pre-existing factors were generally similar in Manitoba and Oregon, suggesting that even though teens volunteer to take driver education in both jurisdictions, DE and Non-DE teens do not differ in relation to many personal attributes or factors related to safety knowledge, attitudes, skills, and behaviors before some of them are exposed to driver education. Some differences, however, emerged from the analyses. In Manitoba, the DE group compared to the Non-DE group was younger, expressed greater support for GDL overall, scored higher on risky attitudes (i.e., were more accepting of taking risks), and was less tolerant of deviant behavior. In Oregon, baseline comparisons included a similar set of factors to those examined in Manitoba, as well as a wider range of teen attributes not measured in Manitoba – i.e., race, urban/rural residence, parents' education. Baseline survey results in Oregon showed that the DE group compared to the Non-DE group was younger, more likely male, less likely Hispanic/Latino, from an urban residence, had higher support for GDL features, and reported less driving skills and driving. Other than these few differences, no other variables in the regression models used in the Manitoba and Oregon multivariate analyses had a significant effect on DE status.

Changes in Student Outcomes: Taken together, the survey findings across the studies in this investigation are suggestive of some positive but modest influences of driver education. Key findings that emerged from the Manitoba study suggested that exposure to the MPI HSDE program was associated with greater self-reported driving skills, and less risk taking behaviors, after controlling for age and gender. As well, the survey of teen drivers several months after they passed their road test suggested that those in the MPI HSDE program, in comparison to the Non-DE group, had slightly greater safe driving knowledge scores, rated their driving skills higher, and estimated they took fewer trips and spent less time driving.

In Oregon, from the first wave of the survey to the second, the results suggest that after controlling for age and gender, the ODOT-approved driver education program was associated with increases in knowledge about the GDL program and safe driving practices, greater self-reported driving skills, and more driving exposure.

Completion of these driver education programs in Manitoba and Oregon did not appear to be associated with changes in any other factors measured in the surveys, compared to changes in the group that had not completed these programs.

Increases in knowledge, both in terms of the GDL program and safe driving issues, were greater for teens in the ODOT-approved DE program compared to the MPI HSDE program. Of course, in the case of the MPI HSDE program, it is possible that because this program is so widely available, Non-DE teens may be accessing MPI driver education materials from other sources such as family, friends, or MPI websites. It is also possible, albeit unproven, that program content and delivery are better in Oregon than in Manitoba. The Oregon program has recently undergone an expert panel assessment relative to the U.S. Novice Teen Driver Education and Training Administration Standards. Their program content and delivery were assessed as being reasonable, but neither a similar assessment nor other formative evaluation results are available for the MPI HSDE program, and direct comparisons are not possible.

Notwithstanding the positive findings on knowledge gains associated with the ODOT-approved driver education program, there is still a relatively low level of knowledge among teen drivers completing these programs in both jurisdictions. This could be because DE teens are not retaining knowledge taught in these programs, or the programs do not effectively cover knowledge items identified in this investigation by an expert panel as being important for teen drivers to learn in driver education programs.

Participation in the Manitoba and Oregon DE programs was associated with greater self-reported driving skills. Given that an essential objective of driver education is to teach teens how to drive, this finding suggests these programs may be effective in doing so, at least based on the subjective rating of teen drivers completing the program compared to those that have not. In regard to better driving skills, Manitoba results based on a simulated drive test suggest a short-term training effect on skill performance of the MPI HSDE program: Learner drivers who had recently completed the MPI HSDE program generally performed better on the simulated drive test than learner drivers who had not taken the MPI program. However, these results were based on small samples and did not find an overall effect of driver education on skill performance once the influence of driving experience, as measured by license status, was taken into account. The results also do not support a longer-term training effect on skill performance, because HSDE new drivers did not perform better on the simulated drive test than Non-DE new drivers.

In terms of hazard anticipation skills during the simulated drive test, the pattern of results also suggest that the MPI HSDE program may have had a positive influence (i.e., for the HSDE group, hazard anticipation skills improved with license status, which presumably is a proxy measure for increased driving experience). HSDE learner drivers performed better on hazard perception than HSDE pre-drivers, and HSDE new drivers performed best. This conclusion, however, needs to be interpreted cautiously, because statistically significant differences in the percent of hazards the driver failed to identify were not found between the Non-DE and HSDE groups at any license status level. This suggests that other factors besides, or in combination with, driver education may have played a role in these improvements for the HSDE group. Group comparisons should also be interpreted cautiously, especially involving the non-HSDE new driver group, because of the very small number of subjects (n=4). It should also be noted that although hazard anticipation skills improved for the HSDE group, they still failed to identify 60 percent of hazards on the simulated drive test, even though they had completed the HSDE program.

Safety Effectiveness: The safety effectiveness of the MPI HSDE program and the ODOT-approved DE program was initially assessed in terms of performance on the license tests. Since license tests, especially the road test, are administered to determine whether license applicants meet the minimum standards for safe driving and qualify for a license to drive independently, the expectation is that those teen drivers completing driver education should perform better on the test(s) than teens who have not taken driver education.

The findings regarding performance on the Manitoba driver license road test showed no significant difference in the pass rates of the MPI HSDE and Non-DE groups, although the MPI HSDE group did have better test scores, both among those who passed and failed the test. This finding may indicate some positive effect of the MPI HSDE program on some aspects of driving skills. However, given that research elsewhere has suggested that road test measures are not well developed psychometrically, and test reliability and validity are questionable or unknown (Haire et al. 2011), further investigation is warranted. Despite this caveat, MPI HSDE teen drivers with an Intermediate license still showed a significantly higher rating of their self-reported driving skills, which might suggest they overestimate their actual skill level.

Although the overall pass rate on the road test in Oregon is much higher than in Manitoba, the results for Oregon were generally similar to those for Manitoba. Multivariate analyses revealed that teen drivers who had completed the ODOT-approved DE program did not have higher pass rates than those that had not completed it after taking into account the effects of other variables – i.e., driver education status was not associated with the number of road test attempts.

The safety effectiveness of the ODOT-approved DE program was also evaluated in terms of collisions, suspensions, and convictions. Several recent studies in Oregon are suggestive and show potentially promising findings for the safety effectiveness of driver education (Hartos 2006; Raymond et. al. 2007). Raymond et al., however, cautioned that: "it is not possible to determine if the better outcomes are a result of the ODOT-approved training courses, or if they are due to selection bias." This current investigation attempted to overcome some of the methodological difficulties encountered by Raymond et al. to determine the safety effectiveness of the ODOT-approved driver education program. Principal among these difficulties was the use of parental certification of driver education completion versus 100 hours of practice to determine driver education status and group assignment. This could have resulted in teens being assigned to the 100 hours of practice group even though they had completed the ODOT-approved driver education program, thereby confounding the analyses. In this current investigation, completion of the ODOT-approved driver education program was determined by using the official records of program completion maintained by the Transportation Safety Division, the agency responsible for this program.

Some attention was also given to overcoming the issue of self-selection bias by taking into account demographic factors, such as age and gender, as well as other factors related to driving exposure and practice, and place of residence. Further efforts to control for self-selection biases included surveying teens to gather person-centered information – e.g., attitudes towards risk-taking and risky driving, and the level of safe driving knowledge.

Two independent studies were conducted as part of this investigation to determine whether the ODOT-approved DE program was associated with reductions in collisions, convictions, and suspensions. The first study focused on the safety performance of the DE and Non-DE teen drivers who participated in the baseline survey by examining their collisions, convictions, and suspensions after they obtained a provisional license and were driving independently for a few months. An examination of collision rates, adjusted for months licensed, suggested that DE teens either have significantly higher rates than Non-DE teen drivers, or that for some of the comparisons there were no differences in the collision involvement of both groups – e.g., for female teen drivers, the adjusted collision rate for the DE group was not significantly different than the crash rate for the Non-DE group. Further logistic regression analyses revealed, however, that after taking into account the influence of other factors, DE status was not found to have a significant effect on collision involvement. Logistic regression also showed that DE status was not associated with having had a conviction or a suspension.

The opportunity for the ODOT-approved driver education program to demonstrate a safety effect on collisions may have been compromised in this study for three reasons. First, some teens in the Non-DE group may have taken non-approved commercial driver education programs, but the number is unknown. It was not possible to identify them in this study sample. The inclusion of these teens in the Non-DE group may have had a downward influence on this groups' collision involvement, assuming driver education "per se" reduces collisions. Of some interest, the classic DeKalb study, which employed an experimental design in the evaluation of a high school driver education program, had the same problems related to identifying and maintaining groups of subjects even with random assignment (Lonero and Mayhew, 2010; Mayhew and Simpson, 1996; Stock et al, 1993). A comparison of teens completing ODOT-approved driver education with those completing a commercial driver education program and those receiving no formal training would have provided a better test of the safety effectiveness of the ODOT-approved program. This had been the intention of the original evaluation design of this investigation, but it was not possible because of practical and cost constraints.

Second, although efforts were taken in this study to adjust for driving exposure (months licensed), an important feature of the GDL program is that those teens choosing not to complete the ODOT-approved driver education program must certify completion of 100 hours of supervised driving to receive their provisional license, rather than the 50 hours for DE teens. This means that Non-DE teens may have on average 50 hours more supervised driving practice than DE teens, resulting in more experience and possibly safer driving habits. The bivariate analyses suggest that the Non-DE teens had more driving exposure than DE teens. If this is the case, there may be a safety benefit to having more supervised hours in lieu of the education component, because more driving exposure under supervision may be a protective factor. Alternatively, assuming that parents correctly certify the 100 hours of practice, this suggests that the ODOT-approved driver education is at least as effective as 50 additional hours of supervised practice, because DE status was not associated with collision involvement after controlling for pre-existing, self-selection factors.

Third, the sample size in this study was small, and initial power analyses had revealed that a relatively large difference in collision rates between the DE and Non-DE groups would have been needed to find a statistically significant effect of driver education. In fact, Peck (2010) argued that as many as 35,000 drivers would be required in a two group design to reliably detect a 10 percent reduction in crashes. The small sample of teens in this study may not have been representative with respect to collisions, even though this sample was the population of all teens obtaining a provisional instruction permit over the study period and there was a very high response rate (over 40%) in the survey.

In the second study, the safety impacts of the ODOT-approved DE program were evaluated using a much larger population of teen drivers – almost 95,000 teen drivers compared to only about 5,000 teen survey participants in the first study. A large sample size is almost always better than a small sample size because it provides a more adequate representation of the population of teen drivers who take and do not take driver education, especially in terms of their crash involvements, which are rare events. The primary disadvantage with this larger sample is that only limited information is available on teen attributes because of the reliance on official historical driver records.

Bivariate analyses showed that DE teen drivers had lower adjusted collision and conviction rates. Poisson regression analyses suggested that driver education was still associated with a lower incidence of collisions and convictions after taking into account other factors such as age, gender, driving exposure (months licensed), and place of residence (urban/rural). Driver education significantly decreases the expected number of collisions by 4.3 percent and the expected number of convictions by 39.3 percent.

These two studies have both strengths and limitations. The first one was based on a relatively small sample size but had a rich pool of information on teen driver attributes derived from both the survey and official records. The second was based on a much larger sample size but had limited information on teen driver attributes derived from only official sources. The results of additional sensitivity analyses, however, suggest that controlling for all the questionnaire-based variables might not be too important to draw inferences about the safety performance of driver education. Thus, there is some limited evidence suggesting that the results from the simple retrospective analysis using the larger sample probably are not biased by not controlling for these other potentially confounding variables.

On balance, the two studies using the small sample of teen survey participants and the larger state-wide sample of teen drivers suggest that at worst, the ODOT-approved driver education program is not associated with increased collision involvement. At best, it is associated with a significantly lower incidence of collisions, though other factors related to self-selection might still account for some or all of these differences in collisions and convictions, and not just having taken driver education. This suggests that the overall findings on the safety effects of driver education are either neutral or cautiously optimistic.

### *Implications*

The results of this investigation have implications both for driver education in Manitoba and Oregon as well as in other jurisdictions. The results also have important implications for evaluations of driver education programs that are well-established and where an experimental evaluation design with random assignment would not be feasible on practical, ethical, financial, or other grounds.

For Driver Education: There is some evidence that the MPI HSDE program and the ODOT-approved DE program were associated with positive changes in student outcomes, principally related to knowledge gains and improved driving skills. This research, for example, suggested that driver education, especially the program in Oregon, is imparting relevant information about graduated driver licensing. It is important to note, however, that there were practical limits to the amount of change that could be expected in knowledge about the licensing system since most of the students were still in the learner phase and a number of the questions dealt with the requirements in the intermediate or provisional stage – a stage that was not yet relevant to these students. However, driver education provides an appropriate "window" of opportunity to inform teens about the need for, and the features of, the GDL program, and more could be done in driver education to ensure teen drivers as well as their parents understand the GDL requirements as well as why it is important to comply with them.

The level of safe driving knowledge also improved among Oregon teen drivers completing the ODOT-approved program compared to those who had not, and it also appeared higher among the MPI HSDE group compared to the Non-DE group who had been driving independently for a few months. The level of safe driving knowledge, however, was still quite low even after completion of the driver education programs in both Manitoba and Oregon. It is also important to note that the knowledge questions in the New Driver Questionnaire had been refined during pilot testing to ensure that easy items were removed. Accordingly, the remaining knowledge items were relatively difficult, which might explain why so many items were answered incorrectly. At the same time, they represent aspects of safe driving that experts in the field believe are critical. The more serious weaknesses of the knowledge items were identified by an item-by-item analysis (e.g., items which 60%-70% of the students answered incorrectly), and this analysis is included in Appendices D for Manitoba and U for Oregon. This might facilitate a detailed review of the current curriculums and their delivery to identify areas that need to be strengthened. It is possible, for example, that key knowledge items need to be reinforced repeatedly to make more significant gains, and that more effective instructional technology should be employed.

Results across studies in Manitoba and Oregon showed that students exposed to driver education demonstrated a significant increase in self-rated skills, while the Non-DE group showed no such improvement. The higher self-rating of driving skills among DE teens reflects a potential safety benefit of these programs, to the extent that self-rated skill reflects actual skill. However, programs should review the extent to which they may also be generating an optimism bias of an unrealistic skill level that potentially has negative safety consequences – e.g., teens who take the program may think they are more skilled than they actually are because of exposure to the program. The simulated drive test results in Manitoba revealed only modest increases in observable driving skills among DE teens. Parents also need to understand the importance of practice driving with their teens to improve skill levels, even if the teen has successfully completed a driver education program. An important role that driver education could potentially play is to encourage and motivate parents to spend more time supervising during, and especially after, the program. This could include a follow-up component of the program with parents as part of a second stage program to reinforce lessons and behaviors.

Another implication of the Manitoba findings for driver education is that more focus should be specifically placed on training in hazard anticipation skills, because most MPI HSDE teens still fail to identify hazards, at least on a simulated drive test. Hazard anticipation errors have been shown in the literature to be a major crash factor (McKnight & McKnight 2003; McDonald et al. 2012). As well, other performance categories did not show any improvement with increased driving experience or any differences between HSDE and Non-DE subjects (e.g., inattention), suggesting the program may be exerting very little if any influence on them. Improving performance on these driving skills is important and has been shown to be feasible through use of computer- and simulator-based instructional methods (see for example, Pradham et al. 2011).

The implications of the findings on road test performance are not straightforward. Taken together, the results are perplexing and difficult to interpret, especially given that other factors besides, or in combination with, driver education might have influenced the road test pass rates in Manitoba and Oregon. A few potential factors were controlled (e.g., age differences), and results suggested that driver education did not influence the pass rate.

Differences in learning-to-drive experiences and driving exposure might also have been important factors, since requisite skills to pass the road test can be acquired through driver education as well as through practice driving under supervision. In this regard, Hirsch et al. (2006), in a study of driver education and the licensing process in Quebec, found that taking driver education is associated with fewer hours of driving practice with a Learner's license.

The results from Quebec suggest that driver education teens may be little better prepared overall for the road test than those who have not taken the program, because, despite their formal training, they actually have had less practice driving. This may especially be the case in Oregon, where teens who take the ODOT-approved DE program are only required to certify 50 hours of supervised practice, compared to 100 hours for those who have not completed this program.

That the pass rate on the road test of the driver education group did not differ from the rate of the non-driver education group suggests the need to lengthen the practice hour requirements for DE graduates. It also suggests the need for improvement in the content and/or delivery of the driver education program so that it better prepares applicants to master the driving skills necessary to pass the road test. The MPI and ODOT DE programs could work more closely with parents to emphasize the importance of practice under supervision, and restructure so some in-class and/in-vehicle lessons are closer in proximity to the end of the learner period when the teen graduate becomes eligible to attempt the road test.

In Manitoba, the fact that the driver education group actually scored better on the road test than the non-driver education group, although not at a level to achieve a higher pass rate, suggests that the HSDE program may have a positive influence on minor driving errors, but apparently not on serious ones that result in an automatic failure.

In consideration of these findings, the following recommendations are suggested. First, a detailed review of the road test and curriculum content is recommended to determine the source of test unreliability, and the extent to which it covers driving errors that are critical and which errors could be addressed in the driver education program. Second, the reasons for test failure should be given further consideration. Most driver education and non-driver education teens in Manitoba did not fail only because of a score of more than 50 demerit marks, but more often failure resulted from the commission of other types of errors that resulted in an automatic failure. These failure types included the need for the driver examiner to assist the applicant or dangerous actions on the part of the driver. The reasons driver examiners have to assist the applicant should be reviewed, especially given that the driver education group more often was cited for this failure (the difference approached statistical significance, with $p=0.09$).

In the case of Oregon, reviews of road test procedures and the driver education curriculum are also warranted given that over 80 percent of DE and Non-DE teen drivers pass the road test on their first attempt, suggesting that the test is relatively easy, and consequently, that it may not motivate teens to develop their driving skills more fully so they can pass. The reasons for the high road test pass rates also need to be investigated and consideration given to making adjustments that will result in more rigorous testing that is reliable, evidence-based, and focused on the key driver competencies that should be covered in driver education and tested on road.

An important objective of this investigation was to examine the safety performance of the ODOT-approved driver education program. Previous reviews of the evaluation literature consistently report that driver education fails to reduce collisions and convictions (Christie 2011; Engstrom et al. 2003; Lonero and Mayhew 2010; Mayhew 2007; Mayhew and Simpson 1996; Mayhew and Simpson 2002; Nichols 2003; Roberts et al. 2002; Thomas et al., 2012; Vernick et al. 1999; Williams et al., 2009; Woolley et al. 2000). This is not a result specific to driver education programs that have been evaluated in the United States, but is a conclusion of evaluation studies conducted in other countries over the past several decades as well as a finding of evaluations that have used experimental designs with random assignment of teens who take or do not take driver education.

The results of the current investigation have been mixed. The first study in Oregon, using a relatively small sample of Oregon teen drivers, controlling for the influences of various teen attributes and crash-related factors, suggests no effects of driver education on collisions and convictions. The second study, using a larger sample of Oregon teen drivers and controlling for fewer factors, suggests lower rates of collisions and convictions. This latter finding is encouraging for driver education in Oregon, especially since it is generally consistent with the earlier positive finding by Raymond et al. (2007). However, both the Raymond et al. study and this one urge caution in the use of their findings, and especially not overvaluing them, given the study limitations that have been previously underscored.

Williams, Preusser and Ledingham (2009) provide some insights into the reasons why traditional driver education programs, like the ones offered in Manitoba and Oregon, may have had less of an effect than expected:

> The courses generally are of short duration, and most time has to be spent teaching basic vehicle handling skills. This leaves less time to try to teach safe driving skills. The audience for driver education may also be relatively unmotivated regarding safety, the primary motivation being to learn enough to get a driver's license. Probably the biggest impediment to driver education effectiveness involves the inherent difficulties in affecting lifestyle and developmental factors: the attitudes, motivations, peer influences, and cognitive and decision-making skills that are so influential in shaping driving styles and crash involvement. (p.11)

The results of the current investigation support this perspective to the extent that the evaluations of the ODOT-approved DE program and the MPI HSDE program did not reveal significant changes in safety attitudes, motivations, behaviors, and lifestyle factors that were measured in the New Driver survey. In fact, one recent study suggests that a non-traditional driver education program that is more community-oriented and resilience-focused was associated with a reduced relative risk of a crash, but a more conventional program had no significant effect (Senserrick et al. 2009). The authors caution, however, that because this was a voluntary study, albeit based on a large sample size, there is still an important need for further research to confirm the road safety benefits of this resilience-based program.

More recently, Thomas et al. (2012), in a study taking a fresh look at driver education in America, have concluded that "the expectation that driver education by itself will lead to a decreased teen crash rate is unrealistic." Although this conclusion may hold some merit, the fact is that driver education programs have been developed and are marketed not just to teach teens how to drive and pass the road test, but also to produce safer drivers, which typically translates to drivers that have lower collision rates. The recently-published Novice Teen Driver Education and Training Administrative Standards (NHTSA, 2011), developed by representatives from the driver education professional community with assistance from NHTSA, states that: "The goal of driver education and training is to transfer knowledge, develop skills, and enhance the disposition of the teen, so he/she can perform as a safe and competent driver, thereby contributing to the reduction of crashes, fatalities, and injuries." These National Administrative standards also provide some guidance as to how traditional driver education programs can be improved to potentially better achieve their safety goals. Furthermore, as mentioned previously, the ODOT-approved DE program has recently been assessed by a panel of experts relative to these standards. While the originally-planned detailed formative (or "product and process") evaluation component of the current project did not occur, the brief review of the Oregon program against the national standards provides some basis for understanding how the program could be modified to improve its impact beyond that seen in the current studies. Priority recommendations for the Oregon program were, for example: increasing classroom hours from 30 to 45 hours, increasing behind-the-wheel instruction from six hours to 10 hours, increasing in-car observation from six hours to 10 hours, and requiring second stage education of at least 10 hours. As well, the expert panel recommended that ODOT-TSD should establish a procedure for providing an end-of-course evaluation or progress report to parents. This end-of-course "debriefing" could be a written student progress report which includes areas of successful completion of safe driving practices and any necessary recommendations for continued practice prior to licensing.

Only a few other jurisdictions have undergone this national assessment review, including Maryland, Vermont, Delaware, and Idaho. Other jurisdictions can benefit from participating in this NHTSA-assisted review process, and jurisdictions in Canada and elsewhere can use these administrative standards to provide guidance for an internal review of their own driver education and training programs to start identifying workable improvements. These standards have not yet been proven to result in measurable improvement, and they do not go as far in theoretical terms as the AAA Foundation's much earlier document proposed for "reinventing" driver education (Lonero et al, 1995). Nevertheless, the present investigation makes it clear that major improvements in driver education are needed, and the standards provide a direction to start a systematic program of development and evaluation that may lead eventually to substantial safety benefits. Perhaps it is unrealistic to expect that traditional driver education will lead to fewer teen crashes, but there is no reason this should not be a goal of improved programs and the focus of future evaluation to determine whether enhancements lead to better outcomes.

This investigation provides some evidence in support of the benefits of driver education in terms of intermediate measures – e.g., improved knowledge and driving skills – and safety. Positive effects of the MPI HSDE program and the ODOT-approved DE program, however, have been modest or, in relation to some factors, absent, and caution has to be taken regarding their potential to reduce collisions. Existing driver education programs can certainly be improved, and new ones need to adopt best practices that are evidence-based. It is equally important that program enhancements are evaluated and new programs piloted to determine the extent to which they meet their stated objectives. The implications of this investigation for future evaluations are discussed in the next section.

For Evaluation: Several research designs were employed in this investigation – pre-post repeated measures, cross-sectional, retrospective designs – and data were collected by means of survey, driving simulation, road tests, and driver records. The design for several of the inter-related studies included a quasi-experimental approach with a pre-post design and a comparison group.

It is important to keep in mind that program evaluation research necessarily has requirements, limitations, and optimal methods that may differ from more basic forms of research. In medical, behavioral, and some social research an experimental design with random assignment to treatments is considered the "gold standard" for basic research. The primary reason for employing such a design is to overcome or minimize self-selection bias – i.e., individuals choose to take or not take some treatment, and this means these two groups are likely different in ways other than whether they take treatment. A common contention in the road safety field is that young people who are more safety conscious are more likely to take driver education, and consequently, lower crash rates of DE graduates are due to them being safety conscious and not their exposure to driver education (Williams et al. 2009).

The problem of self-selection bias has plagued previous evaluations of driver education. Unfortunately, there is no completely satisfactory solution to this problem. Even evaluations using experimental designs that randomly assign teens to driver education or no driver education – to control for person-centered and other differences between groups – have difficulties and limitations. For example, students assigned to take driver education do not always do so, or if they do, they may not complete the program; moreover, those assigned to the no-program condition sometimes find comparable instruction anyway. It is also possible that teens assigned to a program might not learn and benefit as much as teens self-motivated to take the program. This means that unbiased comparison groups are hard to establish and maintain. As well, random assignment is often not politically and ethically feasible or practical when evaluating established programs, which is the case with the MPI HSDE and the ODOT-approved DE programs. For these reasons, professional evaluators of educational and other social programs do not share the view that randomized control trials are the only, or even the best, methodology for evaluating such programs. The broader evaluators' view is reflected in the AAA Foundation's *Comprehensive Guidelines* for driver education and served as the foundation for this project. The failure of the driver safety research community to fully understand the critical differences between evaluation of operational programs and evaluation of "experimental" treatments and pilot studies is a barrier to progress in this field.

Accordingly, parts of this investigation employed a quasi-experimental design, an alternative to an experimental design which is often used in the evaluation of road safety programs. The current investigation relied on a quasi-experimental design because the driver education programs in Manitoba and Oregon are well-established and unable or unwilling to participate in a study that involves random assignment. In addition to the legal and financial concerns, a major objection to an experimental design with random assignment is that this evaluative approach denies people access to a program that they might otherwise have taken and potentially benefited from.

The primary advantage of a quasi-experimental design is that it recognizes the real-world constraints of an experimental design and compares groups that are not randomly assigned. To reduce or eliminate self-selection bias, however, this design requires careful selection of the treatment and comparison groups so that they are as similar as possible on important person-centered variables and other factors that could potentially confound the evaluation. This involved obtaining information about the knowledge, attitudes, opinions, and driving skills of two primary groups – a group of students who intended to take driver education (treatment group) and a group who did not intend to do so (comparison group). Information about the group that planned on taking driver education was intended to serve as a baseline against which changes following exposure to driver education could be gauged. Information from the group who did not plan on taking driver education would serve to identify differences that might be unrelated to the treatment (driver education). The pre-post repeated measures components of the study also provided benefits in reducing the effects of extraneous variables by repeated measures with the same subjects, before and after exposure to driver education for those who took it, and after a comparable passage of time for those who did not take it.

The use of a quasi-experimental design necessitates developing insights into how teens who self-select to take driver education differ from those that choose not to take driver education. Use of survey and other data to control for personal factors and other pre-existing differences between those who take a program and those who do not is basic to effective evaluation. The overall pattern of results in this project underscore that there are differences in pre-existing factors, confirming the existence of self-selection bias. These pre-existing differences definitely need to be identified and taken into account when evaluating the safety effectiveness of driver education programs.

However, there are also many similarities between the groups, suggesting that the issue of volunteer bias and self-selection, for example, in terms of the DE group being more safety-oriented or having a less risky lifestyle, than the Non-DE group, may not be as critical as suggested in the literature. In fact, there is evidence from Manitoba that some teen drivers do not take driver education because of practical constraints – e.g., availability of the program and scheduling conflicts – rather than fundamental differences between teens that take and do not take driver education. In other words, even in a jurisdiction like Manitoba where most teens voluntarily choose to take driver education, those who do not may differ little from DE teens on important factors shown to be associated with having a collision. The same conclusion can be derived from the results in Oregon, where only about one-third of teen drivers voluntarily choose to take the ODOT-approved DE program.

Although all plausible alternative explanations for differences in the collision rates of DE and Non-DE teen drivers need to be considered in future evaluations, it is not possible to account for every conceivable factor; thus, ruling out the key ones should be adequate in assessing the safety effectiveness of driver education programs, or for that matter, other road safety programs where an experimental design is unworkable. In this regard, sensitivity analyses suggested that controlling for all the questionnaire-based variables might not be too important to draw inferences about the safety performance of driver education. This provides some limited evidence suggesting that the positive results using the larger sample of state-wide teen drivers probably are not biased by not controlling for these other potentially-confounding variables.

In practice, a quasi-experimental design can still provide considerable insights and increase understanding and advance knowledge. In addition, if reasonable efforts are taken to control for key confounding factors in a well-designed quasi-experimental evaluation, results should not be rejected outright because of the frequently stated criticism that other unaccounted for factors related to volunteer bias and self-selection may explain the differences in collision rates and not the influence of driver education. This also speaks to the need for more research into identifying pre-existing factors associated with collision involvement that differentiate teen drivers who voluntarily take and do not take driver education, and that should be taken into account in future evaluations.

The present investigation provides a number of interesting implications for an expanded evaluation approach. There are both encouraging and cautionary lessons in the study execution and its results.

First, in planning and designing the study, the team found a serious lack of prior development of reliable and valid measures of desirable driver traits and skills. Measures had to be developed, including the New Driver Survey questionnaire and the simulated drive test. Certainly a broad implication of the study is that there is a critical need for development and validation of additional intermediate measures of driver skill, attitudes, and knowledge that can subsequently be linked to crash outcomes.

The New Driver Questionnaire developed for the present investigation has been rigorously tested and developed and demonstrated to be a reliable index of important teen attributes that can be used (with relevant modifications) by others in evaluation research. As well, the simulated drive test developed for the Manitoba skills study has proven an objective and valid measure of skill performance, and can be replicated by others in evaluation research. Indeed, this is to be encouraged so that comparisons across studies are feasible. There is currently ongoing research by scientists at the Children's Hospital of Philadelphia (CHOP) to develop and validate a simulated drive test for use in program evaluation (McDonald et al. 2012). Finally, the use of in-vehicle technologies to monitor teen driving behavior was pilot tested as part of this investigation and shown to be a promising method to evaluate the extent to which DE teens drive differently than Non-DE teens in a "naturalistic" setting. This was not discussed earlier because this pilot did not lead to a full study due to limited resources. Further information on various measures developed and applied in the current evaluation is provided in the "tool kit" report (Mayhew et al. 2014).

Second, the study shows that it is practical to use repeated measures surveys to assess the intermediate effects of driver education on students' knowledge and attitudes, as well as some aspects of behavior and behavioral intentions. Again, the New Driver Survey offers a valuable tool for such research. The approach with repeated (before and after) measures of the same subjects is considered more powerful and sensitive than the simpler cross-sectional approach. Surveys of reasonable size were able to find significant differences based on modest effects of the program. However, the substantial attrition between the two survey waves in Manitoba suggests this approach must be used with care and caution. It is costly in time and, perhaps especially with a youth population and involving schools, subject to loss of strength through difficulty in retaining subjects in the study, even over a period of just a few months. Considerable effort is needed to identify potential sources of attrition and to overcome them. For example, the current study in Manitoba was ad hoc and the survey measures were not part of a routine process in the program or the schools. A more regular set of measures as part of an ongoing program evaluation might not experience as much subject loss over time.

Third, the cooperation of ODOT-DMV in providing contact lists of teen drivers, including mailing addresses, proved an efficient means of identifying and recruiting teens for the survey in Oregon. However, even with names and mailing addresses it was difficult to obtain telephone numbers to call, recruit, and interview teen drivers. This is because many households no longer have land-phone lines or have delisted their telephone numbers. An effective alternative was an initial mail contact and an online survey. In addition, the use of a modest direct incentive – $5 in the mailed envelope to encourage teen drivers to complete the survey online – produced a much higher response rate than did the opportunity for them to win an attractive price in a raffle(s). The benefits of this approach for future evaluations, however, have to be weighed against the cost, since even a modest direct incentive becomes costly when recruiting several thousand participants.

Fourth, at the broadest level, the study supports the need for a comprehensive approach to evaluation. For example, in Oregon, only modest positive effects of the program were found on student knowledge about GDL and safe driving issues, and on driving skills. This raises the question of why these effects are not greater and why there are no significant improvements on other key outcomes, and how these could be achieved. The comprehensive approach to evaluation proposed in the AAA Foundation *Guidelines* (Clinton & Lonero 2006) suggests that full understanding of summative outcome results requires formative evaluation data on program products and processes. This implies a close look at the program's curriculum and its delivery to explain the seeming weakness of the knowledge and other results and identify areas that need to be strengthened. However, program providers, even public ones, may be reluctant to have researchers looking closely at the details of their program delivery. This is an issue of organizational culture in road safety that needs to be addressed.

Fifth, the results of this investigation found that a simulated drive test can provide a valid and objective measure of driving performance skills for research purposes. However, recruitment difficulties led to small sample sizes for several of the groups examined in this study, making it difficult to find statistically significant differences across comparison groups. Future studies using simulated drive tests to evaluate the influence of driver education programs on performance skills should recognize the potential difficulty in recruiting larger sample sizes with adequate power to isolate differences in driver errors between comparison groups, if they exist. This study using a simulated drive test also adopted a cross-sectional approach to subject selection. Future studies should attempt to replicate this approach as well as to conduct longitudinal designs in which subjects are recruited and then tracked over an extended length of the licensing process – e.g., simulated drive tests: when study participants are beginners, before obtaining a Learner license; after they have completed the driver education program as learner drivers before the road test; after the road tests when they have a few months of independent driving experience and again after a year or more of driving. Such a design, with repeated simulated drive tests of the same drivers, has the potential to show the progression of driving skills associated with driver education and increasing driving experience. If simulator training becomes part of a driver education program, this repeated testing could be an automatic and integral part of the program with little additional cost.

Finally, this investigation, in an initial study with the Oregon teen survey participants, did not find that the ODOT-approved DE program was associated with lower incidences of collisions and convictions after controlling for various teen attributes and other factors. Of course, it is possible that GDL penalties for collisions and convictions deterred teen drivers from engaging in risky driving behaviors during their first few months of independent driving. It is also possible that the sample of teens was unrepresentative with regard to collisions and too small to reliably detect a positive effect of driver education. If this study had recruited a larger sample of teen drivers, tracked their driver record over a longer period of time, and collected self-reported collisions rather than relying on less-frequently reported collisions from official records, the results might have been different. Although the original research design had proposed a longer tracking period and capturing self-reported data on collisions, both practical and cost constraints precluded doing so, and these are now important limitations of this study that should be the focus of follow-up research.

One of the Oregon studies in this project, however, did use a much larger population of Oregon teen drivers and a retrospective design to address the issue of the safety performance of the ODOT-approved driver education program. This study found that the program has safety-related benefits, in terms of being associated with lower incidences of collisions and convictions. This investigation also took into account important self-selection factors by controlling for age, gender, driving exposure (months licensed), and place of residence (urban/rural). These are all factors shown in this current study to differentiate between teens who voluntarily take the ODOT-approved driver education program and those that do not. However, this study used only official records so it was not possible to control for other pre-existing factors that could potentially account for differences in the collisions of DE and Non-DE teens (e.g., attitudes and skills), although the limited evidence from sensitivity analyses suggests that omitting some pre-existing factors may not have biased the results too much.

Future evaluations focusing on the safety effects of driver education will have to struggle with the trade-offs between using smaller sample sizes with a richer pool of information derived from self-report and other methods, versus larger sample sizes with more limited information derived from official sources. This investigation has demonstrated that both approaches produce relevant and practical results to better understand the value of driver education, as well as provide directions to improve the development, content, and delivery of programs. Clinton and Lonero (2006), however, have observed: “Evaluation should become a progressive and integral part of program implementation and improvement. Remember, good evaluation is systematic research, and just doing it once is not enough” (p 42). Accordingly, a primary goal of this investigation was to build on previous evaluations and provide methods, tools, and lessons learned to better evaluate and develop driver education on an ongoing basis in the future.

# References

Allen, R.W., Parseghian, Z., Kelly, S., & Rosenthal, T. (1994). *An experimental study of driver alertness monitoring.* Hawthorne, CA, Systems Technology, Inc.

American Association of Motor Vehicle Administrators. (1994). *Guidelines for Knowledge and Skill Testing*. Washington, DC.: American Association of Motor Vehicle Administrators.

Bédard, M., Parkkari, M., Weaver, B., Riendeau, J., Dahlquist, M. (2010). Brief report-assessment of driving performance using a simulator protocol: Validity and reproducibility. *American Journal of Occupational Therapy*, *64*, 336-340.

Beirness DJ, Simpson HM. (1988). Lifestyle correlates of risky driving and accident involvement among youth. *Alcohol, Drugs, and Driving*, 4, 193-204.

Bella F. (2008). Driving simulator for speed research on two-lane rural roads. *Accident Analysis and Prevention 40,* 1078-1087.

Bingham, C.R., & Shope, J.T. (2005) Adolescent predictors of traffic crash patterns from licensure into early young adulthood. 49th Annual Proceedings from the Association for the Advancement of Automotive Medicine September 12-14, 2005.

Campbell, D.T. & Stanley, J.C. (1966). *Experimental and quasi-experimental designs for research.* Chicago: Rand McNally College Publishing Company.

Chaudhary, N., Bayer, L., Ledingham, K., and and Casanova, T. (2011). *Driver Education Practices in Selected States.* Washington, D.C.: National Highway Traffic Safety Administration.

Christie, R. (2011). The Effectiveness of Driver Training as a Road Safety Measure: A Review of the Literature (2011 Edition/Update). Report prepared for the Royal Automobile Club of Victoria (RACV) Ltd., Noble Park, Victoria.

Christie, R. (2000). Driver *Licensing Requirements and Performance Standards Including Driver and Rider Training*. Melbourne, Victoria: National Road Transport Commission.

Clinton, K., Lonero, L. (2006). *Evaluation of Driver Education: Comprehensive Guidelines.* Washington, DC: AAA Foundation for Traffic Safety.

Compton, R. P., & Ellison-Potter, P. (2008). *Teen driver crashes: A report to Congress*. Washington, DC: U.S. National Highway Traffic Safety Administration.

DeJoy, D.M. (1989). The optimism bias and traffic accident risk perception. *Accident Analysis & Prevention*, 21, 333-340.

Dillman, D. (2007). Mail and Internet Surveys: The Tailored Design Method. Hoboken, New Jersey: John Wileys and Sons.

Donovan, J.E. (1993). Problem behavior theory and the explanation of adolescent marijuana use. *Journal of Drug Issues*. 26: 379-404.

Engstrom, I., Gregersen, N. P., Hernetkoski, K., Keskinen, E., & Nyberg, A. (2003). Young novice drivers, driver education and training. (Literature review, VTI-rapport 491A). Linköping, Sweden: Swedish National Road and Transport Research Institute.

Finn, P. & Bragg, B.W.E. (1986). Perception of the risk of an accident by young and older drivers. *Accident Analysis & Prevention*, 18, 289-298.

Fleiss, J. L. (1981). *Statistical methods for rates and proportions*. 2nd ed. (New York: John Wiley) pp. 38–46.

Frankfort-Nachmias, C. and Leon-Guerrero, A. (2006). Social Statistics for a Diverse Society, Fourth Edition. Thousand Oaks, California: Sage Publications Ltd.

Garay-Vega L., Fisher, D.L. & Pollatsek, A. (2007). Hazard anticipation of novice and experienced drivers: Empirical evaluation on a driving simulator in daytime and nighttime conditions. *Transportation Research Record, 2009,* 1-7.

Gillis, A. J. (1997). The Adolescent Lifestyle Questionnaire: Development and psychometric testing. *Canadian Journal of Nursing Research, 29*(1), 29-46.

Godley S. T., Triggs T. J., & Fildes B. (2002). Driving simulator validation for speed research. *Accident Analysis and Prevention, 34,* 589-600.

Goodwin, A. & Foss, R. (2010). Parents, Teens, and the Learner Stage of Graduate Driver Licensing. Washington, DC: American Automobile Association Foundation for Traffic Safety.

Gwet, K. L. (2010). *Handbook of Inter-Rater Reliability* (2nd Edition). Gaithersburg: Advanced Analytics, LLC.

Haire, E., Williams, A.F., Preusser, W.F., & Solomon, M.G. (2011). *Driver Licence Testing of Young Novice Drivers*. Washington, DC: National Highway Traffic Safety Administration.

Haire, E., Williams, A.F., and Preusser, D.F. (2011). *Driver License Testing of Young Novice Drivers*. DOT HS 811 440, National Highway Traffic Safety Administration, Office of Behavioral Safety Research, Washington, D.C.

Holland, B.S. & Copenhaver, M.D. (1988). Improved Bonferroni-Type Multiple Testing Procedures. *Psychological Bulletin*, 104, 1, 145-149.

Ivers, R. (2006). “Supervised driving experience in learner drivers - the DRIVE Study (Australasian Road Safety Research, Policing and Education Conference)”, in *The Australasian Road Safety Research, Policing and Education Conference* , Gold Coast, Australia, October, 2006.

Ivers, R. (2006). [“DRIVE Study update”](), in *Annual Meeting of the Australian Driver Trainers Association*, Sydney, Australia, December 2006.

Lajunen, T., Parker, D., & Stradling, S.G. (1998). Dimensions of driver anger, aggressive and highway code violations and their mediation by safety orientation. *Transportation Research Part F, 1,* 107-121.

Lajunen, T., Parker, D., & Summala, H. (2003). The Manchester Driver Behaviour Questionnaire: a cross-cultural study. *Accident Analysis and Prevention, 942,* 1-8.

Land Transport Safety Authority. (1997). *Land Transport Rules: Driver Licensing Proposed Policy*. Wellington, New Zealand: Land Transport Safety Authority.

Leaf, W A, Simons-Morton, B G., Hartos, J L, & Shabanova Northrup, V (2008). Driving miles estimates by teen drivers: how accurate are they? *Injury Prevention, 14,* 59-61.

Lee H. C., Cameron D., & Lee A. H. (2004). Assessing the driving performance of older adult drivers: On-road versus simulated driving. *Accident Analysis and Prevention 35,* 797-803.

Lonero, L.P. and Mayhew, D.R. (2010). Large-Scale Evaluation of Driver Education Review of the Literature on Driver Education Evaluation: 2010 Update. Washington, D.C.: AAA Foundation for Traffic Safety.

Lonero, L.P., Clinton, K., Brock, J., Wilde, G., Laurie, I., and Black, D. (1995). *Novice Driver Education Model Curriculum Outline*. Washington, DC: AAA Foundation for Traffic Safety.

Mayhew, D.R. (2007) Driver education and graduated licensing in North America: Past, present, and future. Journal of Safety Research, 38(2): 229-235.

Lynam, D. & Twisk, D. (1995). *Car Driver Training and Licensing Systems in Europe*. TRL Report 147. Crowthorne, Berkshire: Transport Research Laboratory.

Marcotte, T. D., Rosenthal, T. J., Corey-Bloom, J., Roberts, E., Lampinen, S., & Allen, R. W. (2005). The impact of cognitive deficits and spasticity on driving simulator performance in multiple sclerosis. Paper presented at the 3rd International Driving Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design, Rockport, Maine.

Matthews, M.L. & Moran, A.R. (1986). Age differences in male drivers’ perception of accident risk: The role of perceived driving ability. *Accident Analysis & Prevention*, 18, 299-313.

Mayhew, D. and Simpson, H.M. (1990). *New to the Road. Young Drivers and Novice Drivers: Similar Problems and Solutions?* Ottawa Ontario: Traffic Injury Research Foundation.

Mayhew, D.R., & Simpson, H.M. (1996) Effectiveness and Role of Driver Education in a Graduated Licensing System. Ottawa, Ontario: Traffic Injury Research Foundation.

Mayhew, D.R., & Simpson, H.M. (2002). The safety value of driver education and training. Injury Prevention, 8(Suppl. II): ii3-ii8.

Mayhew, D.R.; Simpson, H.M.; Groseillers M.; and Williams, A.F. (2001). Impact of the graduated driver licensing program in Nova Scotia. Journal of Crash Prevention and Injury Control. 2(3):179-192.

Mayhew, D.R., Simpson, H.M., Singhal, D., & Desmond, K. (2006) Reducing the crash risk for young drivers. Washington, DC: American Automobile Association.

Mayhew, D.R., Simpson, H., Wood, K., Marcoux, K., Lonero, L., and Clinton, K. (2013). Measuring Changes in Driving Behavior: A "Tool Kit" for Driver Education. Washington D.C.: AAA Foundation for Traffic Safety.

Mayhew, D., Simpson, H., Wood, K., Lonero, L., Clinton, K., & Johnson, A. (2011). On-road and Simulated Driving: Concurrent and Discriminant Validation. *Journal of Safety Research 42(4).*

McClendon, M.J. (2004). Statistical Analysis in the Social Sciences. Toronto, Ontario: Thomson Learning Inc.

McKnight, A.J. (1992). *Driver Licensing in Victoria*. Report no. 27. Victoria, Australia: Monash University.

McPherson, K., & McKnight, A. J. (1981). Automobile driver on-road performance test, vol. I: Final Report (Publication No. DOT-HS-806-207). Washington, DC: National Highway Traffic Safety Administration.

NHTSA. (2011). Novice Teen Driver Education and Training Administrative Standards. Washington, D.C. National Highwasy Traffic Safety Administration.

Nichols, J. L. (2003). A review of the history and effectiveness of driver education and training as a traffic safety program. Washington, DC: National Transporation Safety Board.

NuStats. (March 2008, unpublished report). *AAAFTS Driver Education Survey Cognitive Tests*. Austin, Texas: NuStats.

ODOT. (2013). Oregon Driver Education Program Background. From: http://www.oregon.gov/ODOT/TS/docs/DE/2013%20Driver%20Ed%20Background%20and%20Timeline.pdf.

Olejnik, S., Li, J., Supattathum, S., & Huberty, C J (1997). Multiple testing and statistical power with modified Bonferroni procedures. Journal of Educational and Behavioral Statistics, 22, 389-406.

Oregon Office of Rural Health (2012). List of Oregon Zip Codes and their ORH. Retrieved November 6, 2012 from: http://www.ohsu.edu/xd/outreach/oregon-rural-health/data/rural-definitions/index.cfm

Partinen M., Hirvonen K., Hublin C., Halavaara M., & Hiltunen H. (2003). Effects of after-midnight intake of zolpidem and temazepam on driving ability in women with non-organic insomnia. *Sleep Medicine, 4,* 553–561.

Patil, S.M., Shope, J.T., Raghunathan, T.E., & Gingham, C.R. (2006) The role of personality characteristics in Young Adult Driving. Traffic Injury Prevention. 7: 328-334.

Peck, R.C. (2010). Do driver training programs reduce crashes and traffic violations? – A critical examination of the literature. *IATSS Research*, 34:63-71.

Portney L, Watkins M. *Foundations of Clinical Research Applications to Practice*. Upper Saddle River, NJ: Prentice Hall; 2000.

Rachel, J. V., Williams, J. R., Brehm, M. L., Cavanaugh, B., Moore, R. P. & Eckerman, W. C. (1975). A national study of adolescent drinking behavior, attitudes, and correlates: A final report. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.

Raymond, P., Johns, M., Golembiewski, G., Furst Seifert, R., Nichols, J., and Knoblauch, R. (2007). Evaluation of Oregon's Graduated Driver Licensing Program. Washington, D.C.: National Highway Traffic Safety Administration.

Roberts, I., Kwan, I., & Reviewers, C. I. G. D. E. (2002). School-based driver education for the prevention of traffic crashes. The Cochrane Library, Issue 1, Oxford, England.

Rosen, P.N. (2004). Vision screening for Alzheimer's disease: Prevention from an Ophthalmologist's perspective (there is more to vision than meets the eye). *The Permanente Journal, 8(1):* 15-21.

Seaman, M.A., Levin, J.R. & Serlin, R.C. (1991). New Developments in Pairwise Multiple Comparisons: Some Powerful and Practicable Procedures. *Psychological Bulletin*, 110, 3, 577-586.

Senserrick, T. et al. (2009). Young driver education programs that build resilience have potential to reduce road crashes. *Pediatrics*, 124(5), 1287-1292.

Sidak, Z. (1967). Rectangular confidence regions for the means of multivariate normal distributions. *Journal of the American Statistical Association*. 62, 626-633.

Siegrist, S. (Ed.). (1999). Driver training, testing and licensing – towards a theory-based management of young drivers' injury risk in road traffic. Results of EU-project GADGET, Work Package 3. Berne: Accident Prevention bfu.

Stock, J.R., Weaver, J.K., Ray, H.W., Brink, J.R., and Sadof, M.G. (1983). Evaluation of Safe Performance Secondary School Driver Education Curriculum Demonstration Project. Washington D.C.: U.S. Department of Transportation, National Highway Traffic Safety Administration.

Svenson, O. (1981). Are we all less risky and more skillful than our fellow drivers? *Acta Psychologica*, 47, 143-148.

Svenson, O., Fischhoff, B., & MacGregor, D. (1985). Perceived driving safety and seat belt usage. *Accident Analysis & Prevention*, 17, 119-133.

Thomas, F. D., III, Blomberg, R. D., & Donald L. Fisher, D. L. (2012, April). A Fresh Look at Driver Education in America. (Report No. DOT HS 811 543). Washington, DC: National Highway Traffic Safety Administration.

Törnros J. (1998). Driving Behavior in a Real and a Simulated Road Tunnel—A Validation Study. *Accident Analysis and Prevention, 30*(4), 497–503.

Ware, J.C., Risser, M.R., Manser, T., & Karlson, K.H. (2006). Medical resident driving simulator performance following a night on-call. *Behavioral Sleep Medicine, 4*(1), 1-12.

Watson B., Fresta J., Whan H., McDonald J., Dray R., Bauermann C. & Churchward R. (1996). *Enhancing Driver Management in Queensland*. Brisbane: Qld Transport.

Williams, A. & Mayhew, D. (2008). Graduated licensing and beyond. American Journal of Preventative Medicine, 35(3 Suppl),324-33.

Vernick, J. D., Li, G., Ogaitis, S., MacKenzie, E. J., Baker, S. P., & Gielen, A. C. (1999). Effects of high school driver education on motor vehicle crashes, violations, and licensure. American Journal of Preventive Medicine, 1S, 16.

Williams, A.F., Preusser, D.F., and Ledingham, K.A. 2009. Feasibility Study on Evaluating Driver Education Curriculum. Washington, D.C. National Highway Traffic Safety Administration.

Woolley, J. (2000). In car driver training at high schools: a literature review. Walkerville, South Australia: Safety Strategy, Transport SA.

Yan, X., Abdel-Aty, M., Radwan, E., Wang,X., & Chilakapati, P. (2008). Validating a driving simulator using surrogate safety measures. *Accident Analysis and Prevention, 40,* 274-288.

Zimbardo, P.G., Keough, K.A. & Boyd, J.N. (1997). Present time perspective as a predictor of risky driving. Personality and Individual Differences. 23(6): 1007-1023.

# Evaluation of Driver Education in Manitoba and Oregon: Appendices for Final Report

**Prepared for:**

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# APPENDIX A: THE MANITOBA NEW DRIVER SURVEY

# New Driver Survey

## Manitoba

**Traffic Injury Research Foundation of Canada**

**&**

**Northport Associates**
**2009**

## BACKGROUND

**This is a confidential survey of new drivers, and teens who will soon be new drivers. The survey is part of a major study on driver education. It asks for your views and opinions about driver education, graduated licensing, safe driving, and your skills and abilities.**

## CONFIDENTIAL INFORMATION

Name (Please Print): ______________________________

How old are you: ________ Yrs ________ Months

What is your gender: ________ Male ________ Female

What level of Driver's Licence do you currently have:

________ No Licence ________ Intermediate Licence

________ Learner's Permit ________ Full Licence

How long have you been driving in your current licence level: _____ days

What Grade are you in: ________________

Town or City where you live: ________________

Today's date: ________ Day ________ Month

## INSTRUCTIONS

**Please answer all the questions that apply to you. For each question, please fill in the bubble that best matches your answer. For example,**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| *Driver education is an excellent way to learn how to drive* | ○ | ○ | ○ | ○ | ● |

**If you strongly agree with this statement, you would fill in the bubble under "5", strongly agree. Otherwise you would fill in the bubble under the number that corresponds to your answer.**

## SECTION A: DRIVER EDUCATION/TRAINING

**For each question, please fill in the bubble that best matches your answer.**

**1. Have you taken, are you taking, or will you be taking a driver education/training course?**

- ◯ a. I have completed a driver education/training program
- ◯ b. I am currently taking a driver education/training program
- ◯ c. I plan on taking a driver education/training program in the next 6 months
- ◯ d. I do not plan on taking a driver education/training program. **[IF YOU SELECTED d, GO TO SECTION B OF THE SURVEY ON PAGE 4: GRADUATED DRIVER LICENSING.]**

**2. What type of driver education program have you taken, are taking, or plan on taking? (mark only one)**

- ◯ a. Private/commercial program
- ◯ b. School program

**3. What were the main reasons you took (plan on taking or are taking) a driver education course? (mark all that apply)**

- ◯ a. A parent or guardian made me take it
- ◯ b. To get my licence sooner
- ◯ c. To get credits from school
- ◯ d. So I wouldn't learn someone else's bad habits
- ◯ e. I had no one else to teach me
- ◯ f. To make me a safer driver
- ◯ g. To make me a more skilled driver
- ◯ h. To help me pass the road test
- ◯ i. So I could get my learner's permit before age 16

**3a. Of these reasons, which was the single most important reason? (write in the letter next to your answer)**

Specify Letter_____

**4. What were the main reasons for not taking a different driver education program? (mark all that apply)**

- ◯ a. Not aware of other programs
- ◯ b. Not convenient
- ◯ c. Couldn't afford the cost
- ◯ d. Couldn't afford the time
- ◯ e. Not available in my school
- ◯ f. No other programs exist in my area

**4a. Of these reasons, which was the single most important reason? (write in the letter next to your answer)**

Specify Letter_____

**5. For each of the following statements indicate the extent to which you agree or disagree.**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| a. I think my driver education course was (will be) important in teaching me to be a safe driver | ○ | ○ | ○ | ○ | ○ |
| b. My driver education course has helped me (will help me) become a better defensive driver | ○ | ○ | ○ | ○ | ○ |
| c. My driver education course has helped me (will help me) avoid being in an accident | ○ | ○ | ○ | ○ | ○ |
| d. I think that teenagers planning to get a driver's licence should take my driver education course | ○ | ○ | ○ | ○ | ○ |
| e. I would recommend my driver education course to my friends | ○ | ○ | ○ | ○ | ○ |

## SECTION B: GRADUATED DRIVER LICENSING

**For each question, please fill in the bubble that best matches your answer.**

**1. In Manitoba the first stage of the graduated driver licensing system is called the learners permit. For each of the following statements, tell us whether you think each is allowed *during the learner phase.***

| | Yes 1 | No 2 | Don't Know 3 |
|---|---|---|---|
| a. Driving without a supervising driver in the vehicle | ○ | ○ | ○ |
| b. Driving with a supervising driver who has held a full valid licence for one year | ○ | ○ | ○ |
| c. Driving with a supervising driver who has held a full valid licence for 3 years | ○ | ○ | ○ |
| d. Driving with two teenagers in the front seat | ○ | ○ | ○ |
| e. Driving with the number of backseat passengers equal to the number of seatbelts | ○ | ○ | ○ |
| f. Driving after consuming any amount of alcohol | ○ | ○ | ○ |
| g. Driving with a supervising driver whose blood alcohol exceeds .05 | ○ | ○ | ○ |

**2. In Manitoba the second stage of the graduated driver licence that allows driving without a supervising driver is called an *intermediate licence*. For each of the following statements, tell us whether you think each is allowed *during this intermediate licence phase.***

| | Yes 1 | No 2 | Don't Know 3 |
|---|---|---|---|
| a. Driving home from school with one teenage friend in the car | ○ | ○ | ○ |
| b. Driving to a friend's house after school with one teenage friend in the car | ○ | ○ | ○ |
| c. Driving home from school with two teenage friends in the front seat of your car | ○ | ○ | ○ |
| d. Driving home from your job at 1 a.m. | ○ | ○ | ○ |
| e. Driving home from your friends at 1.a.m with only 3 teenage friends in the car | ○ | ○ | ○ |
| f. Driving home from school with one teenage friend in the front seat and three in the backseat | ○ | ○ | ○ |
| g. Driving after consuming any amount of alcohol | ○ | ○ | ○ |
| h. Sending a text message from your cell phone while you are driving | ○ | ○ | ○ |
| i. Talking on a hand-held cell phone while you are driving | ○ | ○ | ○ |
| j. Talking on a hands-free cell phone while you are driving | ○ | ○ | ○ |

***There are no right or wrong answers to the following questions. Please answer them to the best of your ability.***

**3. Indicate the extent to which you oppose or support Manitoba's Graduated Driver Licensing Program.**

| | Strongly Oppose 1 | 2 | 3 | 4 | Strongly Support 5 |
|---|---|---|---|---|---|
| | ○ | ○ | ○ | ○ | ○ |

**4. Tell us whether you oppose or support the following driving requirements. The requirement:**

| | Strongly Oppose 1 | 2 | 3 | 4 | Strongly Support 5 |
|---|---|---|---|---|---|
| a. New drivers have a zero blood alcohol content | ○ | ○ | ○ | ○ | ○ |
| b. To hold a learner permit for at least 9 months before getting an intermediate licence | ○ | ○ | ○ | ○ | ○ |
| c. To limit passengers during the intermediate stage between 5 a.m. and midnight to one passenger in the front seat and up to the number of seat belts in the rear seat | ○ | ○ | ○ | ○ | ○ |
| d. For new drivers to drive only with a supervising driver when they have a learner permit | ○ | ○ | ○ | ○ | ○ |
| e. That limits the number of passengers at night | ○ | ○ | ○ | ○ | ○ |

**5. When you had a learner's permit, who rode with you as your supervising driver? (mark all that apply) [ANSWER ONLY IF YOU CURRENTLY HAVE A LEARNER'S PERMIT OR YOU HAVE HAD A PERMIT]**

○ a. Mother
○ b. Father
○ c. Older brother or sister
○ d. Other relative
○ e. Friend
○ f. Driving instructor
○ g. Other: (specify) ______________________________

**5a. Of those, which <u>one</u> person rode with you the most?**

Specify letter: ___

**6. Thinking about ALL the driving practice you had before obtaining your intermediate licence, about how many hours of supervised driving practice did you get? [ANSWER ONLY IF YOU CURRENTLY HAVE AN INTERMEDIATE OR FULL LICENCE]**

_________ number of hours

**7. About how many of these hours involved practice with a driver education/training course or instructor? [ANSWER ONLY IF YOU CURRENTLY HAVE AN INTERMEDIATE OR FULL LICENCE]**

_________ number of hours

8. **After you got your licence to drive by yourself, did you ever drive with a parent or other adult driver specifically to get more supervised driving practice? [ANSWER ONLY IF YOU CURRENTLY HAVE AN INTERMEDIATE OR FULL LICENCE]**

○ a. Yes ➔ If yes, for how many hours ________
○ b. No

9. **How many hours of driving practice do you think the "average" new driver should have before they get their intermediate driver's licence?**

_________ number of hours

10. **For each of the following statements indicate the extent to which you agree or disagree.**

| | *Strongly Disagree* 1 | 2 | 3 | 4 | *Strongly Agree* 5 |
|---|---|---|---|---|---|
| a. The graduated licensing program has made me a safer driver | ○ | ○ | ○ | ○ | ○ |
| b. It is important for new drivers to have several months of practice driving before they begin driving without a parent or other adult driver in the car | ○ | ○ | ○ | ○ | ○ |
| c. Requiring me to practice driving under supervision has given (will give) me the confidence to drive without an experienced adult driver in the car | ○ | ○ | ○ | ○ | ○ |

## SECTION C: SAFE DRIVING

**For each question, please mark only one answer.**

1. **When changing lanes, you can check your blind spot by:**
   - ○ a. Using the inside rearview mirror
   - ○ b. Using both inside rearview mirrors and outside rearview mirrors
   - ○ c. Turning your head and looking over your shoulder
   - ○ d. All of the above

2. **To reduce glare from the head lights of an oncoming vehicle, you should:**
   - ○ a. Look to the right edge of the roadway just as you approach the vehicle
   - ○ b. Look to the left edge of the roadway just as you approach the vehicle
   - ○ c. Increase your speed to get past the vehicle quickly
   - ○ d. Keep the overhead light turned on

3. **What is the most common cause of <u>minor</u> accidents among teens?**
   - ○ a. Slippery roads
   - ○ b. Alcohol
   - ○ c. Speeding
   - ○ d. Poor visual search patterns

4. **A car going twice as fast as another would strike an object how much harder:**
   - ○ a. Four times as hard
   - ○ b. Three times as hard
   - ○ c. Twice as hard
   - ○ d. A little harder

5. **What is most important in preventing a vehicle from going off the road in a curve?**
   - ○ a. Resistance of the air around the vehicle
   - ○ b. Friction between the tires and the road surface
   - ○ c. The weight of the vehicle
   - ○ d. The power steering system

6. **Your traffic light changes to yellow as you approach an intersection. In most cases, what action should you take?**
   - ○ a. Stop, if you can do so safely
   - ○ b. Signal for a right turn and slow
   - ○ c. Go through if no other vehicles are coming
   - ○ d. Accelerate to clear the intersection

**7. Beer's effects on your reflexes and judgment:**

- ◯ a. Are less than if you drink wine
- ◯ b. Depends on the amount of alcohol in your blood stream
- ◯ c. Is greater than if you drink champagne
- ◯ d. Are less than if you drink hard liquor

**8. To safely drive into a curve, you should:**

- ◯ a. Brake as you enter the curve
- ◯ b. Accelerate while in the curve
- ◯ c. Complete your braking before entering the curve
- ◯ d. Stay to the outside of the curve

**9. Which of the following best describes where you should be looking when driving:**

- ◯ a. At the road directly in front of your vehicle
- ◯ b. Several car lengths straight ahead of your vehicle
- ◯ c. Several car lengths ahead and side to side
- ◯ d. As far ahead as you can see and side to side

**10. What is the most common cause of <u>serious injury</u> accidents among teens?**

- ◯ a. Speeding
- ◯ b. Alcohol
- ◯ c. Poor visual search patterns
- ◯ d. Slippery roads

**11. The most common type of accident at entrances to freeways (expressways) is:**

- ◯ a. Head-on accidents
- ◯ b. Side impact accidents
- ◯ c. Rear end accidents
- ◯ d. None of the above

**12. Because of their faster reaction time, teens deal with which of the following situations better than typical 40 year old drivers:**

- ◯ a. Driving in bad weather
- ◯ b. Recovering from a run-off-the-road event
- ◯ c. Reacting to a change in a traffic signal
- ◯ d. None of the above

**13. Which of the following accident types result in the greatest number of deaths to teenage drivers and their passengers each year?**

- ◯ a. Rear end accidents at stop lights on city streets during rush hour
- ◯ b. Run-off-the-road accidents at curves on country roads at night
- ◯ c. Head-on accidents on straight suburban roads in rain
- ◯ d. Multiple-vehicle accidents on freeways in fog

**14. On a wet road, hydroplaning can be caused by:**

- ◯ a. Low tire tread depth
- ◯ b. Too much speed
- ◯ c. Tire under-inflation
- ◯ d. Any of the above

## SECTION D: SKILLS AND ABILITIES

**1. We want you to rate how good you think your skills and/or abilities are in performing each of the following driving tasks. If you are not yet driving, rate each of these in terms of how good you think you will be when you start driving:**

| | *Very Poor* 1 | 2 | 3 | 4 | *Very Good* 5 |
|---|---|---|---|---|---|
| a. Identifying hazards on the road that could cause an accident | ○ | ○ | ○ | ○ | ○ |
| b. Predicting traffic situations that could develop ahead | ○ | ○ | ○ | ○ | ○ |
| c. Reacting quickly to risky traffic situations | ○ | ○ | ○ | ○ | ○ |
| d. Driving in the dark | ○ | ○ | ○ | ○ | ○ |
| e. Controlling the vehicle if it starts to skid | ○ | ○ | ○ | ○ | ○ |
| f. Maintaining a constant speed | ○ | ○ | ○ | ○ | ○ |
| g. Adjusting speed to the driving conditions | ○ | ○ | ○ | ○ | ○ |
| h. Maintaining a safe following distance | ○ | ○ | ○ | ○ | ○ |
| i. Driving in an unfamiliar area | ○ | ○ | ○ | ○ | ○ |
| j. Changing lanes in heavy traffic | ○ | ○ | ○ | ○ | ○ |
| k. Keeping up with the speed of traffic | ○ | ○ | ○ | ○ | ○ |
| l. Driving in bad weather | ○ | ○ | ○ | ○ | ○ |
| m. Passing on a 2-lane road | ○ | ○ | ○ | ○ | ○ |
| n. Anticipating the actions of other drivers | ○ | ○ | ○ | ○ | ○ |
| o. Avoiding risks that could result in an accident | ○ | ○ | ○ | ○ | ○ |
| p. Tolerating the mistakes of other drivers | ○ | ○ | ○ | ○ | ○ |

**2. For each of the following, indicate how likely they are to happen to you in the coming year.**

| | *Very Unlikely* 1 | 2 | 3 | 4 | *Very Likely* 5 |
|---|---|---|---|---|---|
| a. As a driver, how likely are you to be <u>involved</u> in an accident? | ○ | ○ | ○ | ○ | ○ |
| b. As a driver, how likely are you to be <u>injured</u> in an accident? | ○ | ○ | ○ | ○ | ○ |

## SECTION E: YOUR DRIVING BEHAVIOUR

1. **We want to know how often you do each of the following while driving. If you are not yet driving, we want to know how often you think you might do each of the following as a driver. Please remember that your answers are confidential and for research purposes only.**

| | *Never* 1 | *Rarely* 2 | *Occasionally* 3 | *Often* 4 | *Very Frequently* 5 |
|---|---|---|---|---|---|
| a. Take chances for the fun of it | ○ | ○ | ○ | ○ | ○ |
| b. Pass other cars because it's exciting | ○ | ○ | ○ | ○ | ○ |
| c. Drive dangerously because you enjoy it | ○ | ○ | ○ | ○ | ○ |
| d. Take some risks because it feels good | ○ | ○ | ○ | ○ | ○ |
| e. See how fast you can drive | ○ | ○ | ○ | ○ | ○ |
| f. Out-maneuver other drivers for the thrill of it | ○ | ○ | ○ | ○ | ○ |
| g. Test your skills in ways others might find risky | ○ | ○ | ○ | ○ | ○ |
| h. Try to beat other drivers leaving a stoplight | ○ | ○ | ○ | ○ | ○ |

2. **How often have you done the following things when you were driving during the last three months? [ANSWER ONLY IF YOU HAVE DRIVEN IN THE PAST THREE MONTHS]**

| | *Never* 1 | *Rarely* 2 | *Occasionally* 3 | *Often* 4 | *Very Frequently* 5 |
|---|---|---|---|---|---|
| a. Attempted to pass a vehicle that you hadn't noticed was signaling for a left turn | ○ | ○ | ○ | ○ | ○ |
| b. Failed to notice that pedestrians were crossing before starting to turn | ○ | ○ | ○ | ○ | ○ |
| c. Failed to check your rear-view mirrors and blind spot before changing lanes | ○ | ○ | ○ | ○ | ○ |
| d. Braked to hard on slippery road | ○ | ○ | ○ | ○ | ○ |
| e. Driven especially close to the car in front as a signal to its driver to go faster or get out of the way | ○ | ○ | ○ | ○ | ○ |
| f. Driven over the speed limit on a residential road | ○ | ○ | ○ | ○ | ○ |
| g. Raced away from the traffic lights with the intention of beating the driver next to you | ○ | ○ | ○ | ○ | ○ |
| h. Cut off other drivers who made you angry | ○ | ○ | ○ | ○ | ○ |
| i. Driven when you knew that drinking alcohol had affected your coordination | ○ | ○ | ○ | ○ | ○ |
| j. Missed 'Stop' or 'Yield' signs and narrowly avoided colliding with traffic having the right of way | ○ | ○ | ○ | ○ | ○ |

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very Frequently 5 |
|---|---|---|---|---|---|
| k. On turning right, nearly hit a cyclist who has come up on your right side | ○ | ○ | ○ | ○ | ○ |
| l. Underestimated the speed of an oncoming vehicle when passing another vehicle | ○ | ○ | ○ | ○ | ○ |
| m. Stayed in a lane that you know will be closed ahead until the last minute before merging into another lane | ○ | ○ | ○ | ○ | ○ |
| n. Crossed an intersection knowing that the traffic signal lights have already turned red | ○ | ○ | ○ | ○ | ○ |
| o. Driven over the speed limit on a freeway/expressway/highway | ○ | ○ | ○ | ○ | ○ |
| p. Driven within an hour after having 1 or 2 drinks of alcohol | ○ | ○ | ○ | ○ | ○ |
| q. Driven when you felt high or light-headed from drinking alcohol | ○ | ○ | ○ | ○ | ○ |
| r. Consumed alcohol in the car while you were driving | ○ | ○ | ○ | ○ | ○ |

**3. Indicate how often, if ever, do you do the following while driving. While driving, how often do you: [ANSWER ONLY IF YOU HAVE BEEN DRIVING]**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very Frequently 5 |
|---|---|---|---|---|---|
| a. Make or answer calls on a cell phone | ○ | ○ | ○ | ○ | ○ |
| b. Look at your passengers while talking to them | ○ | ○ | ○ | ○ | ○ |
| c. Look at an event going on outside your vehicle and fail to watch for traffic | ○ | ○ | ○ | ○ | ○ |
| d. Send or receive text messages | ○ | ○ | ○ | ○ | ○ |
| e. Look down while adjusting the radio/CD/iPod/mp3 player | ○ | ○ | ○ | ○ | ○ |

**4. For each of the following statements indicate how responsible you feel when driving. If you are not yet driving, we want to know how responsible you think you will feel as a driver. How responsible do you feel you are for:**

| | Not at All Responsible 1 | 2 | 3 | 4 | Extremely Responsible 5 |
|---|---|---|---|---|---|
| a. Your own safety | ○ | ○ | ○ | ○ | ○ |
| b. The safety of passengers in your vehicle | ○ | ○ | ○ | ○ | ○ |
| c. The safety of other people outside your vehicle | ○ | ○ | ○ | ○ | ○ |

5. **In the past three months, how often did you drive for each of the following reasons? How often did you drive: [ANSWER ONLY IF YOU HAVE DRIVEN IN THE PAST THREE MONTHS]**

| | *Never* 1 | *Less Than Once Per Week* 2 | *Once or Twice Per Week* 3 | *Several Times Per Week* 4 | *Every Day* 5 |
|---|---|---|---|---|---|
| a. To and from school and activities | ○ | ○ | ○ | ○ | ○ |
| b. To and from work | ○ | ○ | ○ | ○ | ○ |
| c. As part of your work | ○ | ○ | ○ | ○ | ○ |
| d. For errands or shopping | ○ | ○ | ○ | ○ | ○ |
| e. Just for fun or something to do | ○ | ○ | ○ | ○ | ○ |
| f. During rush hour | ○ | ○ | ○ | ○ | ○ |
| g. In a town | ○ | ○ | ○ | ○ | ○ |
| h. In a city | ○ | ○ | ○ | ○ | ○ |
| i. On unpaved roads | ○ | ○ | ○ | ○ | ○ |
| j. At night after 10 p.m | ○ | ○ | ○ | ○ | ○ |
| k. With teen passengers in your vehicle | ○ | ○ | ○ | ○ | ○ |
| l. On rural highways | ○ | ○ | ○ | ○ | ○ |
| m. On highways (expressways) | ○ | ○ | ○ | ○ | ○ |

6. **After you got your licence to drive by yourself, how many short trips (at least 1 kilometer or up to ten kilometers) and long trips (ten kilometers or more) did you take in a typical weekday and weekend. Record the number of trips in the table below: [ANSWER ONLY IF YOU HAVE AN INTERMEDIATE OR FULL LICENCE]**

| | Weekday (Monday - Friday) | Weekend (Saturday - Sunday) |
|---|---|---|
| a. Short Trips | ________ | ________ |
| b. Long Trips | ________ | ________ |

7. **In the past three days, about how much time, in minutes, did you drive each day, beginning with yesterday? [ANSWER ONLY IF YOU HAVE DRIVEN IN THE PAST THREE DAYS]**

a. Yesterday ______ minutes

c. Three days ago ______ minutes

b. Two days ago ______ minutes

## SECTION F: ABOUT YOU

**1. For each of the following statements about driving indicate the extent to which you agree or disagree. If you are not yet driving, answer each of these in terms of whether you think you will agree or disagree when you start driving.**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| a. I am confident that I know (will know) all the rules of the road | ○ | ○ | ○ | ○ | ○ |
| b. Because I am (will be) a skilled driver, I can (will be able to) drive recklessly and still be safe | ○ | ○ | ○ | ○ | ○ |
| c. If I were (become) a more cautious driver, some of my friends would laugh at the way I drive | ○ | ○ | ○ | ○ | ○ |
| d. It is (will be) really satisfying to pass other cars on the highway | ○ | ○ | ○ | ○ | ○ |
| e. It is (will be) fun to weave through slower traffic | ○ | ○ | ○ | ○ | ○ |
| f. There's a lot I can do (will be able to do) to avoid an accident | ○ | ○ | ○ | ○ | ○ |
| g. I take (will likely take) more driving risks when I am with my friends | ○ | ○ | ○ | ○ | ○ |
| h. It is (will be) fun to beat other drivers when the light changes | ○ | ○ | ○ | ○ | ○ |
| i. It is (will be) a thrill to out-maneuver other drivers | ○ | ○ | ○ | ○ | ○ |
| j. Taking risks in traffic makes (will make) driving more fun | ○ | ○ | ○ | ○ | ○ |

**2. The following statements are NOT related to driving. For each indicate the extent to which you agree or disagree.**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| a. I like taking risks | ○ | ○ | ○ | ○ | ○ |
| b. If I do only what is safe, I will go through life never fully enjoying things | ○ | ○ | ○ | ○ | ○ |
| c. It is OK to do anything you want as long as you keep out of trouble | ○ | ○ | ○ | ○ | ○ |
| d. If something works, it does not matter whether it is the right or wrong thing to do | ○ | ○ | ○ | ○ | ○ |
| e. It is OK to get around laws and rules as long as you don't break them | ○ | ○ | ○ | ○ | ○ |
| f. My friends could push me into doing just about anything | ○ | ○ | ○ | ○ | ○ |
| g. I've often broken rules because others urged me to | ○ | ○ | ○ | ○ | ○ |
| h. If my friends were drinking, it would be hard for me to resist having a drink | ○ | ○ | ○ | ○ | ○ |
| i. I've felt pressured to get drunk at parties | ○ | ○ | ○ | ○ | ○ |
| j. I often do things because my friends want me to | ○ | ○ | ○ | ○ | ○ |
| k. I've often done dangerous things because others dared me to | ○ | ○ | ○ | ○ | ○ |
| l. I've felt pressured to have sex, because a lot of people my own age have already had sex | ○ | ○ | ○ | ○ | ○ |
| m. I've felt pressured to do drugs | ○ | ○ | ○ | ○ | ○ |

**3. For each of the following statements indicate the extent to which they describe you.**

| | Not At All Like Me 1 | 2 | 3 | 4 | Very Much Like Me 5 |
|---|---|---|---|---|---|
| a. I believe that getting together with one's friends to "hangout" is one of life's important pleasures | ○ | ○ | ○ | ○ | ○ |
| b. I try to live my life one day at a time | ○ | ○ | ○ | ○ | ○ |
| c. I don't think much about where I'll be in the future | ○ | ○ | ○ | ○ | ○ |
| d. I feel that it's more important to enjoy what you're doing than to get work done on time | ○ | ○ | ○ | ○ | ○ |
| e. If things don't get done on time, I don't worry about it | ○ | ○ | ○ | ○ | ○ |
| f. It doesn't make sense to worry about the future | ○ | ○ | ○ | ○ | ○ |
| g. I do things without thinking | ○ | ○ | ○ | ○ | ○ |

**4. For each of the following statements we want to know how often this applies to you.**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very Frequently 5 |
|---|---|---|---|---|---|
| a. Your parents know where you are when you are not in school or at work | ○ | ○ | ○ | ○ | ○ |
| b. When your parents tell you to do something, you do it | ○ | ○ | ○ | ○ | ○ |
| c. You follow your parents' values | ○ | ○ | ○ | ○ | ○ |
| d. Your parents want to know where you are | ○ | ○ | ○ | ○ | ○ |

**5. For each of the following statements, indicate the extent to which you disagree or agree.**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| a. I like who I am | ○ | ○ | ○ | ○ | ○ |
| b. I am happy and content | ○ | ○ | ○ | ○ | ○ |
| c. I set goals for myself | ○ | ○ | ○ | ○ | ○ |
| d. My life has purpose | ○ | ○ | ○ | ○ | ○ |
| e. I am confident about my beliefs | ○ | ○ | ○ | ○ | ○ |
| f. I know my strengths and weaknesses | ○ | ○ | ○ | ○ | ○ |
| g. I look forward to the future | ○ | ○ | ○ | ○ | ○ |
| h. I examine my beliefs | ○ | ○ | ○ | ○ | ○ |

**6. For each of the following statements indicate the extent to which you disagree or agree.**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| a. I'd do almost anything on a dare | ○ | ○ | ○ | ○ | ○ |
| b. I like to live dangerously | ○ | ○ | ○ | ○ | ○ |
| c. I enjoy the thrill I get when I take risks | ○ | ○ | ○ | ○ | ○ |

**7. For each of the following statements indicate how acceptable you view the behaviour. How acceptable do you think it is to:**

| | *Very Unacceptable* 1 | 2 | 3 | 4 | *Very Acceptable* 5 |
|---|---|---|---|---|---|
| a. Give a fake excuse for missing work | ○ | ○ | ○ | ○ | ○ |
| b. Damage public property on purpose | ○ | ○ | ○ | ○ | ○ |
| c. Damage something valuable that belongs to a person you are angry with | ○ | ○ | ○ | ○ | ○ |
| d. Take things of value that do not belong to you | ○ | ○ | ○ | ○ | ○ |
| e. Skip a class | ○ | ○ | ○ | ○ | ○ |
| f. Give false information when filing out a job application | ○ | ○ | ○ | ○ | ○ |

# End of Survey

# Thank You

# APPENDIX B: REFERENCES FOR THE DIMENSION/OUTCOME BEING MEASURED BY VARIOUS SCALES/ITEMS IN THE MANITOBA NEW DRIVER SURVEY

| Dimension | Location in Survey | Scale Origin | Reference | # of Items |
|---|---|---|---|---|
| **1. GDL Knowledge** response 1= yes response 2= no response 3= don't know | Section B; Q1 & 2 | no pre-existing scale used; developed by research team and advisory panel | n/a | 17 |
| **2. GDL Overall Support** response 1= strongly oppose to response 5= strongly support | Section B; Q3 | no specific scale used; developed by research team and advisory panel | n/a | 1 |
| **3. GDL Support-Specific Requirements** response 1= strongly oppose to response 5= strongly support | Section B; Q4 | no pre-existing scale used; developed by research team and advisory panel | n/a | 5 |
| **4. GDL Influence** response 1= strongly disagree to response 5= strongly agree | Section B; Q10 | no pre-existing scale used; developed by research team and advisory panel | n/a | 3 |
| **5. Safe Driving Knowledge** | Section C; Q1-14 | no pre-existing scale used; developed by research team and advisory panel | n/a | 14 |
| **6. Self-rated Skills** response 1= very poor to response 5= very good | Section D; Q1 | • Driving Skills and Safety Mindedness: Skill items (DQ1: items a, b, c, d, e, i, j, k, m)<br>• Driving Skills and Safety Mindedness: Safety-mindedness items | Mayhew, D., Simpson, H., Singhal, D., and Desmond, K. (2006). *Reducing the Crash Risk for Young Drivers:* Washington, DC: American Automobile Association.<br><br>Matthews, M.L. & Moran, A.R. (1986) Age differences in male drivers' perception of accident risk: The role of perceived driving ability. *Accident Analysis and Prevention*. 18(4): 299-313. | 16 |

| Dimension | Location in Survey | Scale Origin | Reference | # of Items |
|---|---|---|---|---|
| | | (DQ1: items f, g, h, n, o, p) | Groeger, J.A. and Brown, I.D. (1989) Assessing one's own and others driving ability: influences of sex, age, and experience. *Accident Analysis and Prevention*. 21(2): 155-168. | |
| **7. Perceived Likelihood of Accident or Injury** response 1= very unlikely to response 5= very likely | Section D; Q2 | no pre-existing scale used; developed by research team and advisory panel | n/a | 2 |
| **8. Risk Taking Behavior** response 1= never to response 5= very frequently | Section EQ1 | Donovan Risk-Taking (EQ1: items a-h) | Donovan, J.E. (1993) Problem behavior theory and the explanation of adolescent marijuana use. *Journal of Drug Issues*. 26: 379-404.<br><br>Patil, S.M., Shope, J.T., Raghunathan, T.E., & Gingham, C.R. (2006) The role of personality characteristics in Young Adult Driving. Traffic Injury Prevention. 7: 328-334. | 8 |
| **9. Risky Driving Behavior** response 1= never to response 5= very frequently | Section E; EQ2 & EQ3 | • Manchester Driving Behavior Questionnaire (DBQ): Errors subscale (EQ2: items a-d, j-l)<br>• Manchester DBQ: Highway Code Violations Subscale (EQ2: items e, f, g, m-o) | Lajunen, T., Parker, D., & Summala, H. (2003). The Manchester Driver Behaviour Questionnaire: a cross-cultural study. *Accident Analysis and Prevention, 942,* 1-8.<br><br>Lajunen, T., Parker, D., & Stradling, S.G. (1998). Dimensions of driver anger, aggressive and highway code violations and their mediation by safety orientation. *Transportation Research Part F, 1,* 107-121. | 23 |

| Dimension | Location in Survey | Scale Origin | Reference | # of Items |
|---|---|---|---|---|
| | | • Drink/Driving (EQ2: items i, p-r)<br>• Distraction (EQ3: items a-e) | | |
| **10. Risky Driving Attitude** response 1= strongly disagree to response 5= strongly agree | Section F; Q1 | Competitive Attitude Toward Driving (FQ1: items d, e, h, i, j) | Donovan, J.E. (1993) Problem behavior theory and the explanation of adolescent marijuana use. *Journal of Drug Issues*. 26: 379-404.<br><br>Patil, S.M., Shope, J.T., Raghunathan, T.E., & Gingham, C.R. (2006) The role of personality characteristics in Young Adult Driving. Traffic Injury Prevention. 7: 328-334. | 10 |
| **11. Risk Taking Attitude** response 1= strongly disagree to response 5= strongly agree | Section F; FQ2 & FQ6 | • Normlessness (FQ2: items c, d, e)<br>• Peer-Pressure (FQ2: items, f-m)<br>• Risk Taking Propensity (FQ6 a-c) | | 16 |
| **12. Lifestyle** response 1= strongly disagree to response 5= strongly agree | Section F; Q5 | Adolescent Lifestyle Questionnaire (FQ5: items a-h) | Gillis, A. J. (1997). The Adolescent Lifestyle Questionnaire: Development and psychometric testing. *Canadian Journal of Nursing Research, 29*(1), 29-46. | 8 |
| **13. Tolerance of Deviance** response 1= very unacceptable to response 5= very acceptable | Section F; Q7 | Tolerance of Deviance (FQ7: items a-f) | Rachel, J. V., Williams, J. R., Brehm, M. L., Cavanaugh, B., Moore, R. P. & Eckerman, W. C. (1975) A national study of adolescent drinking behavior, attitudes, and correlates: A final report. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism. | 6 |

| Dimension | Location in Survey | Scale Origin | Reference | # of Items |
|---|---|---|---|---|
| **14. Parental Monitoring** response 1= never to response 5= very frequently | Section F; Q4 | Parental Behavioral Monitoring (FQ4: items a-d) | McAlister, A.L. (1983) Social-psychological approaches. National Institute on Drug Abuse: Research Monograph Series. 47: 36-50. Parental behavioral monitoring (McAlister 1983) was measured by four items. | 4 |
| **15. Exposure** response 1= never to response 5= every day | Section E; Q5 | no pre-existing scale used; developed by research team and advisory panel | n/a | 13 |
| **16. Time Perspective** response 1= not at all like me to response 5= very much like me | Section F; Q3 | Zimbardo Time Perspective Inventory (FQ3: items a-g) | Zimbardo, P.G., Keough, K.A. & Boyd, J.N. (1997) Present time perspective as a predictor of risky driving. Personality and Individual Differences. 23(6): 1007-1023. | 7 |

# APPENDIX C: ITEM BY ITEM RESPONSES TO GDL KNOWLEDGE QUESTIONS FROM MANITOBA

| | GDL knowledge<br>Item by item analysis | Driver Education Status | | | |
|---|---|---|---|---|---|
| Learner Phase | Respondents were asked to indicate which of the following were permitted: | HSDE Group Wave 1: Percent Correct | HSDE Group Wave 2: Percent Correct | Non-DE Group Wave 1: Percent Correct | Non-DE Group Wave 2: Percent Correct |
| | 1a. Driving without a supervising driver in the vehicle | 88 | 88 | 81 | 82 |
| | 1b. Driving with a supervising driver who has held a full valid licence for one year | 68 | 81 | 43 | 53 |
| | 1c. Driving with a supervising driver who has held a full valid licence for 3 years | 88 | 90 | 81 | 85 |
| | 1d. Driving with two teenagers in the front seat | 88 | 89 | 78 | 78 |
| | 1e. Driving with the number of backseat passengers equal to the number of seatbelts | 77 | 86 | 62 | 66 |
| | 1f. Driving after consuming any amount of alcohol | 97 | 92 | 90 | 86 |
| | 1g. Driving with a supervising driver whose blood alcohol exceeds .05 | 82 | 80 | 73 | 75 |
| Intermediate Licence Phase | 2a. Driving home from school with one teenage friend in the car | 86 | 92 | 74 | 78 |
| | 2b. Driving to a friend's house after school with one teenage friend in the car | 86 | 90 | 72 | 75 |
| | 2c. Driving home from school with two teenage friends in the front seat of your car | 72 | 71 | 68 | 66 |
| | 2d. Driving home from your job at 1:00 am | 46 | 53 | 29 | 69 |
| | 2e. Driving home from your friends at 1:00 am with only 3 teenage friends in the car | 81 | 76 | 70 | 69 |
| | 2f. Driving home from school with one teenage friend in the front seat and three in the backseat | 68 | 79 | 49 | 53 |
| | 2g. Driving after consuming any amount of alcohol | 93 | 87 | 85 | 84 |
| | 2h. Sending a text message from your cell phone while you are driving | 85 | 83 | 84 | 84 |
| | 2i. Talking on a hand-held cell phone while you are driving | 80 | 79 | 79 | 78 |

| | | | | | |
|---|---|---|---|---|---|
| | **2j. Talking on a hands-free cell phone while you are driving** | 60 | 66 | 48 | 50 |

# APPENDIX D: ITEM BY ITEM RESPONSES TO SAFE DRIVING KNOWLEDGE QUESTIONS FROM MANITOBA

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **HSDE Group Wave 1: Percent of Responses** | **HSDE Group Wave 2: Percent of Responses** | **Non-DE Group Wave 1: Percent of Responses** | **Non-DE Group Wave 2: Percent of Responses** |
| **1. When changing lanes, you can check your blind spot by:** | | | | |
| a. Using the inside rear-view mirror | 1 | 1 | 6 | 5 |
| b. Using both inside rear-view mirrors and outside rear-view mirrors | 10 | 2 | 22 | 20 |
| c. Turning your head and looking over your shoulder | 23 | 28 | 14 | 13 |
| d. All of the above | 66 | 69 | 58 | 62 |
| **2. To reduce glare from the head lights of an oncoming vehicle, you should:** | | | | |
| a. Look to the right edge of the roadway just as you approach the vehicle | 75 | 84 | 54 | 56 |
| b. Look to the left edge of the roadway just as you approach the vehicle | 14 | 9 | 19 | 22 |
| c. Increase your speed to get past the vehicle quickly | 3 | 3 | 5 | 6 |
| d. Keep the overhead light turned on | 9 | 3 | 23 | 16 |
| **3. What is the most common cause of minor accidents among teens?** | | | | |
| a. Slippery roads | 12 | 8 | 11 | 10 |
| b. Alcohol | 23 | 23 | 28 | 23 |
| c. Speeding | 46 | 48 | 46 | 50 |
| d. Poor visual search patterns | 19 | 21 | 15 | 17 |
| **4. A car going twice as fast as another would strike an object how much harder?** | | | | |
| a. Four times as hard | 41 | 52 | 37 | 45 |
| b. Three times as hard | 12 | 11 | 11 | 10 |
| c. Twice as hard | 46 | 36 | 51 | 40 |
| d. A little harder | 1 | 1 | 2 | 5 |
| **5. What is most important in preventing a vehicle from going off the road in a curve?** | | | | |
| a. Resistance of the air around the vehicle | 5 | 7 | 3 | 11 |

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **HSDE Group Wave 1: Percent of Responses** | **HSDE Group Wave 2: Percent of Responses** | **Non-DE Group Wave 1: Percent of Responses** | **Non-DE Group Wave 2: Percent of Responses** |
| b. Friction between the tires and the road surface | 69 | 74 | 56 | 56 |
| c. The weight of the vehicle | 10 | 6 | 13 | 11 |
| d. The power steering system | 16 | 13 | 27 | 22 |
| **6. Your traffic light changes to yellow as you approach an intersection. In most cases, what action should you take?** | | | | |
| a. Stop, if you can do so safely | 84 | 88 | 79 | 76 |
| b. Signal for a right turn and slow | 5 | 3 | 7 | 9 |
| c. Go through if no other vehicles are coming | 8 | 6 | 11 | 10 |
| d. Accelerate to clear the intersection | 4 | 4 | 3 | 6 |
| **7. Beer's effects on your reflexes and judgement:** | | | | |
| a. Are less than if you drink wine | 3 | 3 | 5 | 5 |
| b. Depends on the amount of alcohol in your blood stream | 85 | 82 | 81 | 80 |
| c. Is greater than if you drink champagne | 4 | 3 | 4 | 5 |
| d. Are less than if you drink hard liquor | 9 | 12 | 11 | 10 |
| **8. To safely drive into a curve, you should:** | | | | |
| a. Brake as you enter the curve | 47 | 44 | 47 | 51 |
| b. Accelerate while in the curve | 5 | 9 | 8 | 10 |
| c. Complete your braking before entering the curve | 35 | 37 | 25 | 25 |
| d. Stay to the outside of the curve | 13 | 11 | 19 | 14 |
| **9. Which of the following best describes where you should be looking when driving:** | | | | |

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **HSDE Group Wave 1: Percent of Responses** | **HSDE Group Wave 2: Percent of Responses** | **Non-DE Group Wave 1: Percent of Responses** | **Non-DE Group Wave 2: Percent of Responses** |
| a. At the road directly in front of your vehicle | 8 | 6 | 18 | 18 |
| b. Several car lengths straight ahead of your vehicle | 13 | 13 | 15 | 18 |
| c. Several car lengths ahead and side to side | 43 | 42 | 38 | 36 |
| d. As far ahead as you can see and side to side | 36 | 40 | 30 | 28 |
| **10. What is the most common cause of serious injury accidents among teens?** | | | | |
| a. Speeding | 38 | 38 | 33 | 33 |
| b. Alcohol | 58 | 55 | 56 | 59 |
| c. Poor visual search patterns | 3 | 5 | 5 | 5 |
| d. Slippery roads | 2 | 2 | 5 | 4 |
| **11. The most common type of accident at entrances to freeways (expressways) is:** | | | | |
| a. Head-on accidents | 13 | 13 | 16 | 16 |
| b. Side impact accidents | 45 | 48 | 44 | 48 |
| c. Rear end accidents | 37 | 36 | 31 | 27 |
| d. None of the above | 5 | 3 | 10 | 9 |
| **12. Because of their faster reaction time, teens deal with which of the following situations better than typical 40 year old drivers:** | | | | |
| a. Driving in bad weather | 8 | 9 | 12 | 16 |
| b. Recovering from a run-off-the-road event | 16 | 19 | 17 | 19 |
| c. Reacting to a change in a traffic signal | 41 | 40 | 40 | 38 |
| d. None of the above | 35 | 32 | 30 | 27 |
| **13. Which of the following accident types result in the greatest number of deaths to teenage drivers and their passengers each year?** | | | | |
| a. Rear end accidents at stop lights on city streets during rush hour | 21 | 22 | 21 | 23 |
| b. Run-off-the-road accidents at curves on country roads at night | 40 | 42 | 32 | 37 |
| c. Head-on accidents on straight suburban roads in | 29 | 28 | 31 | 25 |

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **HSDE Group Wave 1: Percent of Responses** | **HSDE Group Wave 2: Percent of Responses** | **Non-DE Group Wave 1: Percent of Responses** | **Non-DE Group Wave 2: Percent of Responses** |
| rain | | | | |
| d. Multiple-vehicle accidents on freeways in fog | 11 | 8 | 16 | 14 |
| **14. On a wet road, hydroplaning can be caused by:** | | | | |
| a. Low tire tread depth | 6 | 6 | 5 | 12 |
| b. Too much speed | 13 | 14 | 18 | 20 |
| c. Tire under-inflation | 4 | 4 | 6 | 7 |
| d. Any of the above | 76 | 76 | 65 | 61 |

# APPENDIX E: THE MANITOBA NEW DRIVER SURVEY (TEEN RETROSPECTIVE)

# MANITOBA NEW DRIVER SURVEY

## TEEN SURVEY

The questionnaire will take you about 20 minutes to complete. Please complete it as soon as possible and return it in the envelope provided. Your answers are completely confidential, will remain anonymous, and have no effect on your driver's licence or automobile insurance coverage.

If you have any questions about the survey or the process, you can call Nicholas Borodenko, Senior Research Manager at PRA, at 987-2030 or toll-free at 1-888-877-6744. Thank you for taking the time to participate.

## SECTION A: BACKGROUND INFORMATION

1. **What grade are you in?** __________________

2. **What is your gender?**
   - ○ a. Male
   - ○ b. Female
   - ○ c. Prefer not to answer

3. **Do you live in a city, town, or rural area?**
   - ○ a. City
   - ○ b. Town
   - ○ c. Rural
   - ○ d. Don't know

4. **What is the name of the town or city where you live or are closest to?**

   ____________________________________________________________

5. **Today's date:** ________ Day ________ Month

## SECTION B: DRIVER EDUCATION/TRAINING

**For each question, please fill in the bubble that best matches your answer -- e.g., if your answer to Question 1 is Yes, I have taken the MPI High School Driver Education program, fill in the bubble** ● a. Yes, I have taken the MPI High School Driver Education program.

**1. Have you taken a driver education/training program?**

○ a. Yes, I have taken the MPI High School Driver Education program. **If you have taken the MPI Driver Education program, have you… (mark all that apply):**
- ○ a1. Finished all of the in-class lessons
- ○ a2. Finished all of the in-vehicle lessons
- ○ a3. Submitted your practice log sheet to MPI
- ○ a4. Received a Driver Education Certificate from MPI

○ b. Yes, I have taken a private/commercial driving school program

○ c. No, I have not taken a driver education/training program. **IF NO, GO TO SECTION C OF THE SURVEY ON PAGE 3: LEARNING TO DRIVE.**

**2. What were the main reasons you took a driver education program? (mark all that apply)**

○ a. A parent or guardian made me take it
○ b. To get my licence sooner
○ c. To get credits from school
○ d. So I wouldn't learn someone else's bad habits
○ e. I had no one else to teach me
○ f. To make me a safer driver
○ g. To make me a more skilled driver
○ h. To help me pass the road test
○ i. So I could get my learner's permit before age 16
○ j. Other reason (please specify) ______________________________

**2a. Of these reasons, which was the single most important reason?**
**(write in the letter that appears next to your answer from the above question)**

Specify letter_____

**3. What were the main reasons for not taking a different driver education program? (mark all that apply)**

○ a. Not aware of other programs
○ b. Not convenient
○ c. Couldn't afford the cost
○ d. Couldn't afford the time
○ e. Not available in my school
○ f. Not as good as the program I took
○ g. Other reason (please specify) ______________________

**3a. Of these reasons, which was the single most important reason?**
**(write in the letter that appears next to your answer from the above question)**

Specify letter_____

**4. Using a number from 1 to 5, where 1 means you strongly disagree and 5 means you strongly agree, please rate the extent to which you agree or disagree with each of the following statements.**

| | *Strongly disagree* 1 | 2 | 3 | 4 | *Strongly agree* 5 |
|---|---|---|---|---|---|
| a. I think my driver education course was important in teaching me to be a safe driver | ○ | ○ | ○ | ○ | ○ |
| b. My driver education course has helped me become a better defensive driver | ○ | ○ | ○ | ○ | ○ |
| c. My driver education course has helped me avoid being in an accident | ○ | ○ | ○ | ○ | ○ |
| d. I think that teenagers planning to get a driver's licence should take my driver education course | ○ | ○ | ○ | ○ | ○ |
| e. I would recommend my driver education course to my friends | ○ | ○ | ○ | ○ | ○ |

## SECTION C: LEARNING TO DRIVE

**For each question, please fill in the bubble that best matches your answer.**

**1. When you had a Learner's licence, who served as the experienced driver accompanying you? (mark all that apply)**

○ a. Mother
○ b. Father
○ c. Older brother or sister
○ d. Other relative
○ e. Friend
○ f. Driving instructor
○ g. Other (specify) ____________________________________________

**1a. Of those, which <u>one</u> person rode with you the most as the experienced driver accompanying you?**

Specify letter ___

**2. In an average week, about how many hours of supervised driving practice did you get before obtaining your Intermediate licence?**

_________ number of hours

**3. How many hours of driving practice do you think the *average* new driver should have before they get their Intermediate licence?**

_________ number of hours

**4. After you got your Intermediate licence to drive by yourself, did you ever drive with a parent or other adult driver specifically to get more supervised driving practice?**

○ a. Yes ➔ If yes, for how many hours ________
○ b. No

**5. For each of the following statements, indicate the extent to which you agree or disagree.**

| | Strongly disagree 1 | 2 | 3 | 4 | Strongly agree 5 |
|---|---|---|---|---|---|
| a. It is important for new drivers to have several months to practice driving before they begin driving without a parent or other adult driver in the car | ○ | ○ | ○ | ○ | ○ |
| b. Requiring me to practice driving under supervision has given me the confidence to drive without an experienced adult driver in the car | ○ | ○ | ○ | ○ | ○ |

## SECTION D: SAFE DRIVING

**For each question, please mark only one answer.**

**1. When changing lanes, you can check your blind spot by:**

○ a. Using the inside rear-view mirror
○ b. Using both inside rear-view mirrors and outside rear-view mirrors
○ c. Turning your head and looking over your shoulder
○ d. All of the above

**2. To reduce glare from the headlights of an oncoming vehicle, you should:**

○ a. Look to the right edge of the roadway just as you approach the vehicle
○ b. Look to the left edge of the roadway just as you approach the vehicle
○ c. Increase your speed to get past the vehicle quickly
○ d. Keep the overhead light turned on in your vehicle

**3. What is the most common cause of minor accidents among teens?**

○ a. Slippery roads
○ b. Alcohol
○ c. Speeding
○ d. Poor visual search patterns

**4. A car going twice as fast as another would strike an object how much harder?**

○ a. Four times as hard
○ b. Three times as hard
○ c. Twice as hard
○ d. A little harder

**5. What is most important in preventing a vehicle from going off the road in a curve?**

○ a. Resistance of the air around the vehicle
○ b. Friction between the tires and the road surface
○ c. The weight of the vehicle
○ d. The power steering system

6. **Your traffic light changes to yellow as you approach an intersection. In most cases, what action should you take?**
   - ○ a. Stop, if you can do so safely
   - ○ b. Signal for a right turn and slow
   - ○ c. Go through if no other vehicles are coming
   - ○ d. Accelerate to clear the intersection

7. **Beer's effects on your reflexes and judgment:**
   - ○ a. Are less than if you drink wine
   - ○ b. Depend on the amount of alcohol in your bloodstream
   - ○ c. Are greater than if you drink champagne
   - ○ d. Are less than if you drink hard liquor

8. **To safely drive into a curve, you should:**
   - ○ a. Brake as you enter the curve
   - ○ b. Accelerate while in the curve
   - ○ c. Complete your braking before entering the curve
   - ○ d. Stay to the outside of the curve

9. **Which of the following best describes where you should be looking when driving?**
   - ○ a. At the road directly in front of your vehicle
   - ○ b. Several car lengths straight ahead of your vehicle
   - ○ c. Several car lengths ahead and side-to-side
   - ○ d. As far ahead as you can see and side-to-side

10. **What is the most common cause of <u>serious injury</u> accidents among teens?**
    - ○ a. Speeding
    - ○ b. Alcohol
    - ○ c. Poor visual search patterns
    - ○ d. Slippery roads

11. **The most common type of accident at entrances to freeways (expressways) is:**
    - ○ a. Head-on accidents
    - ○ b. Side impact accidents
    - ○ c. Rear-end accidents
    - ○ d. None of the above

12. **Because of their faster reaction time, teens deal with which of the following situations better than typical 40-year-old drivers?**
    - ○ a. Driving in bad weather
    - ○ b. Recovering from a run-off-the-road event
    - ○ c. Reacting to a change in a traffic signal
    - ○ d. None of the above

13. **Which of the following accident types results in the greatest number of deaths among teenage drivers and their passengers each year?**
    - ○ a. Rear-end accidents at stoplights on city streets during rush hour
    - ○ b. Run-off-the-road accidents at curves on country roads at night
    - ○ c. Head-on accidents on straight suburban roads in rain
    - ○ d. Multiple-vehicle accidents on freeways in fog

**14. On a wet road, hydroplaning can be caused by:**

- a. Low tire tread depth
- b. Too much speed
- c. Tire under-inflation
- d. Any of the above

## SECTION E: SKILLS AND ABILITIES

**1. We want you to rate how good you think your skills and/or abilities are in performing each of the following driving tasks:**

| | Very poor 1 | 2 | 3 | 4 | Very good 5 |
|---|---|---|---|---|---|
| a. Identifying hazards on the road that could cause an accident | ○ | ○ | ○ | ○ | ○ |
| b. Predicting traffic situations that could develop ahead | ○ | ○ | ○ | ○ | ○ |
| c. Reacting quickly to risky traffic situations | ○ | ○ | ○ | ○ | ○ |
| d. Driving in the dark | ○ | ○ | ○ | ○ | ○ |
| e. Controlling the vehicle if it starts to skid | ○ | ○ | ○ | ○ | ○ |
| f. Maintaining a constant speed | ○ | ○ | ○ | ○ | ○ |
| g. Adjusting speed to the driving conditions | ○ | ○ | ○ | ○ | ○ |
| h. Maintaining a safe following distance | ○ | ○ | ○ | ○ | ○ |
| i. Driving in an unfamiliar area | ○ | ○ | ○ | ○ | ○ |
| j. Changing lanes in heavy traffic | ○ | ○ | ○ | ○ | ○ |
| k. Keeping up with the speed of traffic | ○ | ○ | ○ | ○ | ○ |
| l. Driving in bad weather | ○ | ○ | ○ | ○ | ○ |
| m. Passing on a two-lane road | ○ | ○ | ○ | ○ | ○ |
| n. Anticipating the actions of other drivers | ○ | ○ | ○ | ○ | ○ |
| o. Avoiding risks that could result in an accident | ○ | ○ | ○ | ○ | ○ |
| p. Tolerating the mistakes of other drivers | ○ | ○ | ○ | ○ | ○ |

## SECTION F: YOUR DRIVING BEHAVIOUR

**1. We want to know how often you do each of the following <u>while driving</u>. Please remember that your answers are confidential and are for research purposes only.**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very frequently 5 |
|---|---|---|---|---|---|
| a. Take chances for the fun of it | ○ | ○ | ○ | ○ | ○ |
| b. Pass other cars because it's exciting | ○ | ○ | ○ | ○ | ○ |
| c. Drive dangerously because you enjoy it | ○ | ○ | ○ | ○ | ○ |
| d. Take some risks because it feels good | ○ | ○ | ○ | ○ | ○ |
| e. See how fast you can drive | ○ | ○ | ○ | ○ | ○ |
| f. Out-manoeuvre other drivers for the thrill of it | ○ | ○ | ○ | ○ | ○ |
| g. Test your skills in ways others might find risky | ○ | ○ | ○ | ○ | ○ |
| h. Try to beat other drivers leaving a stoplight | ○ | ○ | ○ | ○ | ○ |

**2. In the past three months, how often have you done the following things when you were driving?**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very frequently 5 |
|---|---|---|---|---|---|
| a. Attempted to pass a vehicle that you hadn't noticed was signalling for a left turn | ○ | ○ | ○ | ○ | ○ |
| b. Failed to notice that pedestrians were crossing before starting to turn | ○ | ○ | ○ | ○ | ○ |
| c. Failed to check your rear-view mirrors and blind spot before changing lanes | ○ | ○ | ○ | ○ | ○ |
| d. Braked too hard on a slippery road | ○ | ○ | ○ | ○ | ○ |
| e. Driven especially close to the car in front as a signal to its driver to go faster or get out of the way | ○ | ○ | ○ | ○ | ○ |
| f. Driven over the speed limit on a residential road | ○ | ○ | ○ | ○ | ○ |
| g. Raced away from the traffic lights with the intention of beating the driver next to you | ○ | ○ | ○ | ○ | ○ |
| h. Cut off other drivers who made you angry | ○ | ○ | ○ | ○ | ○ |
| i. Driven when you knew that drinking alcohol had affected your coordination | ○ | ○ | ○ | ○ | ○ |
| j. Missed 'Stop' or 'Yield' signs and narrowly avoided colliding with traffic having the right of way | ○ | ○ | ○ | ○ | ○ |
| k. On turning right, nearly hit a cyclist who has come up on your right side | ○ | ○ | ○ | ○ | ○ |
| l. Underestimated the speed of an oncoming vehicle when passing another vehicle | ○ | ○ | ○ | ○ | ○ |
| m. Stayed in a lane that you knew would be closed ahead until the last minute before merging into another lane | ○ | ○ | ○ | ○ | ○ |
| n. Crossed an intersection knowing that the traffic signal lights have already turned red | ○ | ○ | ○ | ○ | ○ |
| o. Driven over the speed limit on a freeway/expressway/highway | ○ | ○ | ○ | ○ | ○ |
| p. Driven within an hour after having one or two drinks of alcohol | ○ | ○ | ○ | ○ | ○ |
| q. Driven when you felt high or light-headed from drinking alcohol | ○ | ○ | ○ | ○ | ○ |
| r. Consumed alcohol in the car while you were driving | ○ | ○ | ○ | ○ | ○ |

3. **Indicate how often, if ever, you do the following while driving. While driving, how often do you:**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very frequently 5 |
|---|---|---|---|---|---|
| a. Make or answer calls on a cell phone | ○ | ○ | ○ | ○ | ○ |
| b. Look at your passengers while talking to them | ○ | ○ | ○ | ○ | ○ |
| c. Look at an event going on outside your vehicle and fail to watch for traffic | ○ | ○ | ○ | ○ | ○ |
| d. Send or receive text messages | ○ | ○ | ○ | ○ | ○ |
| e. Look down while adjusting the radio/CD/iPod/MP3 player | ○ | ○ | ○ | ○ | ○ |

4. **After you got your licence to drive by yourself, how many short trips (at least 1 kilometre or up to 10 kilometres) and long trips (10 kilometres or more) did you take on a typical day during the week and during the weekend? Record the number of trips in the table below:**

| | Weekday (Monday - Friday) | Weekend (Saturday - Sunday) |
|---|---|---|
| a. Number of short trips | _________ | _________ |
| b. Number of long trips | _________ | _________ |

5. **In the past three days, about how much time, in minutes, did you drive each day, beginning with yesterday?**

   a. Yesterday ______ minutes

   b. Two days ago ______ minutes

   c. Three days ago ______ minutes

## SECTION G: ABOUT YOU

1. **For each of the following statements <u>about driving,</u> indicate the extent to which you agree or disagree.**

| | Strongly disagree 1 | 2 | 3 | 4 | Strongly agree 5 |
|---|---|---|---|---|---|
| a. I am confident that I know all of the rules of the road | ○ | ○ | ○ | ○ | ○ |
| b. Because I am a skilled driver, I can drive recklessly and still be safe | ○ | ○ | ○ | ○ | ○ |
| c. If I were a more cautious driver, some of my friends would laugh at the way I drive | ○ | ○ | ○ | ○ | ○ |
| d. It is really satisfying to pass other cars on the highway | ○ | ○ | ○ | ○ | ○ |
| e. It is fun to weave through slower traffic | ○ | ○ | ○ | ○ | ○ |
| f. There's a lot I can do to avoid an accident | ○ | ○ | ○ | ○ | ○ |
| g. I take more driving risks when I am with my friends | ○ | ○ | ○ | ○ | ○ |
| h. It is fun to beat other drivers when the light changes | ○ | ○ | ○ | ○ | ○ |
| i. It is a thrill to out-manoeuvre other drivers | ○ | ○ | ○ | ○ | ○ |
| j. Taking risks in traffic makes driving more fun | ○ | ○ | ○ | ○ | ○ |

# APPENDIX F: THE MANITOBA PARENT SURVEY

# MANITOBA NEW DRIVER SURVEY
## Parent Survey

The questionnaire will take you about 15 minutes to complete. Please complete it as soon as possible and return it in the envelope provided. Your answers are completely confidential, will remain anonymous, and have no effect on your driver's licence or automobile insurance coverage.

If you have any questions about the survey or the process, you can call Nicholas Borodenko, Senior Research Manager at PRA, at 987-2030 or toll-free at 1-888-877-6744. Thank you for taking the time to participate.

## SECTION A: BACKGROUND INFORMATION

**1. Do you live in a city, town, or rural area?**

- ○ a. City
- ○ b. Town
- ○ c. Rural
- ○ d. Don't know

**2. What is the name of the town or city where you live or are closest to?**

______________________________________________

**3. In what year were you born?**

19___

**4. What is your gender?**

- ○ a. Male
- ○ b. Female
- ○ c. Prefer not to answer

**5. What is the highest level of education you have completed?**

- ○ a. Some grade school or high school
- ○ b. Completed high school
- ○ c. Attended some college or university
- ○ d. Community college diploma
- ○ e. Undergraduate degree / Bachelor's degree
- ○ f. Graduate or Professional degree

**6. Today's date:** ________ ________
**Day** **Month**

## SECTION B: LEARNING TO DRIVE

For each question, please fill in the bubble that best matches your answer -- e.g., if your answer to Question 1 is Father, fill in the bubble ⬬ b. Father.

**1. What is your relationship to the teen participating in this survey?**

- ○ a. Mother
- ○ b. Father
- ○ c. Sibling
- ○ d. Relative
- ○ e. Other (specify) ____________________________________

**2. Who supervised your teen most often when he/she was driving with a Learner's licence?**

- ○ a. Mother
- ○ b. Father
- ○ c. Both parents equally
- ○ d. Sibling
- ○ e. Relative
- ○ f. No one, drove alone
- ○ g. Don't know
- ○ h. Other (specify) ____________________________________

**3. Using a number from 1 to 5, where 1 means it was very difficult and 5 means it was very easy, how easy or difficult was it for you to find time in your schedule to supervise your teen when he/she drove with a Learner's licence?**

- ○ a. 1- Very difficult
- ○ b. 2
- ○ c. 3
- ○ d. 4
- ○ e. 5- Very easy
- ○ f. Don't know

**4. During the first few weeks of driving, after a driving session with you, how often did you talk with your teen to review how things went?**

- ○ a. Very frequently
- ○ b. Often
- ○ c. Occasionally
- ○ d. Rarely
- ○ e. Never
- ○ f. Don't know

5. **Thinking about all of your teen's driving practice with a driving instructor, a parent, or another adult supervisor, about how many total hours of supervised driving practice did he/she get when he/she had a Learner's licence? (please give your best guess)**

| | **# of hours** |
|---|---|
| ○ a. With an MPI driving instructor | ___ |
| ○ b. With a private/commercial driving instructor | ___ |
| ○ c. With parent/guardian | ___ |
| ○ d. With another adult supervising driver | ___ |

## SECTION C: DRIVING PRIVILEGES

1. **After your teen obtained his/her Intermediate licence, did you or anyone else in the family place any restrictions or limits on his/her driving?**
   - ○ a. Yes
   - ○ b. No

2. **Have you or any family member ever taken away your teen's driving privileges as a result of their driving unsafely?**
   - ○ a. Yes
   - ○ b. No

3. **Have you or any family member ever taken away your teen's driving privileges as a result of behaviours not related to driving, such as skipping classes, not doing homework, not doing chores, or breaking house rules?**
   - ○ a. Yes
   - ○ b. No

## SECTION D: DRIVER EDUCATION

1. **Did your teen take MPI's High School Driver Education program?**
   - ○ a. No. **IF NO, GO TO QUESTION 2.**
   - ○ b. Yes. **IF YES, SKIP QUESTION 2 AND GO TO QUESTION 3 ON THE NEXT PAGE.**

**If your teen took the MPI Driver Education program, GO TO QUESTION 3.**

2. **IF NO: What were the reasons your teen did not take the MPI Driver Education program? (mark all that apply)**
   - ○ a. Never heard of it
   - ○ b. Too expensive
   - ○ c. Not available where we live
   - ○ d. Other driver education courses are just as good
   - ○ e. Not necessary – others could teach them just as well
   - ○ f. Couldn't fit the classes into my teen's schedule
   - ○ g. Couldn't register for/take the program when they wanted to
   - ○ h. My teen wasn't in a hurry to get a Learner's licence, so didn't see the need
   - ○ i. Other (please specify) ____________________________

**If your teen did <u>not</u> take the MPI Driver Education program, YOU ARE FINISHED THE QUESTIONNAIRE. PLEASE RETURN THIS SURVEY IN THE ENVELOPE PROVIDED.**

**3. (IF YES TO QUESTION 1 IN SECTION D) What led you to choose MPI's Driver Education program for your teen? (mark all that apply)**

- ○ a. Convenience of location
- ○ b. Convenience of classroom schedule
- ○ c. Convenience of in-car schedule
- ○ d. Qualifications of instructors
- ○ e. Quality of instruction methods
- ○ f. Affordability
- ○ g. Availability of vehicle for practice driving
- ○ h. To have someone to teach teen how to drive
- ○ i. To get a variety of driving experiences
- ○ j. To get more driving practice
- ○ k. If they take Driver Education, teen can obtain a Learner's licence before they turn 16
- ○ l. Everyone in teen's class was taking it
- ○ m. Program's reputation (e.g., excellence in teaching teens how to drive in order to pass the licensing test; excellence in teaching safe driving; excellence in teaching skilled driving)
- ○ n. Only program in area
- ○ o. Easy registration/no hassles
- ○ p. Family has always taken Driver Education
- ○ q. To make them a safer driver
- ○ r. To make them a more skilled driver
- ○ s. To help them pass the road test
- ○ t. Other (please specify) ________________________________________

**4. Did you or someone else in your household practice with your teen in between the in-car lessons from the Driver Education instructor?**

- ○ a. Yes. IF YES, estimated number of hours _____
- ○ b. No

**5. Who was most often responsible for filling out the Practice Log Sheet?**

- ○ a. Parent/guardian
- ○ b. Teen
- ○ c. Parent/guardian and teen together
- ○ d. Other ______________________________

**6. Was the Practice Log Sheet returned to MPI?**

- ○ a. Yes. IF YES, who was responsible for returning it? __________________________
- ○ b. No. IF NO, why not? __________________________________________

**7. For each of the following statements, indicate the extent to which you agree or disagree.**

| | *Strongly disagree* 1 | 2 | 3 | 4 | *Strongly agree* 5 |
|---|---|---|---|---|---|
| a. If my teen had not taken the MPI Driver Education program, he/she would have had more accidents by now | ○ | ○ | ○ | ○ | ○ |
| b. The MPI Driver Education program helped my teen be a more careful driver | ○ | ○ | ○ | ○ | ○ |
| c. I would recommend the MPI Driver Education program for my friends' teens | ○ | ○ | ○ | ○ | ○ |
| d. I think the MPI Driver Education program is valuable for training new drivers | ○ | ○ | ○ | ○ | ○ |

| | Strongly disagree 1 | 2 | 3 | 4 | Strongly agree 5 |
|---|---|---|---|---|---|
| e. I believe my teen thinks the MPI Driver Education program is valuable for training new drivers | ○ | ○ | ○ | ○ | ○ |
| f. I think that young drivers who take the MPI Driver Education program are more skilled than those who do not take it | ○ | ○ | ○ | ○ | ○ |
| g. The MPI Driver Education program has increased my confidence in my son's or daughter's driving | ○ | ○ | ○ | ○ | ○ |
| h. I think the MPI Driver Education program is better than lessons from another driving school | ○ | ○ | ○ | ○ | ○ |

**8. For each of the following statements, indicate the extent to which you are dissatisfied or satisfied with each aspect of the MPI Driver Education program. From what you know about the program, how satisfied were you with…**

| | Very dissatisfied 1 | 2 | 3 | 4 | Very satisfied 5 |
|---|---|---|---|---|---|
| a. The program overall | ○ | ○ | ○ | ○ | ○ |
| b. The course registration process | ○ | ○ | ○ | ○ | ○ |
| c. The classroom instruction | ○ | ○ | ○ | ○ | ○ |
| d. The in-car training | ○ | ○ | ○ | ○ | ○ |
| e. The value for the money ($50) | ○ | ○ | ○ | ○ | ○ |
| f. The course materials, such as the textbook and handouts | ○ | ○ | ○ | ○ | ○ |
| g. The in-class instructor | ○ | ○ | ○ | ○ | ○ |
| h. The in-car instructor | ○ | ○ | ○ | ○ | ○ |
| i. The scheduling of the in-car lessons | ○ | ○ | ○ | ○ | ○ |
| j. The length of the in-class component (34 hours) | ○ | ○ | ○ | ○ | ○ |
| k. The length of the in-car component (eight hours driving, eight hours observing) | ○ | ○ | ○ | ○ | ○ |
| l. The communication between the instructor and the parent | ○ | ○ | ○ | ○ | ○ |
| m. The instructor's assessment of the student driver | ○ | ○ | ○ | ○ | ○ |

**9. For each of the following statements, indicate the extent to which you are dissatisfied or satisfied with each aspect of the MPI Driver Education program. From your parental involvement with the program, how satisfied were you with…**

| | Very dissatisfied 1 | 2 | 3 | 4 | Very satisfied 5 | N/A |
|---|---|---|---|---|---|---|
| a. The Parent Night meeting | ○ | ○ | ○ | ○ | ○ | ○ |
| b. The demands on you | ○ | ○ | ○ | ○ | ○ | ○ |
| c. The policy that requires parents to provide 24 hours of practice for their teen | ○ | ○ | ○ | ○ | ○ | ○ |
| d. The policy that requires parents to provide practice in between the in-car instructor's lessons | ○ | ○ | ○ | ○ | ○ | ○ |
| e. The training tools provided to parents during Parent Night | ○ | ○ | ○ | ○ | ○ | ○ |
| f. The Practice Log Sheet, which acts as a practice recording tool | ○ | ○ | ○ | ○ | ○ | ○ |
| g. The requirement to complete and return the Practice Log Sheet within nine months of the in-class start date | ○ | ○ | ○ | ○ | ○ | ○ |

**10. Overall, has the MPI Driver Education program met your expectations?**

- ○ a. Yes
- ○ b. No

**11. Are there any aspects of the program that <u>did not</u> meet your needs? (mark all that apply)**

- ○ a. City driving requirement too far for rural families
- ○ b. Not enough preparation for night time driving
- ○ c. Not enough preparation for winter driving
- ○ d. No choice in the in-car instructor
- ○ e. Not enough feedback from instructor
- ○ f. Not enough help with what to do during practice driving
- ○ g. Other (please specify) ____________________

**12. Are there any aspects of the program that <u>did not</u> meet your teen's needs? (mark all that apply)**

- ○ a. Not enough instructors to handle all students in one grade
- ○ b. Total in-car instruction (eight hours of actual driving) is not long enough
- ○ c. Too much time between end of in-car instruction and the road test
- ○ d. In-car instruction hours were inconvenient
- ○ e. In-car instruction was too late in the evening
- ○ f. In-class instruction was too long
- ○ g. Fellow in-car students were not at the same level as my teen
- ○ h. Not enough instruction on driving in the rural environment
- ○ i. Other (please specify)____________________

***Please return this completed questionnaire in the postage-paid, self-addressed envelope to:***

***Manitoba Parent Survey***
***500-363 Broadway***
***Winnipeg, MB R3C 3N9***

**THANK YOU**

# APPENDIX G: SURVEY TEEN COVER LETTER FOR MANITOBA

November 14, 2010

Dear <CHILD NAME>:

As part of Manitoba Public Insurance's ongoing evaluation of Manitoba's High School Driver Education program, the Traffic Injury Research Foundation (TIRF) and Northport Associates (NPA) have been engaged to conduct surveys with teen drivers and their parents.

We are contacting young people like you who are new drivers. Your participation is important in helping Manitoba Public Insurance improve the program and, ultimately, road safety here in Manitoba. This survey will collect information about your attitudes, behaviours, and knowledge, and will give you a unique opportunity to review your experiences as a new driver.

Your answers and participation will be completely confidential and anonymous, and will have no effect on your driver's licence or automobile insurance coverage. This survey should only take you about 20 minutes to complete. We would appreciate you returning it as soon as possible.

In this envelope, you will find:

- **A questionnaire marked Manitoba New Driver Survey: Teen Survey**. This is your survey to complete.

- **A return envelope also marked Manitoba New Driver Survey**. Once you have completed the questionnaire, put it in the envelope and place it in the mail. No postage is required.

- **An envelope marked Parent Survey**. Please pass this on to your parents or guardians immediately. It contains a questionnaire on the Driver Education program and should be mailed back separately from your survey. Since the surveys do not need to be sent back together, you do not need to wait for your parent or guardian to complete their survey before returning yours.

If you wish to verify the legitimacy of this survey, you can call Manitoba Public Insurance at 985-7000, or long distance at 1-800-665-2410.

PRA Inc., a research firm based in Manitoba, has been hired to administer the survey. If you have any questions about the survey or the process, you can call Nicholas Borodenko, Senior Research Manager at PRA, at 987-2030 or toll-free at 1-888-877-6744. If your survey is not received within the next two weeks, we will follow up with a reminder letter.

Thank you in advance for your help with this important research.

Sincerely,

Nicholas Borodenko
Senior Research Manager

# APPENDIX H: SURVEY PARENT COVER LETTER FOR MANITOBA

November 14, 2010

To the Parent or Guardian of <CHILD NAME>:

Manitoba Public Insurance has engaged the Traffic Injury Research Foundation (TIRF) and Northport Associates (NPA) to conduct a survey with teen drivers and their parents as part of Manitoba Public Insurance's ongoing evaluation of Manitoba's High School Driver Education program. Parents of teens who have and have not taken the MPI High School Driver Education program are being surveyed. This survey will give you a unique opportunity to review your opinions of and experiences with the Driver Education program and is important in helping Manitoba Public Insurance improve road safety in Manitoba.

Although this survey will take you about 15 minutes to complete, we would very much appreciate it if you could complete it as soon as possible. Any parent or guardian in the household can complete the questionnaire. A separate survey was included to be completed by your teen. Since the surveys do not need to be returned together, you do not need to wait for your teen to complete their survey before you send yours back.

Once completed, you can return your questionnaire in the postage-paid envelope provided, which is marked ***Manitoba Parent Survey***. If we do not receive the survey in a week or two, we will send a letter to remind you to return it. Your answers are completely confidential, will remain anonymous, and have no effect on your driver's licence or automobile insurance coverage.

If you wish to verify the legitimacy of this survey, you can call Manitoba Public Insurance at 985-7000, or long distance at 1-800-665-2410.

PRA Inc., a research firm based in Manitoba, has been hired to conduct this survey. If you have any questions about the survey or the process, you can call Nicholas Borodenko, Senior Research Manager at PRA, at 987-2030 or toll-free at 1-888-877-6744. Thank you in advance for your help with this important research.

Sincerely,

Nicholas Borodenko
Senior Research Manager

# APPENDIX I: FOLLOW-UP REMINDER CARD FROM MANITOBA

Prairie Research Associates

<SURVEY NUMBER>
<FIRST NAME> <LAST NAME>
<ADDRESS>
<CITY>, <PROV> <POSTAL CODE>

**Recently, on behalf of Manitoba Public Insurance, we sent you a questionnaire for you and your parent or guardian about your experiences as a new driver. If you have already completed and returned it to us, please accept our sincere thanks. If not, please do so at your earliest convenience.**

**The survey was sent to only a small group of teens and their parents, so it is extremely important that your responses are included. The information collected from this study will help Manitoba Public Insurance improve their High School Driver Education program and, ultimately, road safety here in Manitoba.**

**If you have any questions about the survey, please call me at 987-2030 or 1-888-877-6744.**

**Sincerely,**

**Nicholas Borodenko**

# APPENDIX J: ITEM BY ITEM RESPONSES TO TEEN RETROSPECTIVE SURVEY SAFE DRIVING KNOWLEDGE QUESTIONS FROM MANITOBA

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **HSDE: Percent of Responses** | **HSDE and Private DE: Percent of Responses** | **Private DE: Percent of Responses** | **Non-DE: Percent of Responses** |
| **1. When changing lanes, you can check your blind spot by:** | | | | |
| a. Using the inside rear-view mirror | 0.1 | 0 | 0 | 0.4 |
| b. Using both inside rear-view mirrors and outside rear-view mirrors | 1 | 0 | 0 | 3 |
| *c. Turning your head and looking over your shoulder* | 33 | 28 | 30 | 31 |
| d. All of the above | 65 | 72 | 70 | 66 |
| **2. To reduce glare from the head lights of an oncoming vehicle, you should:** | | | | |
| *a. Look to the right edge of the roadway just as you approach the vehicle* | 88 | 88 | 88 | 87 |
| b. Look to the left edge of the roadway just as you approach the vehicle | 7 | 8 | 5 | 9 |
| c. Increase your speed to get past the vehicle quickly | 1 | 0 | 0 | .4 |
| d. Keep the overhead light turned on | 3 | 5 | 5 | 2 |
| **3. What is the most common cause of minor accidents among teens?** | | | | |
| a. Slippery roads | 15 | 23 | 25 | 14 |
| b. Alcohol | 8 | 13 | 8 | 11 |
| c. Speeding | 50 | 45 | 45 | 53 |
| *d. Poor visual search patterns* | 25 | 18 | 18 | 19 |
| **4. A car going twice as fast as another would strike an object how much harder?** | | | | |
| *a. Four times as hard* | 43 | 43 | 38 | 36 |
| b. Three times as hard | 10 | 5 | 10 | 10 |
| c. Twice as hard | 46 | 50 | 53 | 54 |
| d. A little harder | 0.3 | 3 | 0 | 0.4 |
| **5. What is most important in preventing a vehicle from going off the road in a curve?** | | | | |
| a. Resistance of the air around the vehicle | 3 | 8 | 0 | 5 |
| *b. Friction between the tires and the road surface* | 81 | 63 | 75 | 77 |
| c. The weight of the vehicle | 5 | 8 | 5 | 5 |

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **HSDE: Percent of Responses** | **HSDE and Private DE: Percent of Responses** | **Private DE: Percent of Responses** | **Non-DE: Percent of Responses** |
| d. The power steering system | 9 | 18 | 15 | 12 |
| **6. Your traffic light changes to yellow as you approach an intersection. In most cases, what action should you take?** | | | | |
| *a. Stop, if you can do so safely* | 94 | 95 | 83 | 94 |
| b. Signal for a right turn and slow | 0.4 | 0 | 3 | 1 |
| c. Go through if no other vehicles are coming | 3 | 3 | 10 | 3 |
| d. Accelerate to clear the intersection | 2 | 3 | 5 | 2 |
| **7. Beer's effects on your reflexes and judgement:** | | | | |
| a. Are less than if you drink wine | 1 | 0 | 0 | 1 |
| *b. Depends on the amount of alcohol in your blood stream* | 91 | 95 | 85 | 89 |
| c. Is greater than if you drink champagne | 1 | 3 | 5 | 1 |
| d. Are less than if you drink hard liquor | 5 | 3 | 8 | 6 |
| **8. To safely drive into a curve, you should:** | | | | |
| a. Brake as you enter the curve | 32 | 38 | 40 | 34 |
| b. Accelerate while in the curve | 3 | 10 | 0 | 2 |
| *c. Complete your braking before entering the curve* | 58 | 43 | 53 | 56 |
| d. Stay to the outside of the curve | 5 | 5 | 5 | 7 |
| **9. Which of the following best describes where you should be looking when driving:** | | | | |
| a. At the road directly in front of your vehicle | 4 | 10 | 13 | 5 |
| b. Several car lengths straight ahead of your vehicle | 10 | 8 | 3 | 8 |
| c. Several car lengths ahead | 53 | 45 | 53 | 54 |

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **HSDE: Percent of Responses** | **HSDE and Private DE: Percent of Responses** | **Private DE: Percent of Responses** | **Non-DE: Percent of Responses** |
| and side to side | | | | |
| *d. As far ahead as you can see and side to side* | 31 | 35 | 33 | 31 |
| **10. What is the most common cause of serious injury accidents among teens?** | | | | |
| *a. Speeding* | 37 | 33 | 48 | 38 |
| b. Alcohol | 53 | 53 | 48 | 54 |
| c. Poor visual search patterns | 4 | 3 | 3 | 1 |
| d. Slippery roads | 2 | 0 | 0 | 1 |
| **11. The most common type of accident at entrances to freeways (expressways) is:** | | | | |
| a. Head-on accidents | 4 | 8 | 8 | 5 |
| b. Side impact accidents | 54 | 45 | 63 | 51 |
| *c. Rear end accidents* | 37 | 40 | 28 | 38 |
| d. None of the above | 3 | 8 | 3 | 3 |
| **12. Because of their faster reaction time, teens deal with which of the following situations better than typical 40 year old drivers:** | | | | |
| a. Driving in bad weather | 4 | 5 | 13 | 6 |
| b. Recovering from a run-off-the-road event | 8 | 15 | 10 | 8 |
| c. Reacting to a change in a traffic signal | 45 | 55 | 45 | 37 |
| *d. None of the above* | 41 | 23 | 33 | 35 |
| **13. Which of the following accident types result in the greatest number of deaths to teenage drivers and their passengers each year?** | | | | |
| a. Rear end accidents at stop lights on city streets during rush hour | 15 | 13 | 18 | 15 |
| *b. Run-off-the-road accidents at curves on country roads at night* | 45 | 45 | 43 | 48 |
| c. Head-on accidents on straight suburban roads in rain | 27 | 33 | 28 | 24 |
| d. Multiple-vehicle accidents on freeways in fog | 10 | 8 | 10 | 11 |
| **14. On a wet road, hydroplaning can be caused by:** | | | | |
| a. Low tire tread depth | 2 | 3 | 5 | 2 |
| b. Too much speed | 18 | 15 | 25 | 22 |

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **HSDE: Percent of Responses** | **HSDE and Private DE: Percent of Responses** | **Private DE: Percent of Responses** | **Non-DE: Percent of Responses** |
| c. Tire under-inflation | 1 | 0 | 0 | 1 |
| *d. Any of the above* | 75 | 80 | 68 | 72 |

# APPENDIX K: SIMULATED DRIVE TEST CHECKLIST (MANITOBA)

TRAFFIC INJURY RESEARCH FOUNDATION

NORTHPORT ASSOCIATES

DATE: ______________________ TIME: ______________________

DRIVER ID: ______________________ EXAMINER:

**1. STOPPING ........ ERRORS**

A. Stops unnecessarily ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

B. Stops too suddenly ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

C. Over running crosswalk/stopline ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**2. SIGNAL VIOLATIONS ........ ERRORS**

A. Thru on red ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

B. Thru on red (enters amber) ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

C. Thru on red (right turn) ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

D. Does not stop ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**3. VEHICLES MOVING ON ROADWAY ........ ERRORS**

A. Straddles traffic lane ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

B. Follows too closely ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

C. Fails to check changing lanes ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

D. Fails to signal ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

E. Cuts off vehicle ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

F. Wanders ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

G. Crosses solid line ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

H. Fails to drive in proper lane ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**4. UNCONTROLLED INTERSECTIONS/YIELD SIGNS/PEDESTRIAN CROSSWALKSERRORS**

A. Fails to yield ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**5. SPEED ........ ERRORS**

A. Exceeds stated speed limit ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

B. Hinders or drives too slowly ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

C. Drives at uneven rate of speed ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**6. TURNING ........ ERRORS**

A. Improper signal ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

B. Fails to yield ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

C. Fails to signal ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

D. Turns corner too wide ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

E. Turns corner too sharply ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**7. INATTENTIVE ........ ERRORS**

A. Hesitant ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

B. Fails to observe traffic signs ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**8. VISUAL SEARCH/SCANNING ........ ERRORS**

A. Fails to check traffic ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

B. Fails to do mirror check ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**9. COLLISIONS ........ ERRORS**

A. At fault ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

B. Not at fault ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**10. HAZARD ANTICIPATION/IDENTIFICATION**

**CORRECT**

A. Correctly identifies or anticipates hazard ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**MISSED**

B. Fails to identify or anticipate a hazard ........ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

# APPENDIX L: POST SIMULATED DRIVE TEST QUESTIONNAIRE (MANITOBA)

# MANITOBA NEW DRIVER SURVEY

**ID #:**__________________

The questionnaire will take you about 15 minutes to complete. Your answers are completely confidential, will remain anonymous, and have no effect on your driver's licence or automobile insurance coverage.

Thank you for taking the time to participate.

## SECTION A: BACKGROUND INFORMATION

**1. What grade are you in?** ________________

**2. What is your gender?**

- ○ a. Male
- ○ b. Female
- ○ c. Prefer not to answer

**3. Do you live in a city, town, or rural area?**

- ○ a. City
- ○ b. Town
- ○ c. Rural
- ○ d. Don't know

**4. What is the name of the town or city where you live or are closest to?**

______________________________________________________

**5. Today's date:** ________ ________
**Day** **Month**

## SECTION B: SIMULATOR DRIVING

**For each question, please fill in the bubble that best matches your answer -- e.g., if your answer to Question 1 is b, I have a little experience with computer or video games, fill in the bubble ⬬ b. a little.**

**1. How much experience do you have with computer or video games?**
- ○ a. None
- ○ b. A little
- ○ c. A fair amount
- ○ d. A lot

**2. How much experience do you have with computer or video games that involve driving?**
- ○ a. None
- ○ b. A little
- ○ c. A fair amount
- ○ d. A lot

**3. How realistic was our driving simulator?**
- ○ a. Not at all
- ○ b. Somewhat
- ○ c. Fairly
- ○ d. Very realistic

**4. Did our simulator make you feel ill or dizzy?**
- ○ a. Not at all
- ○ b. A little
- ○ c. A fair amount
- ○ d. A lot

**5. How easy were the instructions to understand?**
- ○ a. Not at all
- ○ b. Somewhat easy
- ○ c. Very easy

**6. How well do you think the simulator reflects your driving skills?**
- ○ a. Not at all
- ○ b. Somewhat
- ○ c. Fairly well
- ○ d. Extremely well

**7. How easy was it to “drive” the simulator?**
- ○ a. Not easy
- ○ b. Somewhat easy
- ○ c. Fairly easy
- ○ d. Very easy

**8. How difficult was it to use the steering wheel?**
- ○ a. Not difficult
- ○ b. Somewhat difficult
- ○ c. Fairly difficult
- ○ d. Very difficult

**9. Did you have any difficulty seeing the stop signs or stop lights?**
- ○ a. No difficulty
- ○ b. Some difficulty
- ○ c. A fair amount of difficulty
- ○ d. Considerable difficulty

**10. What was the most difficult part of "driving" the simulator? (Check all that apply)**
- ○ a. Steering
- ○ b. Keeping the car going straight
- ○ c. Turning
- ○ d. Keeping the car at a constant speed
- ○ e. Braking
- ○ f. Changing lanes
- ○ g. Passing other vehicles
- ○ h. ______________________________________________
- ○ i. ______________________________________________

## SECTION C: LEARNING TO DRIVE

**For each question, please fill in the bubble that best matches your answer.**

**1. What level of Driver's Licence do you currently have:**
- ○ a. No Licence. If you do not have a Licence, go to Section D.
- ○ b. Learner's Permit
- ○ c. Intermediate Licence

**2. How long have you been driving on your current Licence Level**:
____________ months

**3. When driving with your Learner's Licence (when you had a Learner's Licence), who served as the experienced driver accompanying you? (mark all that apply)**
- ○ a. Mother
- ○ b. Father
- ○ c. Older brother or sister
- ○ d. Other relative
- ○ e. Friend
- ○ f. Driving instructor
- ○ g. Other (specify) ________________________________________

**3a. Of those, which <u>one</u> person rode with you the most as the experienced driver accompanying you?**
Specify letter ___

4. **In an average week, about how many hours of supervised driving practice did you get (are you getting) on your Learner's Licence?**
   _________ number of hours

5. **How many hours of driving practice do you think the *average* new driver should have before they get their Intermediate licence?**
   _________ number of hours

6. **For each of the following statements, indicate the extent to which you agree or disagree.**

| | Strongly disagree 1 | 2 | 3 | 4 | Strongly agree 5 |
|---|---|---|---|---|---|
| a. It is important for new drivers to have several months to practice driving before they begin driving without a parent or other adult driver in the car | ○ | ○ | ○ | ○ | ○ |
| b. Requiring me to practice driving under supervision has given me the confidence to drive without an experienced adult driver in the car | ○ | ○ | ○ | ○ | ○ |

## SECTION D: SAFE DRIVING

**For each question, please mark only one answer.**

1. **When changing lanes, you can check your blind spot by:**
   - ○ a. Using the inside rear-view mirror
   - ○ b. Using both inside rear-view mirrors and outside rear-view mirrors
   - ○ c. Turning your head and looking over your shoulder
   - ○ d. All of the above

2. **To reduce glare from the headlights of an oncoming vehicle, you should:**
   - ○ a. Look to the right edge of the roadway just as you approach the vehicle
   - ○ b. Look to the left edge of the roadway just as you approach the vehicle
   - ○ c. Increase your speed to get past the vehicle quickly
   - ○ d. Keep the overhead light turned on in your vehicle

3. **What is the most common cause of minor accidents among teens?**
   - ○ a. Slippery roads
   - ○ b. Alcohol
   - ○ c. Speeding
   - ○ d. Poor visual search patterns

4. **A car going twice as fast as another would strike an object how much harder?**
   - ○ a. Four times as hard
   - ○ b. Three times as hard
   - ○ c. Twice as hard
   - ○ d. A little harder

5. **What is most important in preventing a vehicle from going off the road in a curve?**
   - ○ a. Resistance of the air around the vehicle
   - ○ b. Friction between the tires and the road surface
   - ○ c. The weight of the vehicle
   - ○ d. The power steering system

6. **Your traffic light changes to yellow as you approach an intersection. In most cases, what action should you take?**
   - ○ a. Stop, if you can do so safely
   - ○ b. Signal for a right turn and slow
   - ○ c. Go through if no other vehicles are coming
   - ○ d. Accelerate to clear the intersection

7. **Beer's effects on your reflexes and judgment:**
   - ○ a. Are less than if you drink wine
   - ○ b. Depend on the amount of alcohol in your bloodstream
   - ○ c. Are greater than if you drink champagne
   - ○ d. Are less than if you drink hard liquor

8. **To safely drive into a curve, you should:**
   - ○ a. Brake as you enter the curve
   - ○ b. Accelerate while in the curve
   - ○ c. Complete your braking before entering the curve
   - ○ d. Stay to the outside of the curve

9. **Which of the following best describes where you should be looking when driving?**
   - ○ a. At the road directly in front of your vehicle
   - ○ b. Several car lengths straight ahead of your vehicle
   - ○ c. Several car lengths ahead and side-to-side
   - ○ d. As far ahead as you can see and side-to-side

10. **What is the most common cause of <u>serious injury</u> accidents among teens?**
    - ○ a. Speeding
    - ○ b. Alcohol
    - ○ c. Poor visual search patterns
    - ○ d. Slippery roads

11. **The most common type of accident at entrances to freeways (expressways) is:**
    - ○ a. Head-on accidents
    - ○ b. Side impact accidents
    - ○ c. Rear-end accidents
    - ○ d. None of the above

12. **Because of their faster reaction time, teens deal with which of the following situations better than typical 40-year-old drivers?**
    - ○ a. Driving in bad weather
    - ○ b. Recovering from a run-off-the-road event
    - ○ c. Reacting to a change in a traffic signal
    - ○ d. None of the above

**13. Which of the following accident types results in the greatest number of deaths among teenage drivers and their passengers each year?**

- ○ a. Rear-end accidents at stoplights on city streets during rush hour
- ○ b. Run-off-the-road accidents at curves on country roads at night
- ○ c. Head-on accidents on straight suburban roads in rain
- ○ d. Multiple-vehicle accidents on freeways in fog

**14. On a wet road, hydroplaning can be caused by:**

- ○ a. Low tire tread depth
- ○ b. Too much speed
- ○ c. Tire under-inflation
- ○ d. Any of the above

## SECTION E: SKILLS AND ABILITIES

**1. We want you to rate how good you think your skills and/or abilities are in performing each of the following driving tasks. If you are not yet driving, rate each of these in terms of how good you think you will be when you start driving:**

| | *Very poor* 1 | 2 | 3 | 4 | *Very good* 5 |
|---|---|---|---|---|---|
| a. Identifying hazards on the road that could cause an accident | ○ | ○ | ○ | ○ | ○ |
| b. Predicting traffic situations that could develop ahead | ○ | ○ | ○ | ○ | ○ |
| c. Reacting quickly to risky traffic situations | ○ | ○ | ○ | ○ | ○ |
| d. Driving in the dark | ○ | ○ | ○ | ○ | ○ |
| e. Controlling the vehicle if it starts to skid | ○ | ○ | ○ | ○ | ○ |
| f. Maintaining a constant speed | ○ | ○ | ○ | ○ | ○ |
| g. Adjusting speed to the driving conditions | ○ | ○ | ○ | ○ | ○ |
| h. Maintaining a safe following distance | ○ | ○ | ○ | ○ | ○ |
| i. Driving in an unfamiliar area | ○ | ○ | ○ | ○ | ○ |
| j. Changing lanes in heavy traffic | ○ | ○ | ○ | ○ | ○ |
| k. Keeping up with the speed of traffic | ○ | ○ | ○ | ○ | ○ |
| l. Driving in bad weather | ○ | ○ | ○ | ○ | ○ |
| m. Passing on a two-lane road | ○ | ○ | ○ | ○ | ○ |
| n. Anticipating the actions of other drivers | ○ | ○ | ○ | ○ | ○ |
| o. Avoiding risks that could result in an accident | ○ | ○ | ○ | ○ | ○ |
| p. Tolerating the mistakes of other drivers | ○ | ○ | ○ | ○ | ○ |

## SECTION F: YOUR DRIVING BEHAVIOUR

**1. We want to know how often you do each of the following while driving. If you are not yet driving, we want to know how often you think you might do each of the following as a driver. Please remember that your answers are confidential and are for research purposes only.**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very frequently 5 |
|---|---|---|---|---|---|
| a. Take chances for the fun of it | ○ | ○ | ○ | ○ | ○ |
| b. Pass other cars because it's exciting | ○ | ○ | ○ | ○ | ○ |
| c. Drive dangerously because you enjoy it | ○ | ○ | ○ | ○ | ○ |
| d. Take some risks because it feels good | ○ | ○ | ○ | ○ | ○ |
| e. See how fast you can drive | ○ | ○ | ○ | ○ | ○ |
| f. Out-manoeuvre other drivers for the thrill of it | ○ | ○ | ○ | ○ | ○ |
| g. Test your skills in ways others might find risky | ○ | ○ | ○ | ○ | ○ |
| h. Try to beat other drivers leaving a stoplight | ○ | ○ | ○ | ○ | ○ |

**2. In the past three months, how often have you done the following things when you were driving? [ANSWER ONLY IF YOU HAVE DRIVEN IN THE PAST THREE MONTHS]**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very frequently 5 |
|---|---|---|---|---|---|
| a. Attempted to pass a vehicle that you hadn't noticed was signalling for a left turn | ○ | ○ | ○ | ○ | ○ |
| b. Failed to notice that pedestrians were crossing before starting to turn | ○ | ○ | ○ | ○ | ○ |
| c. Failed to check your rear-view mirrors and blind spot before changing lanes | ○ | ○ | ○ | ○ | ○ |
| d. Braked too hard on a slippery road | ○ | ○ | ○ | ○ | ○ |
| e. Driven especially close to the car in front as a signal to its driver to go faster or get out of the way | ○ | ○ | ○ | ○ | ○ |
| f. Driven over the speed limit on a residential road | ○ | ○ | ○ | ○ | ○ |
| g. Raced away from the traffic lights with the intention of beating the driver next to you | ○ | ○ | ○ | ○ | ○ |
| h. Cut off other drivers who made you angry | ○ | ○ | ○ | ○ | ○ |
| i. Driven when you knew that drinking alcohol had affected your coordination | ○ | ○ | ○ | ○ | ○ |
| j. Missed 'Stop' or 'Yield' signs and narrowly avoided colliding with traffic having the right of way | ○ | ○ | ○ | ○ | ○ |
| k. On turning right, nearly hit a cyclist who has come up on your right side | ○ | ○ | ○ | ○ | ○ |

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very frequently 5 |
|---|---|---|---|---|---|
| l. Underestimated the speed of an oncoming vehicle when passing another vehicle | ○ | ○ | ○ | ○ | ○ |
| m. Stayed in a lane that you knew would be closed ahead until the last minute before merging into another lane | ○ | ○ | ○ | ○ | ○ |
| n. Crossed an intersection knowing that the traffic signal lights have already turned red | ○ | ○ | ○ | ○ | ○ |
| o. Driven over the speed limit on a freeway/expressway/highway | ○ | ○ | ○ | ○ | ○ |
| p. Driven within an hour after having one or two drinks of alcohol | ○ | ○ | ○ | ○ | ○ |
| q. Driven when you felt high or light-headed from drinking alcohol | ○ | ○ | ○ | ○ | ○ |
| r. Consumed alcohol in the car while you were driving | ○ | ○ | ○ | ○ | ○ |

**3. Indicate how often, if ever, you do the following while driving. While driving, how often do you: [ANSWER ONLY IF YOU HAVE BEEN DRIVING]**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very frequently 5 |
|---|---|---|---|---|---|
| a. Make or answer calls on a cell phone | ○ | ○ | ○ | ○ | ○ |
| b. Look at your passengers while talking to them | ○ | ○ | ○ | ○ | ○ |
| c. Look at an event going on outside your vehicle and fail to watch for traffic | ○ | ○ | ○ | ○ | ○ |
| d. Send or receive text messages | ○ | ○ | ○ | ○ | ○ |
| e. Look down while adjusting the radio/CD/iPod/MP3 player | ○ | ○ | ○ | ○ | ○ |

**4. How many short trips (at least 1 kilometre or up to 10 kilometres) and long trips (10 kilometres or more) did you take on a typical day during the week and during the weekend? Record the number of trips in the table below: [ANSWER ONLY IF YOU HAVE BEEN DRIVING]**

| | Weekday (Monday - Friday) | Weekend (Saturday - Sunday) |
|---|---|---|
| a. Number of short trips | ________ | ________ |
| b. Number of long trips | ________ | ________ |

**5. In the past three days, about how much time, in minutes, did you drive each day, beginning with yesterday? [ANSWER ONLY IF YOU HAVE BEEN DRIVING IN THE PAST THREE DAYS]**

a. Yesterday ______ minutes

b. Two days ago ______ minutes

c. Three days ago ______ minutes

## SECTION G: ABOUT YOU

**1. For each of the following statements <u>about driving</u>, indicate the extent to which you agree or disagree. If you are not yet driving, answer each of these in terms of whether you think you will agree or disagree when you start driving:**

| | Strongly disagree 1 | 2 | 3 | 4 | Strongly agree 5 |
|---|---|---|---|---|---|
| a. I am confident that I know (will know) all of the rules of the road | ○ | ○ | ○ | ○ | ○ |
| b. Because I am a skilled driver, I can (will be able to) drive recklessly and still be safe | ○ | ○ | ○ | ○ | ○ |
| c. If I were (become) a more cautious driver, some of my friends would laugh at the way I drive | ○ | ○ | ○ | ○ | ○ |
| d. It is (will be) really satisfying to pass other cars on the highway | ○ | ○ | ○ | ○ | ○ |
| e. It is (will be) fun to weave through slower traffic | ○ | ○ | ○ | ○ | ○ |
| f. There's a lot I can do (will be able to do) to avoid an accident | ○ | ○ | ○ | ○ | ○ |
| g. I take (will likely take) more driving risks when I am with my friends | ○ | ○ | ○ | ○ | ○ |
| h. It is (will be) fun to beat other drivers when the light changes | ○ | ○ | ○ | ○ | ○ |
| i. It is (will be) a thrill to out-manoeuvre other drivers | ○ | ○ | ○ | ○ | ○ |
| j. Taking risks in traffic makes (will make) driving more fun | ○ | ○ | ○ | ○ | ○ |

**2. The following statements are NOT related to driving. For each of the following statements, indicate the extent to which you disagree or agree.**

| | Strongly disagree 1 | 2 | 3 | 4 | Strongly agree 5 |
|---|---|---|---|---|---|
| a. I like who I am | ○ | ○ | ○ | ○ | ○ |
| b. I am happy and content | ○ | ○ | ○ | ○ | ○ |
| c. I set goals for myself | ○ | ○ | ○ | ○ | ○ |
| d. My life has purpose | ○ | ○ | ○ | ○ | ○ |
| e. I am confident about my beliefs | ○ | ○ | ○ | ○ | ○ |
| f. I know my strengths and weaknesses | ○ | ○ | ○ | ○ | ○ |
| g. I look forward to the future | ○ | ○ | ○ | ○ | ○ |
| h. I examine my beliefs | ○ | ○ | ○ | ○ | ○ |

***THE END***
***THANK YOU***

# APPENDIX M: SIMULATED DRIVE STUDENT INFORMATION SHEET (MANITOBA)

**Manitoba Public Insurance** **Société d'assurance publique du Manitoba**

***Dear Student,***

*The Traffic Injury Research Foundation (TIRF) on behalf of Manitoba Public Insurance will be conducting a research study to help improve the safety of young drivers.* ***We are looking for student volunteers*** *to participate in the research study.*

*In the study, students will be given an opportunity to drive a driving simulator that runs on a desktop computer platform. The simulator drive test will take place inside a Manitoba Public Insurance office. We will also have the students answer a brief questionnaire about their experience on the simulator. In total it will take about 30 minutes of your time.*

***For your assistance, you will be entered into a raffle to win $1,000. There will be a chance to win one of six raffles for $1,000.***

*The results of the simulator test and questionnaire will be held in the strictest confidence and will have no implications for your insurance or subsequent licensing.*

*The study will take place at MPI's Service Centre located at 420 Pembina Highway. The simulated driving sessions will start in mid-October 2011. The driving sessions will run on Saturdays from 8:30 am to 5:30 pm. The study will take approximately 30 minutes.*

***If you are willing to participate, please sign-up with Pam or Sheldon when they visit your school.***

***Also, you will need to have your parent or guardian fill out and sign the attached permission form, and bring the form with you to the test centre.***

*If you require clarification or further information, please contact one of the following TIRF representatives:*

***Contact****: Pam Iveta, Project Coordinator*
*Sheldon Atts, Project Assistant*
***Email****: driver.study.coordinators@gmail.com*

***Contact: Katie Wood,*** *Research Director*
***Phone****: 877-238-5235*
***Email****: katiew@tirf.ca*

Traffic Injury Research Foundation

# APPENDIX N: SIMULATED DRIVE PARENTAL CONSENT FORM (MANITOBA)

**Manitoba Public Insurance** **Société d'assurance publique du Manitoba**

## *SIMULATOR DRIVING STUDY - PARENTAL CONSENT*

Dear Parent/Guardian,

The Traffic Injury Research Foundation on behalf of Manitoba Public Insurance will be conducting a research study to help improve the safety of young drivers. To assist us with the study, we are looking for student volunteers to participate.

In the study, about 300 students will take a simulated driving test run on a desktop computer platform. They will also complete a survey that asks about their knowledge, attitudes, and self-reported behaviours pertinent to learning to drive and driver education. The simulator drive test will take place inside a Manitoba Public Insurance office, and it will take about 30 minutes. The students will be entered into a raffle to win $1,000 when they are done the simulator drive test and have completed the survey. There will be a chance to win one of six raffles for $1,000.

The results of the simulator test and questionnaire will be held in the strictest confidence and will have no implications for your insurance or subsequent licensing.

The study will take place at MPI's Service Centre located at 420 Pembina Highway. The simulated driving sessions will begin in mid-October 2011. The driving sessions will run on Saturdays and from 8:30 am to 5:30 pm. The study will take approximately 30 minutes.

For students to participate, a parent or guardian will have to fill out and sign this permission form, and bring the form with them to the test centre.

For more information, please contact one of the following TIRF representatives:

***Contact**: Pam Iveta, Project Coordinator*
*Sheldon Atts, Project Assistant*
***Email**: driver.study.coordinators@gmail.com*

***Contact: Katie Wood,** Research Director*
***Phone**: 877-238-5235*
***Email**: katiew@tirf.ca*

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**I have read the above information, and by signing below, I give consent to my son/daughter,**

________________________________________, **to participate in the study.**

(Insert name of Student)

________________________________ ____________________

**Parent/Guardian Signature** **Date Signed**

Traffic Injury Research Foundation

# APPENDIX O: SIMULATED DRIVE SCHEDULING SHEET (MANITOBA)

| Group | ID | Date | Time |
|---|---|---|---|
| 6 | 1 | 08/12/2010 | 5:29 |
| 4 | 2 | 08/12/2010 | 6:13 |
| 4 | 3 | 08/12/2010 | 5:39 |
| 4 | 4 | 08/12/2010 | 6:13 |
| 6 | 5 | 08/12/2010 | 6:04 |
| 4 | 9 | 08/12/2010 | 6:43 |
| 2 | 10 | 08/12/2010 | 7:27 |
| 6 | 11 | 08/12/2010 | 7:24 |
| 6 | 15 | 08/12/2010 | 6:52 |
| 4 | 16 | 09/12/2010 | 5:28 |
| 4 | 17 | 09/12/2010 | 5:31 |
| 6 | 19 | 09/12/2010 | 6:05 |
| 4 | 20 | 09/12/2010 | 6:53 |
| 4 | 21 | 09/12/2010 | 6:37 |
| 4 | 22 | 09/12/2010 | 7:08 |
| 2 | 23 | 09/12/2010 | 6:22 |
| 4 | 24 | 09/12/2010 | 7:18 |
| 1 | 26 | 11/12/2010 | 10:06 |
| 2 | 27 | 11/12/2010 | 9:44 |
| 2 | 28 | 11/12/2010 | 11:18 |
| 2 | 30 | 11/12/2010 | 11:50 |
| 2 | 31 | 11/12/2010 | 11:36 |
| 2 | 32 | 11/12/2010 | 1:27 |
| 2 | 33 | 11/12/2010 | 1:43 |
| 1 | 34 | 11/12/2010 | 2:06 |
| 2 | 35 | 11/12/2010 | 9:18 |
| 2 | 36 | 11/12/2010 | 10:55 |
| 6 | 37 | 11/12/2010 | 10:20 |
| 6 | 38 | 11/12/2010 | 1:40 |
| 6 | 39 | 11/12/2010 | 2:14 |
| 2 | 40 | 11/12/2010 | 4:50 |
| 2 | 41 | 12/12/2010 | 11:26 |

| | | | |
|---|---|---|---|
| 6 | 42 | 12/12/2010 | 12:54 |
| 2 | 43 | 12/12/2010 | 1:52 |
| 2 | 6 | 13/12/2010 | 6:22 |
| 4 | 44 | 13/12/2010 | 6:22 |
| 1 | 45 | 18/12/2010 | 11:15 |
| 4 | 46 | 18/12/2010 | 11:13 |
| 4 | 47 | 18/12/2010 | 11:44 |
| 1 | 48 | 18/12/2010 | 11:49 |
| 1 | 49 | 18/12/2010 | 12:11 |
| 4 | 50 | 18/12/2010 | 12:21 |
| 4 | 51 | 18/12/2010 | 12:54 |
| 2 | 52 | 18/12/2010 | 1:09 |
| 2 | 53 | 18/12/2010 | 1:26 |
| 4 | 54 | 18/12/2010 | 1:39 |
| 2 | 55 | 18/12/2010 | 1:57 |
| 6 | 57 | 18/12/2010 | 2:44 |
| 2 | 58 | 18/12/2010 | 2:47 |
| 2 | 59 | 18/12/2010 | 3:13 |
| 2 | 61 | 18/12/2010 | 3:54 |
| 1 | 63 | 18/12/2010 | 5:08 |
| 2 | 64 | 19/12/2010 | 10:10 |
| 2 | 65 | 19/12/2010 | 10:25 |
| 4 | 66 | 19/12/2010 | 10:45 |
| 2 | 67 | 19/12/2010 | 12:04 |
| 4 | 68 | 19/12/2010 | 1:04 |
| 4 | 69 | 19/12/2010 | 1:02 |
| 2 | 70 | 19/12/2010 | 1:13 |
| 4 | 71 | 19/12/2010 | 1:37 |
| 3 | 72 | 19/12/2010 | 2:03 |
| 4 | 73 | 19/12/2010 | 2:05 |
| 6 | 74 | 19/12/2010 | 3:51 |
| 2 | 75 | 21/12/2010 | 5:35 |
| 2 | 76 | 21/12/2010 | 5:31 |

| | | | |
|---|---|---|---|
| 6 | 77 | 21/12/2010 | 5:44 |
| 6 | 78 | 21/12/2010 | 5:58 |
| 4 | 79 | 21/12/2010 | 6:04 |
| 2 | 80 | 21/12/2010 | 6:15 |
| 4 | 81 | 21/12/2010 | 6:20 |
| 4 | 82 | 21/12/2010 | 6:10 |
| 4 | 83 | 21/12/2010 | 6:54 |
| 2 | 84 | 21/12/2010 | 7:12 |
| 4 | 85 | 21/12/2010 | 7:14 |
| 4 | 86 | 21/12/2010 | 7:21 |
| 3 | 87 | 21/12/2010 | 7:52 |
| 4 | 88 | 21/12/2010 | 8:24 |
| 2 | 89 | 09/01/2011 | 10:09 |
| 2 | 90 | 09/01/2011 | 10:20 |
| 4 | 91 | 09/01/2011 | 10:32 |
| 4 | 92 | 09/01/2011 | 11:05 |
| 2 | 93 | 09/01/2011 | 11:22 |
| 2 | 94 | 09/01/2011 | 11:36 |
| 1 | 95 | 09/01/2011 | 1:04 |
| 2 | 96 | 09/01/2011 | 1:08 |
| 6 | 97 | 09/01/2011 | 1:57 |
| 2 | 98 | 09/01/2011 | 2:22 |
| 4 | 99 | 09/01/2011 | 2:24 |
| 1 | 100 | 09/01/2011 | 2:46 |
| 2 | 101 | 09/01/2011 | 2:53 |
| 4 | 102 | 09/01/2011 | 3:29 |
| 4 | 103 | 09/01/2011 | 4:08 |
| 4 | 104 | 09/01/2011 | 4:04 |
| 2 | 105 | 09/01/2011 | 4:00 |
| 4 | 106 | 09/01/2011 | 4:26 |
| 2 | 108 | 09/01/2011 | 4:54 |
| 4 | 109 | 09/01/2011 | 5:32 |
| 1 | 110 | 15/01/2011 | 10:05 |

| | | | |
|---|---|---|---|
| 2 | 111 | 15/01/2011 | 9:58 |
| 2 | 112 | 15/01/2011 | 10:30 |
| 4 | 113 | 15/01/2011 | 11:15 |
| 1 | 114 | 15/01/2011 | 11:21 |
| 4 | 115 | 15/01/2011 | 11:59 |
| 1 | 116 | 15/01/2011 | 1:09 |
| 1 | 117 | 15/01/2011 | 3:40 |
| 2 | 118 | 15/01/2011 | 4:11 |
| 2 | 119 | 16/01/2011 | 10:08 |
| 4 | 120 | 16/01/2011 | 12:51 |
| 2 | 121 | 16/01/2011 | 1:12 |
| 2 | 122 | 16/01/2011 | 1:39 |
| 2 | 123 | 16/01/2011 | 1:47 |
| 1 | 124 | 16/01/2011 | 2:54 |
| 2 | 125 | 16/01/2011 | 4:38 |
| 4 | 130 | 22/01/2011 | 11:42 |
| 2 | 131 | 22/01/2011 | 12:03 |
| 4 | 132 | 22/01/2011 | 12:53 |
| 2 | 133 | 22/01/2011 | 13:32 |
| 3 | 134 | 22/01/2011 | 14:03 |
| 2 | 135 | 23/01/2011 | 14:19 |
| 6 | 136 | 12/02/2011 | 10:48 |
| 6 | 137 | 12/02/2011 | 10:57 |
| 6 | 138 | 12/02/2011 | 11:32 |
| 6 | 140 | 12/02/2011 | 12:04 |
| 4 | 141 | 12/02/2011 | 13:33 |
| 1 | 142 | 12/02/2011 | 13:39 |
| 4 | 143 | 12/02/2011 | 14:02 |
| 4 | 144 | 13/02/2011 | 10:35 |
| 4 | 145 | 13/02/2011 | 11:18 |
| 6 | 146 | 13/02/2011 | 12:55 |
| 1 | 147 | 13/02/2011 | 13:25 |
| 1 | 148 | 13/02/2011 | 14:12 |

| | | | |
|---|---|---|---|
| 6 | 149 | 13/02/2011 | 14:31 |
| 4 | 150 | 19/02/2011 | 11:11 |
| 4 | 151 | 19/02/2011 | 11:35 |
| 6 | 152 | 19/02/2011 | 11:56 |
| 4 | 153 | 19/02/2011 | 12:08 |
| 6 | 154 | 19/02/2011 | 13:23 |
| 4 | 155 | 19/02/2011 | 13:40 |
| 6 | 156 | 20/02/2011 | 13:03 |
| 6 | 157 | 20/02/2011 | 13:20 |
| 6 | 158 | 20/02/2011 | 13:43 |
| 4 | 159 | 20/02/2011 | 13:59 |
| 1 | 160 | 03/05/2011 | 11:30 |
| 5 | 161 | 23/07/2011 | 10:52 |
| 6 | 162 | 23/07/2011 | 11:04 |
| 6 | 163 | 23/07/2011 | 12:51 |
| 6 | 164 | 23/07/2011 | 13:20 |
| 6 | 165 | 23/07/2011 | 14:20 |
| 3 | 166 | 06/08/2011 | 10:36 |
| 6 | 167 | 06/08/2011 | 10:43 |
| 5 | 168 | 06/08/2011 | 11:12 |
| 3 | 169 | 06/08/2011 | 11:52 |
| 3 | 170 | 06/08/2011 | 13:04 |
| 6 | 171 | 13/08/2011 | 10:56 |
| 3 | 172 | 13/08/2011 | 14:29 |
| 5 | 173 | 27/08/2011 | 11:22 |
| 3 | 174 | 27/08/2011 | 14:06 |
| 3 | 175 | 10/09/2011 | 11:15 |
| 3 | 176 | 10/09/2011 | 11:23 |
| 3 | 177 | 10/09/2011 | 12:51 |
| 3 | 178 | 10/09/2011 | 13:26 |
| 3 | 179 | 10/09/2011 | 13:33 |
| 5 | 180 | 24/09/2011 | 12:03 |
| 6 | 181 | 05/11/2011 | 11:15 |

| | | | |
|---|---|---|---|
| 6 | 182 | 05/11/2011 | 11:48 |
| 6 | 183 | 05/11/2011 | 12:09 |
| 6 | 184 | 05/11/2011 | 13:03 |
| 6 | 185 | 12/11/2011 | 11:34 |
| 1 | 186 | 12/11/2011 | 13:08 |
| 6 | 187 | 19/11/2011 | 11:27 |

# APPENDIX P: NEW DRIVER SURVEY TAILORED FOR OREGON (FIRST ADMINISTRATION OR WAVE 1)

# Oregon Teen Driver Survey

## Traffic Injury Research Foundation & Northport Associates

This is a confidential survey of new drivers, and teens who will soon be new drivers. The survey is part of a major study on driver education. It asks for your views and opinions about driver education, teen driving laws, safe driving, and your skills and abilities.

## INSTRUCTIONS

Please read the instructions in each section carefully to determine whether you should answer a question. The questions you should answer will depend on your current license level and whether or not you have taken, are taking, or plan on taking a driver education course.
Answer all the questions that apply to you.

For each question that applies to you, please fill in the bubble that best matches your answer. For example,

| | *Strongly Disagree* 1 | 2 | 3 | 4 | *Strongly Agree* 5 |
|---|---|---|---|---|---|
| **Driver education is an excellent way to learn how to drive** | ○ | ○ | ○ | ○ | ● |

If you strongly agree with this statement, you would fill in the bubble under "5", strongly agree. Otherwise you would fill in the bubble under the number that corresponds to your answer.

***For some of the questions there are no right or wrong answers. Please answer them to the best of your ability.***

## LICENSE INFORMATION

**What level of Driver's License do you currently have?:**

○$_0$ No License ○$_1$ Instruction Permit ○$_2$ Provisional License ○$_3$ Full License

**How long have you been driving at your current License level?** _____ days

## SECTION A: DRIVER EDUCATION/TRAINING

**For each question, please fill in the bubble that best matches your answer.**

1. **Have you taken, are you taking, or will you be taking a driver education/training course? (mark only one)**
   - ○ 1. I have completed a driver education/training program
   - ○ 2. I am currently taking a driver education/training program
   - ○ 3. I plan on taking a driver education/training program in the next 6 months
   - ○ 4. I do not plan on taking a driver education/training program.

**IF YOU SELECTED "I do not plan on taking a driver education/training program" GO TO SECTION B: TEEN DRIVING LAWS — ON PAGE 3 OF THE SURVEY**

**2. What type of driver education program have you taken, are taking, or plan on taking? (mark only one)**

- ◯ 1. ODOT-approved Public School Program
- ◯ 2. ODOT-approved Commercial/Private Driving School Program
- ◯ 3. Other program
- ◯ 8. Do not know

**3. What were the main reasons you took (plan on taking or are taking) a driver education course? (mark all that apply)**

- ◯ a. A parent or guardian made me take it
- ◯ b. To get my license sooner
- ◯ c. To get credits from school
- ◯ d. So I wouldn't learn someone else's bad habits
- ◯ e. I had no one else to teach me
- ◯ f. To make me a safer driver
- ◯ g. To make me a more skilled driver
- ◯ h. To help me pass the road test

**3a. If you selected more than one reason, which was the single most important reason? (write in the letter next to your answer)**

***Specify Letter*** _____

**4. What were the main reasons you chose the type of driver education program you marked in question #2 above rather than a different program)? (mark all that apply)**

- ◯ a. Not aware of other programs
- ◯ b. Not convenient
- ◯ c. Couldn't afford the cost
- ◯ d. Couldn't afford the time
- ◯ e. Not available in my school
- ◯ f. No other programs exist in my area

**4a. If you selected more than one reason, which was the single most important reason? (write in the letter next to your answer)**

***Specify Letter*** _____

**5. For each of the following statements indicate the extent to which you agree or disagree.**

| | *Strongly Disagree 1* | *2* | *3* | *4* | *Strongly Agree 5* |
|---|---|---|---|---|---|
| a. I think the driver education course will be important in teaching me to be a safe driver | ◯ | ◯ | ◯ | ◯ | ◯ |
| b. The driver education course will help me become a better defensive driver | ◯ | ◯ | ◯ | ◯ | ◯ |
| c. The driver education course will help me avoid being in an accident | ◯ | ◯ | ◯ | ◯ | ◯ |
| d. I think that teenagers planning to get a driver license should take my driver education course | ◯ | ◯ | ◯ | ◯ | ◯ |
| e. I would recommend my driver education course to my friends | ◯ | ◯ | ◯ | ◯ | ◯ |

## SECTION B: TEEN DRIVING LAWS

**For each question, please fill in the bubble that best matches your answer.**

**1. Under Oregon's teen driving laws, beginning drivers under the age of 18 must have an instruction permit before obtaining a provisional license. *For each of the following statements, tell us whether you think each is allowed on an instruction permit.***

| | *Yes* 1 | *No* 2 | *Don't Know* 8 |
|---|---|---|---|
| a. Driving without a supervising driver in the vehicle | ○ | ○ | ○ |
| b. Driving with a supervising driver who has held a full valid license for one year | ○ | ○ | ○ |
| c. Driving with a supervising driver who has held a full valid license for three years | ○ | ○ | ○ |
| d. Driving with a supervising driver who is at least 21 years of age | ○ | ○ | ○ |
| e. Applying for a provisional driver's license after having an instruction permit for at least three months | ○ | ○ | ○ |
| f. Applying for a provisional driver's license after having an instruction permit for at least six months | ○ | ○ | ○ |
| g. Driving after consuming any amount of alcohol | ○ | ○ | ○ |

**2. Under Oregon's teen driving laws, beginning drivers under the age of 18 must have a Provisional Driver License to drive without a supervising driver in the vehicle. For each of the following statements, tell us whether you think each is allowed on a Provisional Driver License.**

| | *Yes* 1 | *No* 2 | *Don't Know* 8 |
|---|---|---|---|
| a. Driving home from school with one teenage friend in the car in the first six months | ○ | ○ | ○ |
| b. Driving to a friend's house after school with one teenage friend in the car in the first six months | ○ | ○ | ○ |
| c. Driving home from school with two teenage friends in the front seat of your car in the second six months | ○ | ○ | ○ |
| d. Driving home from school with one teenage friend in the front seat and three in the backseat in the second six months | ○ | ○ | ○ |
| e. Driving home from your friend's house at 1.a.m with only three teenage friends in the car in the second six months | ○ | ○ | ○ |
| f. Driving home from your job at 1 a.m. | ○ | ○ | ○ |
| g. Driving for your job between midnight and 5 a.m | ○ | ○ | ○ |
| h. Driving after consuming any amount of alcohol | ○ | ○ | ○ |
| i. Sending a text message from your cell phone while you are driving | ○ | ○ | ○ |
| j. Talking on a hand-held cell phone while you are driving | ○ | ○ | ○ |
| k. Talking on a hands-free cell phone while you are driving | ○ | ○ | ○ |

**3. Indicate the extent to which you oppose or support Oregon's Teen Driving Laws.**

| | *Strongly Oppose* 1 | 2 | 3 | 4 | *Strongly Support* 5 |
|---|---|---|---|---|---|
| | ○ | ○ | ○ | ○ | ○ |

**4. Tell us whether you oppose or support the following driving requirements. The requirement:**

| | *Strongly Oppose* 1 | 2 | 3 | 4 | *Strongly Support* 5 |
|---|---|---|---|---|---|
| a. For teen drivers to have a zero blood alcohol content | ○ | ○ | ○ | ○ | ○ |
| b. To hold an instruction permit for at least six months before getting a provisional driver's license | ○ | ○ | ○ | ○ | ○ |
| c. To prohibit passengers under 20 who are not family members in the first six months | ○ | ○ | ○ | ○ | ○ |
| d. To limit passengers under 20 who are not family members in the second six months | ○ | ○ | ○ | ○ | ○ |
| e. For teen drivers to drive only with a supervising driver when they have an instruction permit | ○ | ○ | ○ | ○ | ○ |
| f. That limits unsupervised driving between midnight and 5 am | ○ | ○ | ○ | ○ | ○ |
| g. To complete at least 50 hours of supervised driving along with an ODOT-approved traffic safety education course **OR** at least 100 hours of supervised driving | ○ | ○ | ○ | ○ | ○ |

**5. With your instruction permit, who rode/rides with you as your supervising driver? (mark all that apply)**

○ a. Mother ○ b. Father ○ c. Older brother or sister ○ d. Other relative ○ e. Friend
○ f. Driving instructor
○ g. Other: (specify) ________________________
○ h. Do not have instruction permit yet

**5a. Of those, which one person rode/rides with you the most?**

***Specify letter*** ____

**6. How many hours of driving practice do you think the "average" teen driver should have before they get their provisional driver's license?**

_________ ***insert the number of hours***

**7. For each of the following statements indicate the extent to which you agree or disagree.**

| | *Strongly Disagree* 1 | 2 | 3 | 4 | *Strongly Agree* 5 |
|---|---|---|---|---|---|
| a. The Oregon Teen Driving Laws will make me a safer driver | ○ | ○ | ○ | ○ | ○ |
| b. It is important for teen drivers to have several months of practice driving before they begin driving without a parent or other adult driver in the car | ○ | ○ | ○ | ○ | ○ |
| c. Requiring me to practice driving under supervision will give me the confidence to drive without an experienced adult driver in the car | ○ | ○ | ○ | ○ | ○ |

## SECTION C: SAFE DRIVING

**For each question, please mark only one answer.**

1. **When changing lanes, you can check your blind spot by:**
   - ◯ 1 Using the inside rearview mirror
   - ◯ 2. Using both inside rearview mirrors and outside rearview mirrors
   - ◯ 3. Turning your head and looking over your shoulder
   - ◯ 4. All of the above

2. **To reduce glare from the head lights of an oncoming vehicle, you should:**
   - ◯ 1. Look to the right edge of the roadway just as you approach the vehicle
   - ◯ 2. Look to the left edge of the roadway just as you approach the vehicle
   - ◯ 3. Increase your speed to get past the vehicle quickly
   - ◯ 4. Keep the overhead light turned on

3. **What is the most common cause of <u>minor</u> accidents among teens?**
   - ◯ 1. Slippery roads
   - ◯ 2. Alcohol
   - ◯ 3. Speeding
   - ◯ 4. Poor visual search patterns

4. **A car going twice as fast as another would strike an object how much harder:**
   - ◯ 1. Four times as hard
   - ◯ 2. Three times as hard
   - ◯ 3. Twice as hard
   - ◯ 4. A little harder

5. **What is most important in preventing a vehicle from going off the road in a curve?**
   - ◯ 1. Resistance of the air around the vehicle
   - ◯ 2. Friction between the tires and the road surface
   - ◯ 3. The weight of the vehicle
   - ◯ 4. The power steering system

6. **Your traffic light changes to yellow as you approach an intersection. In most cases, what action should you take?**
   - ◯ 1. Stop, if you can do so safely
   - ◯ 2. Signal for a right turn and slow
   - ◯ 3. Go through if no other vehicles are coming
   - ◯ 4. Accelerate to clear the intersection

7. **Beer's effects on your reflexes and judgment:**
   - ◯ 1. Are less than if you drink wine
   - ◯ 2. Depends on the amount of alcohol in your blood stream
   - ◯ 3. Are greater than if you drink champagne
   - ◯ 4. Are less than if you drink hard liquor

**8. To safely drive into a sharp curve, you should:**

- ○ 1. Brake as you enter the curve
- ○ 2. Accelerate while in the curve
- ○ 3. Complete your braking before entering the curve
- ○ 4. Stay to the outside of the curve

**9. Which of the following best describes where you should be looking when driving?**

- ○ 1. At the road directly in front of your vehicle
- ○ 2. Several car lengths straight ahead of your vehicle
- ○ 3. Several car lengths ahead and side to side
- ○ 4. As far ahead as you can see and side to side

**10. What is the most common cause of <u>serious injury</u> accidents among teens?**

- ○ 1. Speeding
- ○ 2. Alcohol
- ○ 3. Poor visual search patterns
- ○ 4. Slippery roads

**11. The most common type of accident at entrances to freeways (expressways) is:**

- ○ 1. Head-on accident
- ○ 2. Side impact accident
- ○ 3. Rear end accident
- ○ 4. None of the above

**12. Because of their faster reaction time teens deal with which of the following situations better than typical 40 year old drivers:**

- ○ 1. Driving in bad weather
- ○ 2. Recovering from a run-off-the-road event
- ○ 3. Reacting to a change in a traffic signal
- ○ 4. None of the above

**13. Which of the following accident types result in the greatest number of deaths to teenage drivers and their passengers each year?**

- ○ 1. Rear end accidents at stop lights on city streets during rush hour
- ○ 2. Run-off-the-road accidents at curves on country roads at night
- ○ 3. Head-on accidents on straight suburban roads in rain
- ○ 4. Multiple-vehicle accidents on freeways in fog

**14. On a wet road, hydroplaning can be caused by:**

- ○ 1. Low tire tread depth
- ○ 2. Too much speed
- ○ 3. Tire under-inflation
- ○ 4. Any of the above

## SECTION D: SKILLS AND ABILITIES

**1. We want you to rate how good you think your skills and/or abilities are in performing each of the following driving tasks. If you are not yet driving, rate each of these in terms of how good you think you will be when you start driving:**

| | Very Poor 1 | 2 | 3 | 4 | Very Good 5 |
|---|---|---|---|---|---|
| a. Identifying hazards on the road that could cause an accident | ○ | ○ | ○ | ○ | ○ |
| b. Predicting traffic situations that could develop ahead | ○ | ○ | ○ | ○ | ○ |
| c. Reacting quickly to risky traffic situations | ○ | ○ | ○ | ○ | ○ |
| d. Driving in the dark | ○ | ○ | ○ | ○ | ○ |
| e. Controlling the vehicle if it starts to skid | ○ | ○ | ○ | ○ | ○ |
| f. Maintaining a constant speed | ○ | ○ | ○ | ○ | ○ |
| g. Adjusting speed to the driving conditions | ○ | ○ | ○ | ○ | ○ |
| h. Maintaining a safe following distance | ○ | ○ | ○ | ○ | ○ |
| i. Driving in an unfamiliar area | ○ | ○ | ○ | ○ | ○ |
| j. Changing lanes in heavy traffic | ○ | ○ | ○ | ○ | ○ |
| k. Keeping up with the speed of traffic | ○ | ○ | ○ | ○ | ○ |
| l. Driving in bad weather | ○ | ○ | ○ | ○ | ○ |
| m. Passing on a two-lane road | ○ | ○ | ○ | ○ | ○ |
| n. Anticipating the actions of other drivers | ○ | ○ | ○ | ○ | ○ |
| o. Avoiding risks that could result in an accident | ○ | ○ | ○ | ○ | ○ |
| p. Tolerating the mistakes of other drivers | ○ | ○ | ○ | ○ | ○ |

**2. For each of the following, indicate how likely they are to happen to you in the coming year.**

| | Very Unlikely 1 | 2 | 3 | 4 | Very Likely 5 |
|---|---|---|---|---|---|
| a. As a driver, how likely are you to be involved in an accident? | ○ | ○ | ○ | ○ | ○ |
| b. As a driver, how likely are you to be injured in an accident? | ○ | ○ | ○ | ○ | ○ |

## SECTION E: YOUR DRIVING BEHAVIOR

**1. We want to know how often you do each of the following while driving. If you are not yet driving, we want to know how often you think you might do each of the following as a driver. Please remember that your answers are confidential and for research purposes only.**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very Frequently 5 |
|---|---|---|---|---|---|
| a. Take chances for the fun of it | ○ | ○ | ○ | ○ | ○ |
| b. Pass other cars because it's exciting | ○ | ○ | ○ | ○ | ○ |
| c. Drive dangerously because you enjoy it | ○ | ○ | ○ | ○ | ○ |
| d. Take some risks because it feels good | ○ | ○ | ○ | ○ | ○ |
| e. See how fast you can drive | ○ | ○ | ○ | ○ | ○ |
| f. Out-maneuver other drivers for the thrill of it | ○ | ○ | ○ | ○ | ○ |
| g. Test your skills in ways others might find risky | ○ | ○ | ○ | ○ | ○ |
| h. Try to beat other drivers leaving a stoplight | ○ | ○ | ○ | ○ | ○ |

2. **For each of the following statements indicate how responsible you feel when driving. If you are not yet driving, we want to know how responsible you think you will feel as a driver. How responsible do you feel you are for:**

| | *Not at All Responsible* 1 | 2 | 3 | 4 | *Extremely Responsible* 5 |
|---|---|---|---|---|---|
| a. Your own safety | ○ | ○ | ○ | ○ | ○ |
| b. The safety of passengers in your vehicle | ○ | ○ | ○ | ○ | ○ |
| c. The safety of other people outside your vehicle | ○ | ○ | ○ | ○ | ○ |

3. **Have you driven at any time in the last 3 months?**

○ 1. Yes

○ 2. No ➡ **IF YOU SELECTED "No" GO TO SECTION F: ABOUT YOU — ON PAGE 10 OF THE SURVEY**

4. **How often have you done the following things when you were driving during the last three months?**

| | *Never* 1 | *Rarely* 2 | *Occasionally* 3 | *Often* 4 | *Very Frequently* 5 |
|---|---|---|---|---|---|
| a. Attempted to pass a vehicle that you hadn't noticed was signaling for a left turn | ○ | ○ | ○ | ○ | ○ |
| b. Failed to notice that pedestrians were crossing before starting to turn | ○ | ○ | ○ | ○ | ○ |
| c. Failed to check your rear-view mirrors and blind spot before changing lanes | ○ | ○ | ○ | ○ | ○ |
| d. Braked too hard on slippery road | ○ | ○ | ○ | ○ | ○ |
| e. Driven especially close to the car in front as a signal to its driver to go faster or get out of the way | ○ | ○ | ○ | ○ | ○ |
| f. Driven over the speed limit on a residential road | ○ | ○ | ○ | ○ | ○ |
| g. Raced away from the traffic lights with the intention of beating the driver next to you | ○ | ○ | ○ | ○ | ○ |
| h. Cut off other drivers who made you angry | ○ | ○ | ○ | ○ | ○ |
| i. Driven when you knew that drinking alcohol had affected your coordination | ○ | ○ | ○ | ○ | ○ |
| j. Missed 'Stop' or 'Yield' signs and narrowly avoided colliding with traffic having the right of way | ○ | ○ | ○ | ○ | ○ |
| k. On turning right, nearly hit a cyclist who has come up on your right side | ○ | ○ | ○ | ○ | ○ |
| l. Underestimated the speed of an oncoming vehicle when passing another vehicle | ○ | ○ | ○ | ○ | ○ |
| m. Stayed in a lane that you know will be closed ahead until the last minute before merging into another lane | ○ | ○ | ○ | ○ | ○ |
| n. Crossed an intersection knowing that the traffic signal lights have already turned red | ○ | ○ | ○ | ○ | ○ |
| o. Driven over the speed limit on a freeway/expressway/highway | ○ | ○ | ○ | ○ | ○ |
| p. Driven within an hour after having one or two drinks of alcohol | ○ | ○ | ○ | ○ | ○ |
| q. Driven when you felt high or light-headed from drinking alcohol | ○ | ○ | ○ | ○ | ○ |
| r. Consumed alcohol in the car while you were driving | ○ | ○ | ○ | ○ | ○ |

**5. Indicate how often, if ever, you do the following while driving. While driving, how often do you:**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very Frequently 5 |
|---|---|---|---|---|---|
| a. Make or answer calls on a cell phone | ○ | ○ | ○ | ○ | ○ |
| b. Look at your passengers while talking to them | ○ | ○ | ○ | ○ | ○ |
| c. Look at an event going on outside your vehicle and fail to watch for traffic | ○ | ○ | ○ | ○ | ○ |
| d. Send or receive text messages | ○ | ○ | ○ | ○ | ○ |
| e. Look down while adjusting the radio/CD/iPod/mp3 player | ○ | ○ | ○ | ○ | ○ |

**6. In the past three months, how often did you drive for each of the following reasons? How often did you drive:**

| | Never 1 | Less Than Once Per Week 2 | Once or Twice Per Week 3 | Several Times Per Week 4 | Every Day 5 |
|---|---|---|---|---|---|
| a. To and from school and activities | ○ | ○ | ○ | ○ | ○ |
| b. To and from work | ○ | ○ | ○ | ○ | ○ |
| c. As part of your work | ○ | ○ | ○ | ○ | ○ |
| d. For errands or shopping | ○ | ○ | ○ | ○ | ○ |
| e. Just for fun or something to do | ○ | ○ | ○ | ○ | ○ |
| f. During rush hour | ○ | ○ | ○ | ○ | ○ |
| g. In a town | ○ | ○ | ○ | ○ | ○ |
| h. In a city | ○ | ○ | ○ | ○ | ○ |
| i. On unpaved roads | ○ | ○ | ○ | ○ | ○ |
| j. At night after 10 p.m. | ○ | ○ | ○ | ○ | ○ |
| k. With teen passengers in your vehicle | ○ | ○ | ○ | ○ | ○ |
| l. On rural highways | ○ | ○ | ○ | ○ | ○ |
| m. On highways (expressways) | ○ | ○ | ○ | ○ | ○ |

**7. In the past three days, about how much time, in minutes, did you drive each day, beginning with yesterday? (IF YOU HAVE NOT DRIVEN ON A PARTICULAR DAY OR ANY OF THESE DAYS, PLEASE ENTER '0')**

a. Yesterday ______ *minutes*

b. Two days ago ______ *minutes*

c. Three days ago ______ *minutes*

## SECTION F: ABOUT YOU

**1. For each of the following statements about driving indicate the extent to which you agree or disagree. If you are not yet driving, answer each of these in terms of whether you think you will agree or disagree when you start driving.**

| | *Strongly Disagree* 1 | 2 | 3 | 4 | *Strongly Agree* 5 |
|---|---|---|---|---|---|
| a. I am confident that I know (will know) all the rules of the road | ○ | ○ | ○ | ○ | ○ |
| b. Because I am (will be) a skilled driver, I can (will be able to) drive recklessly and still be safe | ○ | ○ | ○ | ○ | ○ |
| c. If I were (become) a more cautious driver, some of my friends would laugh at the way I drive | ○ | ○ | ○ | ○ | ○ |
| d. It is (will be) really satisfying to pass other cars on the highway | ○ | ○ | ○ | ○ | ○ |
| e. It is (will be) fun to weave through slower traffic | ○ | ○ | ○ | ○ | ○ |
| f. There's a lot I can do (will be able to do) to avoid an accident | ○ | ○ | ○ | ○ | ○ |
| g. I take (will likely take) more driving risks when I am with my friends | ○ | ○ | ○ | ○ | ○ |
| h. It is (will be) fun to beat other drivers when the light changes | ○ | ○ | ○ | ○ | ○ |
| i. It is (will be) a thrill to out-maneuver other drivers | ○ | ○ | ○ | ○ | ○ |
| j. Taking risks in traffic makes (will make) driving more fun | ○ | ○ | ○ | ○ | ○ |

**2. The following statements are NOT related to driving. For each indicate the extent to which you agree or disagree.**

| | *Strongly Disagree* 1 | 2 | 3 | 4 | *Strongly Agree* 5 |
|---|---|---|---|---|---|
| a. I like taking risks | ○ | ○ | ○ | ○ | ○ |
| b. If I do only what is safe, I will go through life never fully enjoying things | ○ | ○ | ○ | ○ | ○ |
| c. It is OK to do anything you want as long as you keep out of trouble | ○ | ○ | ○ | ○ | ○ |
| d. If something works, it does not matter whether it is the right or wrong thing to do | ○ | ○ | ○ | ○ | ○ |
| e. It is OK to get around laws and rules as long as you don't break them | ○ | ○ | ○ | ○ | ○ |
| f. My friends could push me into doing just about anything | ○ | ○ | ○ | ○ | ○ |
| g. I've often broken rules because others urged me to | ○ | ○ | ○ | ○ | ○ |
| h. If my friends were drinking, it would be hard for me to resist having a drink | ○ | ○ | ○ | ○ | ○ |
| i. I've felt pressured to get drunk at parties | ○ | ○ | ○ | ○ | ○ |
| j. I often do things because my friends want me to | ○ | ○ | ○ | ○ | ○ |
| k. I've often done dangerous things because others dared me to | ○ | ○ | ○ | ○ | ○ |

**3. For each of the following statements indicate the extent to which they describe you.**

| | *Not At All Like Me* 1 | 2 | 3 | 4 | *Very Much Like Me* 5 |
|---|---|---|---|---|---|
| a. I believe that getting together with one's friends to "hang out" is one of life's important pleasures | ○ | ○ | ○ | ○ | ○ |
| b. I try to live my life one day at a time | ○ | ○ | ○ | ○ | ○ |
| c. I don't think much about where I'll be in the future | ○ | ○ | ○ | ○ | ○ |
| d. I feel that it's more important to enjoy what you're doing than to get work done on time | ○ | ○ | ○ | ○ | ○ |
| e. If things don't get done on time, I don't worry about it | ○ | ○ | ○ | ○ | ○ |
| f. It doesn't make sense to worry about the future | ○ | ○ | ○ | ○ | ○ |
| g. I do things without thinking | ○ | ○ | ○ | ○ | ○ |

**4. For each of the following statements we want to know how often this applies to you.**

| | *Never* 1 | *Rarely* 2 | *Occasionally* 3 | *Often* 4 | *Very Frequently* 5 |
|---|---|---|---|---|---|
| a. Your parents know where you are when you are not in school or at work | ○ | ○ | ○ | ○ | ○ |
| b. When your parents tell you to do something, you do it | ○ | ○ | ○ | ○ | ○ |
| c. You follow your parents' values | ○ | ○ | ○ | ○ | ○ |
| d. Your parents want to know where you are | ○ | ○ | ○ | ○ | ○ |

**5. For each of the following statements, indicate the extent to which you disagree or agree.**

| | *Strongly Disagree* 1 | 2 | 3 | 4 | *Strongly Agree* 5 |
|---|---|---|---|---|---|
| a. I like who I am | ○ | ○ | ○ | ○ | ○ |
| b. I am happy and content | ○ | ○ | ○ | ○ | ○ |
| c. I set goals for myself | ○ | ○ | ○ | ○ | ○ |
| d. My life has purpose | ○ | ○ | ○ | ○ | ○ |
| e. I am confident about my beliefs | ○ | ○ | ○ | ○ | ○ |
| f. I know my strengths and weaknesses | ○ | ○ | ○ | ○ | ○ |
| g. I look forward to the future | ○ | ○ | ○ | ○ | ○ |
| h. I examine my beliefs | ○ | ○ | ○ | ○ | ○ |

**6. For each of the following statements indicate the extent to which you disagree or agree.**

| | *Strongly Disagree* 1 | 2 | 3 | 4 | *Strongly Agree* 5 |
|---|---|---|---|---|---|
| a. I'd do almost anything on a dare | ○ | ○ | ○ | ○ | ○ |
| b. I like to live dangerously | ○ | ○ | ○ | ○ | ○ |
| c. I enjoy the thrill I get when I take risks | ○ | ○ | ○ | ○ | ○ |

7. **For each of the following statements indicate how acceptable you view the behavior. How acceptable do you think it is to:**

| | *Very Unacceptable* *1* | *2* | *3* | *4* | *Very Acceptable* *5* |
|---|---|---|---|---|---|
| a. Give a fake excuse for missing work | ○ | ○ | ○ | ○ | ○ |
| b. Damage public property on purpose | ○ | ○ | ○ | ○ | ○ |
| c. Damage something valuable that belongs to a person you are angry with | ○ | ○ | ○ | ○ | ○ |
| d. Take things of value that do not belong to you | ○ | ○ | ○ | ○ | ○ |
| e. Skip a class | ○ | ○ | ○ | ○ | ○ |
| f. Give false information when filing out a job application | ○ | ○ | ○ | ○ | ○ |

## SECTION H: BACKGROUND INFORMATION

**This information helps ensure that our sample is representative of the population of young drivers.**

**What is your birthday?** Year: ____________ Month: ________ Day: _________

**What is your gender?** Male ○1 Female ○2

**Are you... (Select all that apply)**

○1 American Indian or Alaska Native ○2 Asian ○3 Black or African American

○4 Native Hawaiian or other Pacific Islander ○5 White ○6 Hispanic or Latino

○8 Other

**What grade are you in?** ________

**What is the name of the city or town where you live?** ____________

**What are the highest levels of education of your father and mother?**

| | Father | Mother |
|---|---|---|
| Some grade school or high school | ○1 | ○1 |
| Completed high school | ○2 | ○2 |
| Attended college or a university | ○3 | ○3 |
| Community college diploma, associate or 2-yr degree | ○4 | ○4 |
| Undergraduate degree/bachelors degree | ○5 | ○5 |
| Graduate or professional degree | ○6 | ○6 |
| Don't know/not applicable | ○8 | ○8 |

**Today's date:** _____ __________ _________
*Day* *Month* *Year*

**End of Survey – Thank You**

**Please return the completed questionnaire and your parental consent form in the envelope provided**

# APPENDIX Q: NEW DRIVER SURVEY TAILORED FOR OREGON (SECOND ADMINISTRATION OR WAVE 2)

# Oregon Teen Driver Survey

## Traffic Injury Research Foundation & Northport Associates

Thank you for answering our initial survey a few months ago and for agreeing to answer this follow-up survey. Please recall that this is a confidential survey of new drivers, which is part of a major study on driver education. It asks for your views and opinions about driver education, teen driving laws, safe driving, and your skills and abilities.

## INSTRUCTIONS

Please read the instructions in each section carefully to determine whether you should answer a question. The questions you should answer will depend on your current license level and whether or not you have taken, are taking, or plan on taking a driver education course.
Answer all the questions that apply to you.

***For some of the questions there are no right or wrong answers. Please answer them to the best of your ability.***

## LICENSE INFORMATION

**Just to confirm, what level of Driver's License do you currently have?:**

○0 No License

○1 Instruction Permit ➡ When do you plan to take your road test? Month: _________ Day: ______

○8888 Not sure

○2 Provisional License ➡ When did you take your road test? Month: _________ Day: ______

○3 Full License

**How long have you been driving at your current License level?** _____ weeks

## SECTION A: DRIVER EDUCATION/TRAINING

**For each question, please fill in the bubble that best matches your answer.**

**1. Have you taken, are you taking, or will you be taking a driver education/training course? (mark only one)**

○1. I have completed a driver education/training program
○2. I am currently taking a driver education/training program
○3. I plan on taking a driver education/training program in the next 6 months
○4. I do not plan on taking a driver education/training program.

**IF YOU SELECTED "I do not plan on taking a driver education/training program" GO TO SECTION B: TEEN DRIVING LAWS — ON PAGE 3 OF THE SURVEY**

2. **What type of driver education program have you taken, are taking, or plan on taking? (mark only one)**
   - ○ 1. ODOT-approved Public School Program
   - ○ 2. ODOT-approved Commercial/Private Driving School Program
   - ○ 3. Other program
   - ○ 8. Do not know

3. **What were the main reasons you took (plan on taking or are taking) a driver education course? (mark all that apply)**
   - ○ a. A parent or guardian made me take it
   - ○ b. To get my license sooner
   - ○ c. To get credits from school
   - ○ d. So I wouldn't learn someone else's bad habits
   - ○ e. I had no one else to teach me
   - ○ f. To make me a safer driver
   - ○ g. To make me a more skilled driver
   - ○ h. To help me pass the road test
   - ○ i. To get a discount on my automobile insurance

3a. **If you selected more than one reason, which was the single most important reason? (write in the letter next to your answer)**

   ***Specify Letter*** _____

4. **What were the main reasons you chose the type of driver education program you marked in question #2 above rather than a different program? (mark all that apply)**
   - ○ a. Not aware of other programs
   - ○ b. Not convenient
   - ○ c. Couldn't afford the cost
   - ○ d. Couldn't afford the time
   - ○ e. Not available in my school
   - ○ f. No other programs exist in my area

4a. **If you selected more than one reason, which was the single most important reason? (write in the letter next to your answer)**

   ***Specify Letter*** _____

5. **For each of the following statements indicate the extent to which you agree or disagree.**

| | *Strongly Disagree* 1 | 2 | 3 | 4 | *Strongly Agree* 5 |
|---|---|---|---|---|---|
| a. I think the driver education course will be important in teaching me to be a safe driver | ○ | ○ | ○ | ○ | ○ |
| b. The driver education course will help me become a better defensive driver | ○ | ○ | ○ | ○ | ○ |
| c. The driver education course will help me avoid being in an accident | ○ | ○ | ○ | ○ | ○ |
| d. I think that teenagers planning to get a driver license should take my driver education course | ○ | ○ | ○ | ○ | ○ |
| e. I would recommend my driver education course to my friends | ○ | ○ | ○ | ○ | ○ |

## SECTION B: TEEN DRIVING LAWS

**For each question, please fill in the bubble that best matches your answer.**

**1. Under Oregon's teen driving laws, beginning drivers under the age of 18 must have an instruction permit before obtaining a provisional license. *For each of the following statements, tell us whether you think each is allowed on an instruction permit.***

| | *Yes* *1* | *No* *2* | *Don't Know* *8* |
|---|---|---|---|
| a. Driving without a supervising driver in the vehicle | ○ | ○ | ○ |
| b. Driving with a supervising driver who has held a full valid license for one year | ○ | ○ | ○ |
| c. Driving with a supervising driver who has held a full valid license for three years | ○ | ○ | ○ |
| d. Driving with a supervising driver who is at least 21 years of age | ○ | ○ | ○ |
| e. Applying for a provisional driver's license after having an instruction permit for at least three months | ○ | ○ | ○ |
| f. Applying for a provisional driver's license after having an instruction permit for at least six months | ○ | ○ | ○ |
| g. Driving after consuming any amount of alcohol | ○ | ○ | ○ |

**2. Under Oregon's teen driving laws, beginning drivers under the age of 18 must have a Provisional Driver License to drive without a supervising driver in the vehicle. For each of the following statements, tell us whether you think each is allowed on a Provisional Driver License.**

| | *Yes* *1* | *No* *2* | *Don't Know* *8* |
|---|---|---|---|
| a. Driving home from school with one teenage friend in the car in the first six months | ○ | ○ | ○ |
| b. Driving to a friend's house after school with one teenage friend in the car in the first six months | ○ | ○ | ○ |
| c. Driving home from school with two teenage friends in the front seat of your car in the second six months | ○ | ○ | ○ |
| d. Driving home from school with one teenage friend in the front seat and three in the backseat in the second six months | ○ | ○ | ○ |
| e. Driving home from your friend's house at 1.a.m with only three teenage friends in the car in the second six months | ○ | ○ | ○ |
| f. Driving home from your job at 1 a.m. | ○ | ○ | ○ |
| g. Driving for your job between midnight and 5 a.m | ○ | ○ | ○ |
| h. Driving after consuming any amount of alcohol | ○ | ○ | ○ |
| i. Sending a text message from your cell phone while you are driving | ○ | ○ | ○ |
| j. Talking on a hand-held cell phone while you are driving | ○ | ○ | ○ |
| k. Talking on a hands-free cell phone while you are driving | ○ | ○ | ○ |

**3. Indicate the extent to which you oppose or support Oregon's Teen Driving Laws.**

| | *Strongly Oppose* *1* | *2* | *3* | *4* | *Strongly Support* *5* |
|---|---|---|---|---|---|
| | ○ | ○ | ○ | ○ | ○ |

**4. Tell us whether you oppose or support the following driving requirements. The requirement:**

| | *Strongly Oppose* 1 | 2 | 3 | 4 | *Strongly Support* 5 |
|---|---|---|---|---|---|
| a. For teen drivers to have a zero blood alcohol content | ○ | ○ | ○ | ○ | ○ |
| b. To hold an instruction permit for at least six months before getting a provisional driver's license | ○ | ○ | ○ | ○ | ○ |
| c. To prohibit passengers under 20 who are not family members in the first six months | ○ | ○ | ○ | ○ | ○ |
| d. To limit passengers under 20 who are not family members in the second six months | ○ | ○ | ○ | ○ | ○ |
| e. For teen drivers to drive only with a supervising driver when they have an instruction permit | ○ | ○ | ○ | ○ | ○ |
| f. That limits unsupervised driving between midnight and 5 am | ○ | ○ | ○ | ○ | ○ |
| g. To complete at least 50 hours of supervised driving along with an ODOT-approved traffic safety education course **OR** at least 100 hours of supervised driving | ○ | ○ | ○ | ○ | ○ |

**5. With your instruction permit, who rode/rides with you as your supervising driver? (mark all that apply)**

○ a. Mother ○ b. Father ○ c. Older brother or sister ○ d. Other relative ○ e. Friend
○ f. Driving instructor
○ g. Other: (specify) ____________________________________________
○ h. Do not have instruction permit yet

**5a. Of those, which <u>one</u> person rode/rides with you the most?**

***Specify letter*** ____

**6. How many hours of driving practice do you think the "average" teen driver should have before they get their provisional driver's license?**

_________ ***insert the number of hours***

**7. For each of the following statements indicate the extent to which you agree or disagree.**

| | *Strongly Disagree* 1 | 2 | 3 | 4 | *Strongly Agree* 5 |
|---|---|---|---|---|---|
| a. The Oregon Teen Driving Laws will make me a safer driver | ○ | ○ | ○ | ○ | ○ |
| b. It is important for teen drivers to have several months of practice driving before they begin driving without a parent or other adult driver in the car | ○ | ○ | ○ | ○ | ○ |
| c. Requiring me to practice driving under supervision will give me the confidence to drive without an experienced adult driver in the car | ○ | ○ | ○ | ○ | ○ |

## SECTION C: SAFE DRIVING

**For each question, please mark only one answer.**

**1. When changing lanes, you can check your blind spot by:**

- ◯ 1 Using the inside rearview mirror
- ◯ 2. Using both inside rearview mirrors and outside rearview mirrors
- ◯ 3. Turning your head and looking over your shoulder
- ◯ 4. All of the above

**2. To reduce glare from the head lights of an oncoming vehicle, you should:**

- ◯ 1. Look to the right edge of the roadway just as you approach the vehicle
- ◯ 2. Look to the left edge of the roadway just as you approach the vehicle
- ◯ 3. Increase your speed to get past the vehicle quickly
- ◯ 4. Keep the overhead light turned on

**3. What is the most common cause of <u>minor</u> accidents among teens?**

- ◯ 1. Slippery roads
- ◯ 2. Alcohol
- ◯ 3. Speeding
- ◯ 4. Poor visual search patterns

**4. A car going twice as fast as another would strike an object how much harder:**

- ◯ 1. Four times as hard
- ◯ 2. Three times as hard
- ◯ 3. Twice as hard
- ◯ 4. A little harder

**5. What is most important in preventing a vehicle from going off the road in a curve?**

- ◯ 1. Resistance of the air around the vehicle
- ◯ 2. Friction between the tires and the road surface
- ◯ 3. The weight of the vehicle
- ◯ 4. The power steering system

**6. Your traffic light changes to yellow as you approach an intersection. In most cases, what action should you take?**

- ◯ 1. Stop, if you can do so safely
- ◯ 2. Signal for a right turn and slow
- ◯ 3. Go through if no other vehicles are coming
- ◯ 4. Accelerate to clear the intersection

**7. Beer's effects on your reflexes and judgment:**

- ◯ 1. Are less than if you drink wine
- ◯ 2. Depends on the amount of alcohol in your blood stream
- ◯ 3. Are greater than if you drink champagne
- ◯ 4. Are less than if you drink hard liquor

8. **To safely drive into a sharp curve, you should:**
   - ◯ 1. Brake as you enter the curve
   - ◯ 2. Accelerate while in the curve
   - ◯ 3. Complete your braking before entering the curve
   - ◯ 4. Stay to the outside of the curve

9. **Which of the following best describes where you should be looking when driving?**
   - ◯ 1. At the road directly in front of your vehicle
   - ◯ 2. Several car lengths straight ahead of your vehicle
   - ◯ 3. Several car lengths ahead and side to side
   - ◯ 4. As far ahead as you can see and side to side

10. **What is the most common cause of <u>serious injury</u> accidents among teens?**
    - ◯ 1. Speeding
    - ◯ 2. Alcohol
    - ◯ 3. Poor visual search patterns
    - ◯ 4. Slippery roads

11. **The most common type of accident at entrances to freeways (expressways) is:**
    - ◯ 1. Head-on accident
    - ◯ 2. Side impact accident
    - ◯ 3. Rear end accident
    - ◯ 4. None of the above

12. **Because of their faster reaction time teens deal with which of the following situations better than typical 40 year old drivers:**
    - ◯ 1. Driving in bad weather
    - ◯ 2. Recovering from a run-off-the-road event
    - ◯ 3. Reacting to a change in a traffic signal
    - ◯ 4. None of the above

13. **Which of the following accident types result in the greatest number of deaths to teenage drivers and their passengers each year?**
    - ◯ 1. Rear end accidents at stop lights on city streets during rush hour
    - ◯ 2. Run-off-the-road accidents at curves on country roads at night
    - ◯ 3. Head-on accidents on straight suburban roads in rain
    - ◯ 4. Multiple-vehicle accidents on freeways in fog

14. **On a wet road, hydroplaning can be caused by:**
    - ◯ 1. Low tire tread depth
    - ◯ 2. Too much speed
    - ◯ 3. Tire under-inflation
    - ◯ 4. Any of the above

## SECTION D: SKILLS AND ABILITIES

1. **We want you to rate how good you think your skills and/or abilities are in performing each of the following driving tasks:**

| | Very Poor 1 | 2 | 3 | 4 | Very Good 5 |
|---|---|---|---|---|---|
| a. Identifying hazards on the road that could cause an accident | ○ | ○ | ○ | ○ | ○ |
| b. Predicting traffic situations that could develop ahead | ○ | ○ | ○ | ○ | ○ |
| c. Reacting quickly to risky traffic situations | ○ | ○ | ○ | ○ | ○ |
| d. Driving in the dark | ○ | ○ | ○ | ○ | ○ |
| e. Controlling the vehicle if it starts to skid | ○ | ○ | ○ | ○ | ○ |
| f. Maintaining a constant speed | ○ | ○ | ○ | ○ | ○ |
| g. Adjusting speed to the driving conditions | ○ | ○ | ○ | ○ | ○ |
| h. Maintaining a safe following distance | ○ | ○ | ○ | ○ | ○ |
| i. Driving in an unfamiliar area | ○ | ○ | ○ | ○ | ○ |
| j. Changing lanes in heavy traffic | ○ | ○ | ○ | ○ | ○ |
| k. Keeping up with the speed of traffic | ○ | ○ | ○ | ○ | ○ |
| l. Driving in bad weather | ○ | ○ | ○ | ○ | ○ |
| m. Passing on a two-lane road | ○ | ○ | ○ | ○ | ○ |
| n. Anticipating the actions of other drivers | ○ | ○ | ○ | ○ | ○ |
| o. Avoiding risks that could result in an accident | ○ | ○ | ○ | ○ | ○ |
| p. Tolerating the mistakes of other drivers | ○ | ○ | ○ | ○ | ○ |

2. **For each of the following, indicate how likely they are to happen to you in the coming year.**

| | Very Unlikely 1 | 2 | 3 | 4 | Very Likely 5 |
|---|---|---|---|---|---|
| a. As a driver, how likely are you to be <u>involved</u> in an accident? | ○ | ○ | ○ | ○ | ○ |
| b. As a driver, how likely are you to be <u>injured</u> in an accident? | ○ | ○ | ○ | ○ | ○ |

## SECTION E: YOUR DRIVING BEHAVIOR

1. **We want to know how often you do each of the following <u>while driving</u>. Please remember that your answers are confidential and for research purposes only.**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very Frequently 5 |
|---|---|---|---|---|---|
| a. Take chances for the fun of it | ○ | ○ | ○ | ○ | ○ |
| b. Pass other cars because it's exciting | ○ | ○ | ○ | ○ | ○ |
| c. Drive dangerously because you enjoy it | ○ | ○ | ○ | ○ | ○ |
| d. Take some risks because it feels good | ○ | ○ | ○ | ○ | ○ |
| e. See how fast you can drive | ○ | ○ | ○ | ○ | ○ |
| f. Out-maneuver other drivers for the thrill of it | ○ | ○ | ○ | ○ | ○ |
| g. Test your skills in ways others might find risky | ○ | ○ | ○ | ○ | ○ |
| h. Try to beat other drivers leaving a stoplight | ○ | ○ | ○ | ○ | ○ |

2. **For each of the following statements indicate how responsible you feel when driving. How responsible do you feel you are for:**

| | *Not at All Responsible* 1 | 2 | 3 | 4 | *Extremely Responsible* 5 |
|---|---|---|---|---|---|
| a. Your own safety | ○ | ○ | ○ | ○ | ○ |
| b. The safety of passengers in your vehicle | ○ | ○ | ○ | ○ | ○ |
| c. The safety of other people outside your vehicle | ○ | ○ | ○ | ○ | ○ |

3. **Have you driven at any time in the last 3 months?**

○ 1. Yes

○ 2. No ➡ **IF YOU SELECTED "No" GO TO SECTION F: ABOUT YOU — ON PAGE 10 OF THE SURVEY**

4. **How often have you done the following things when you were driving during the last three months?**

| | *Never* 1 | *Rarely* 2 | *Occasionally* 3 | *Often* 4 | *Very Frequently* 5 |
|---|---|---|---|---|---|
| a. Attempted to pass a vehicle that you hadn't noticed was signaling for a left turn | ○ | ○ | ○ | ○ | ○ |
| b. Failed to notice that pedestrians were crossing before starting to turn | ○ | ○ | ○ | ○ | ○ |
| c. Failed to check your rear-view mirrors and blind spot before changing lanes | ○ | ○ | ○ | ○ | ○ |
| d. Braked too hard on slippery road | ○ | ○ | ○ | ○ | ○ |
| e. Driven especially close to the car in front as a signal to its driver to go faster or get out of the way | ○ | ○ | ○ | ○ | ○ |
| f. Driven over the speed limit on a residential road | ○ | ○ | ○ | ○ | ○ |
| g. Raced away from the traffic lights with the intention of beating the driver next to you | ○ | ○ | ○ | ○ | ○ |
| h. Cut off other drivers who made you angry | ○ | ○ | ○ | ○ | ○ |
| i. Driven when you knew that drinking alcohol had affected your coordination | ○ | ○ | ○ | ○ | ○ |
| j. Missed 'Stop' or 'Yield' signs and narrowly avoided colliding with traffic having the right of way | ○ | ○ | ○ | ○ | ○ |
| k. On turning right, nearly hit a cyclist who has come up on your right side | ○ | ○ | ○ | ○ | ○ |
| l. Underestimated the speed of an oncoming vehicle when passing another vehicle | ○ | ○ | ○ | ○ | ○ |
| m. Stayed in a lane that you know will be closed ahead until the last minute before merging into another lane | ○ | ○ | ○ | ○ | ○ |
| n. Crossed an intersection knowing that the traffic signal lights have already turned red | ○ | ○ | ○ | ○ | ○ |
| o. Driven over the speed limit on a freeway/expressway/highway | ○ | ○ | ○ | ○ | ○ |
| p. Driven within an hour after having one or two drinks of alcohol | ○ | ○ | ○ | ○ | ○ |
| q. Driven when you felt high or light-headed from drinking alcohol | ○ | ○ | ○ | ○ | ○ |
| r. Consumed alcohol in the car while you were driving | ○ | ○ | ○ | ○ | ○ |

**5. Indicate how often, if ever, you do the following while driving. While driving, how often do you:**

| | *Never* 1 | *Rarely* 2 | *Occasionally* 3 | *Often* 4 | *Very Frequently* 5 |
|---|---|---|---|---|---|
| a. Make or answer calls on a cell phone | ○ | ○ | ○ | ○ | ○ |
| b. Look at your passengers while talking to them | ○ | ○ | ○ | ○ | ○ |
| c. Look at an event going on outside your vehicle and fail to watch for traffic | ○ | ○ | ○ | ○ | ○ |
| d. Send or receive text messages | ○ | ○ | ○ | ○ | ○ |
| e. Look down while adjusting the radio/CD/iPod/mp3 player | ○ | ○ | ○ | ○ | ○ |

**6. In the past three months, how often did you drive for each of the following reasons? How often did you drive:**

| | *Never* 1 | *Less Than Once Per Week* 2 | *Once or Twice Per Week* 3 | *Several Times Per Week* 4 | *Every Day* 5 |
|---|---|---|---|---|---|
| a. To and from school and activities | ○ | ○ | ○ | ○ | ○ |
| b. To and from work | ○ | ○ | ○ | ○ | ○ |
| c. As part of your work | ○ | ○ | ○ | ○ | ○ |
| d. For errands or shopping | ○ | ○ | ○ | ○ | ○ |
| e. Just for fun or something to do | ○ | ○ | ○ | ○ | ○ |
| f. During rush hour | ○ | ○ | ○ | ○ | ○ |
| g. In a town | ○ | ○ | ○ | ○ | ○ |
| h. In a city | ○ | ○ | ○ | ○ | ○ |
| i. On unpaved roads | ○ | ○ | ○ | ○ | ○ |
| j. At night after 10 p.m. | ○ | ○ | ○ | ○ | ○ |
| k. With teen passengers in your vehicle | ○ | ○ | ○ | ○ | ○ |
| l. On rural highways | ○ | ○ | ○ | ○ | ○ |
| m. On highways (expressways) | ○ | ○ | ○ | ○ | ○ |

**7. How many short trips (at least 1 mile or up to 10 miles) and long trips (10 miles or more) did you take on a typical day during the week and during the weekend? Record the number of trips in the table below:**

| | Weekday (Monday - Friday) | Weekend (Saturday - Sunday) |
|---|---|---|
| a. Number of short trips | ________ | ________ |
| b. Number of long trips | ________ | ________ |

**8. In the past three days, about how much time, in minutes, did you drive each day, beginning with yesterday? (IF YOU HAVE NOT DRIVEN ON A PARTICULAR DAY OR ANY OF THESE DAYS, PLEASE ENTER '0')**

a. Yesterday ______ ***minutes***

b. Two days ago ______ ***minutes***

c. Three days ago ______ ***minutes***

## SECTION F: ABOUT YOU

**1. For each of the following statements about driving indicate the extent to which you agree or disagree.**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| a. I am confident that I know all the rules of the road | ○ | ○ | ○ | ○ | ○ |
| b. Because I am a skilled driver, I can drive recklessly and still be safe | ○ | ○ | ○ | ○ | ○ |
| c. If I were a more cautious driver, some of my friends would laugh at the way I drive | ○ | ○ | ○ | ○ | ○ |
| d. It is really satisfying to pass other cars on the highway | ○ | ○ | ○ | ○ | ○ |
| e. It is fun to weave through slower traffic | ○ | ○ | ○ | ○ | ○ |
| f. There's a lot I can do to avoid an accident | ○ | ○ | ○ | ○ | ○ |
| g. I take more driving risks when I am with my friends | ○ | ○ | ○ | ○ | ○ |
| h. It is fun to beat other drivers when the light changes | ○ | ○ | ○ | ○ | ○ |
| i. It is a thrill to out-maneuver other drivers | ○ | ○ | ○ | ○ | ○ |
| j. Taking risks in traffic makes driving more fun | ○ | ○ | ○ | ○ | ○ |

**2. The following statements are NOT related to driving. For each indicate the extent to which you agree or disagree.**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| a. I like taking risks | ○ | ○ | ○ | ○ | ○ |
| b. If I do only what is safe, I will go through life never fully enjoying things | ○ | ○ | ○ | ○ | ○ |
| c. It is OK to do anything you want as long as you keep out of trouble | ○ | ○ | ○ | ○ | ○ |
| d. If something works, it does not matter whether it is the right or wrong thing to do | ○ | ○ | ○ | ○ | ○ |
| e. It is OK to get around laws and rules as long as you don't break them | ○ | ○ | ○ | ○ | ○ |
| f. My friends could push me into doing just about anything | ○ | ○ | ○ | ○ | ○ |
| g. I've often broken rules because others urged me to | ○ | ○ | ○ | ○ | ○ |
| h. If my friends were drinking, it would be hard for me to resist having a drink | ○ | ○ | ○ | ○ | ○ |
| i. I've felt pressured to get drunk at parties | ○ | ○ | ○ | ○ | ○ |
| j. I often do things because my friends want me to | ○ | ○ | ○ | ○ | ○ |
| k. I've often done dangerous things because others dared me to | ○ | ○ | ○ | ○ | ○ |

3. **For each of the following statements indicate the extent to which they describe you.**

| | Not At All Like Me 1 | 2 | 3 | 4 | Very Much Like Me 5 |
|---|---|---|---|---|---|
| a. I believe that getting together with one's friends to "hang out" is one of life's important pleasures | ◯ | ◯ | ◯ | ◯ | ◯ |
| b. I try to live my life one day at a time | ◯ | ◯ | ◯ | ◯ | ◯ |
| c. I don't think much about where I'll be in the future | ◯ | ◯ | ◯ | ◯ | ◯ |
| d. I feel that it's more important to enjoy what you're doing than to get work done on time | ◯ | ◯ | ◯ | ◯ | ◯ |
| e. If things don't get done on time, I don't worry about it | ◯ | ◯ | ◯ | ◯ | ◯ |
| f. It doesn't make sense to worry about the future | ◯ | ◯ | ◯ | ◯ | ◯ |
| g. I do things without thinking | ◯ | ◯ | ◯ | ◯ | ◯ |

4. **For each of the following statements we want to know how often this applies to you.**

| | Never 1 | Rarely 2 | Occasionally 3 | Often 4 | Very Frequently 5 |
|---|---|---|---|---|---|
| a. Your parents know where you are when you are not in school or at work | ◯ | ◯ | ◯ | ◯ | ◯ |
| b. When your parents tell you to do something, you do it | ◯ | ◯ | ◯ | ◯ | ◯ |
| c. You follow your parents' values | ◯ | ◯ | ◯ | ◯ | ◯ |
| d. Your parents want to know where you are | ◯ | ◯ | ◯ | ◯ | ◯ |

5. **For each of the following statements, indicate the extent to which you disagree or agree.**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| a. I like who I am | ◯ | ◯ | ◯ | ◯ | ◯ |
| b. I am happy and content | ◯ | ◯ | ◯ | ◯ | ◯ |
| c. I set goals for myself | ◯ | ◯ | ◯ | ◯ | ◯ |
| d. My life has purpose | ◯ | ◯ | ◯ | ◯ | ◯ |
| e. I am confident about my beliefs | ◯ | ◯ | ◯ | ◯ | ◯ |
| f. I know my strengths and weaknesses | ◯ | ◯ | ◯ | ◯ | ◯ |
| g. I look forward to the future | ◯ | ◯ | ◯ | ◯ | ◯ |
| h. I examine my beliefs | ◯ | ◯ | ◯ | ◯ | ◯ |

6. **For each of the following statements indicate the extent to which you disagree or agree.**

| | Strongly Disagree 1 | 2 | 3 | 4 | Strongly Agree 5 |
|---|---|---|---|---|---|
| a. I'd do almost anything on a dare | ◯ | ◯ | ◯ | ◯ | ◯ |
| b. I like to live dangerously | ◯ | ◯ | ◯ | ◯ | ◯ |
| c. I enjoy the thrill I get when I take risks | ◯ | ◯ | ◯ | ◯ | ◯ |

7. **For each of the following statements indicate how acceptable you view the behavior. How acceptable do you think it is to:**

| | Very Unacceptable 1 | 2 | 3 | 4 | Very Acceptable 5 |
|---|---|---|---|---|---|
| a. Give a fake excuse for missing work | ◯ | ◯ | ◯ | ◯ | ◯ |
| b. Damage public property on purpose | ◯ | ◯ | ◯ | ◯ | ◯ |
| c. Damage something valuable that belongs to a person you are angry with | ◯ | ◯ | ◯ | ◯ | ◯ |
| d. Take things of value that do not belong to you | ◯ | ◯ | ◯ | ◯ | ◯ |
| e. Skip a class | ◯ | ◯ | ◯ | ◯ | ◯ |
| f. Give false information when filing out a job application | ◯ | ◯ | ◯ | ◯ | ◯ |

## SECTION G: BACKGROUND INFORMATION

**This information helps ensure that our sample is representative of the population of young drivers.**

**What grade are you in?** ________

**For completing the survey, we will need to mail you $10. Please complete your mailing address.**

**ADDRESS:**
**CITY:**
**STATE:**
**ZIP CODE:**

**Today's date:** ______ __________ _________
*Day* *Month* *Year*

[IF NO EMAIL ON FILE] **To contact you in a timely manner in the future, please provide your email address.** ________________________________

**You will receive your $10 for participating within four to six weeks. If you do not receive it by then, please contact as at tirf@pra.ca.**

# APPENDIX R: PRA INVITATION LETTER FOR WAVE 1 WITH LINK TO THE ONLINE SURVEY FOR OREGON

# OREGON TEEN DRIVER SURVEY

<DATE>

Dear <FIRST NAME> <LAST NAME>:

The Traffic Injury Research Foundation (TIRF) and AAA Foundation for Traffic Safety need your help. You have been selected to participate in a study of teens 15 to 17 years of age who have recently applied for a driving instruction permit.

As part of this study, we would like you to complete a survey about your experiences as a new driver. The survey also asks for information on your attitudes, behaviors, and knowledge. The survey will take approximately 20 minutes. We know your time is important and as a small token of appreciation for your participation, we have enclosed a gift of $5. **Once you complete the survey and we receive your parental/guardian's consent, we will send you another $5.** The $5 you received and the additional $5 for participating are being provided by the AAA Foundation for Traffic Safety.

Please complete your survey as soon as possible by going to the following website:

<TEEN LINK>

To participate in the study, a parent or guardian will need to visit the website below and indicate they have reviewed this letter and given you permission to participate in this study.

<PARENT LINK>

The study is being conducted on behalf of the Transportation Safety Division of Oregon's Department of Transportation by the Traffic Injury Research Foundation (TIRF) and AAA Foundation for Traffic Safety. Your participation will provide Oregon's Transportation Safety Division with important information about young drivers' habits and knowledge, and will ultimately improve the safety of all teen drivers. Whether you decide to participate will have no impact on your licence. All information provided is confidential, only the TIRF research team will see your answers. After completing the first survey, we may invite you to complete a couple of follow-up surveys several months later.

If you or your parent or guardian have any questions about the survey, please contact the Oregon Teen Driver Survey manager at tirf@pra.ca or toll-free at 1-888-877-6744. If you have any questions or concerns regarding this research, please contact Katie Wood of the Traffic Injury Research Foundation at 1-877-238-5235, ext. 309.

Thank you in advance for your participation and help with this important research.

Dan Mayhew
Senior Vice President
Traffic Injury Research Foundation

# APPENDIX S: PRA INVITATION LETTER FOR WAVE 2 FOR OREGON

Dear FIRST NAME**:**

You may recall completing a survey approximately 6 to 8 months ago for the Traffic Injury Research Foundation (TIRF) and the AAA Foundation for Traffic Safety. As mentioned in our letter, the study involves completing up to three surveys over several months. **This is to let you know that it is now time to complete the second survey**. **After you have completed the questionnaire you will be mailed $10 for participating.**

To complete your survey, go to **www.prasurveys.com/Oregon** and click on the link to the **New Driver Survey**. When prompted, please enter your 7 character survey key below.

**Your survey key is: KEY**

The study is being conducted by TIRF and AAA Foundation for Traffic Safety on behalf of the Transportation Safety Division of Oregon's Department of Transportation. Whether you decide to participate will have no impact on your licence. All information provided is confidential, only the TIRF research team will see your answers.

If you have any questions about the survey or having problems accessing your link, please contact the Oregon Teen Driver Survey manager at tirf@pra.ca or toll-free at 1-888-877-6744. If you have any questions or concerns regarding this research, please contact Katie Wood of the Traffic Injury Research Foundation at 1-877-238-5235, ext. 309.

Thank you for taking the time to be involved in this important research project.

Dan Mayhew
Senior Vice President
Traffic Injury Research Foundation

# APPENDIX T: ITEM BY ITEM RESPONSES TO GDL KNOWLEDGE QUESTIONS FROM OREGON

| | GDL knowledge<br>Item by item analysis | Driver Education Status | | | |
|---|---|---|---|---|---|
| | Respondents were asked to indicate which of the following were permitted: | DE Group Wave 1 Percent Correct | DE Group Wave 2 Percent Correct | Non-DE Group Wave 1 Percent Correct | Non-DE Group Wave 2 Percent Correct |
| Instruction Permit Phase | 1a. Driving without a supervising driver in the vehicle | 95.80 | 95.10 | 96.90 | 95.95 |
| | 1b. Driving with a supervising driver who has held a full valid licence for one year | 72.03 | 76.57 | 69.77 | 75.44 |
| | 1c. Driving with a supervising driver who has held a full valid licence for 3 years | 64.34 | 73.43 | 66.67 | 68.69 |
| | 1d. Driving with a supervising driver who is at least 21 years of age | 85.66 | 90.21 | 88.80 | 90.69 |
| | 1e. Applying for a provisional license after having an instruction permit for at least three months | 83.22 | 86.71 | 84.21 | 87.85 |
| | 1f. Applying for a provisional license after having an instruction permit for at least six months | 77.27 | 89.51 | 78.54 | 86.37 |
| | 1g. Driving after consuming any amount of alcohol | 98.25 | 99.30 | 99.73 | 99.60 |
| Provisional License Phase | 2a. Driving home from school with one teenage friend in the car in the first six months | 80.07 | 90.21 | 83.67 | 88.93 |
| | 2b. Driving to a friend's house after school with one teenage friend in the car in the first six months | 82.87 | 91.26 | 85.70 | 88.80 |
| | 2c. Driving home from school with two teenage friends in the front seat of your car in the second six month | 53.85 | 61.19 | 53.04 | 57.89 |
| | 2d. Driving home from school with one teenage friend in the front seat and three in the backseat in the second six months | 45.10 | 55.94 | 45.75 | 52.36 |
| | 2e. Driving home from your friends at 1:00 am with only three teenage friends in the car in the second six months | 80.07 | 86.71 | 83.00 | 85.02 |
| | 2f. Driving home from your job at 1 a.m. | 79.72 | 82.52 | 77.33 | 82.59 |
| | 2g. Driving for your job between midnight and 5 a.m. | 76.22 | 77.97 | 72.20 | 78.27 |
| | 2h. Driving after consuming any amount of alcohol | 97.90 | 98.25 | 99.33 | 99.33 |
| | 2i. Sending a text message from your cell phone while you are driving | 98.60 | 99.30 | 99.19 | 98.65 |
| | 2j. Talking on a hand-held cell phone while you are driving | 98.95 | 97.55 | 99.19 | 98.11 |
| | 2k. Talking on a hands-free cell phone while you are driving | 56.64 | 67.13 | 57.22 | 54.93 |

# APPENDIX U: ITEM BY ITEM RESPONSES TO SAFE DRIVING KNOWLEDGE QUESTIONS FROM OREGON

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **DE Group Wave 1 Percent of Responses** | **DE Group Wave 2 Percent of Responses** | **Non-DE Group Wave 1 Percent of Responses** | **Non-DE Group Wave 2 Percent of Responses** |
| **7. When changing lanes, you can check your blind spot by:** | | | | |
| e. Using the inside rear-view mirror | 0.00 | 0.35 | 0.40 | 0.27 |
| f. Using both inside rear-view mirrors and outside rear-view mirrors | 3.50 | 0.70 | 3.10 | 2.70 |
| g. Turning your head and looking over your shoulder | 36.71 | 31.82 | 35.76 | 31.04 |
| h. All of the above | 59.44 | 67.13 | 60.59 | 65.99 |
| **8. To reduce glare from the head lights of an oncoming vehicle, you should:** | | | | |
| e. Look to the right edge of the roadway just as you approach the vehicle | 80.07 | 90.91 | 79.62 | 83.13 |
| f. Look to the left edge of the roadway just as you approach the vehicle | 14.69 | 6.99 | 13.09 | 13.23 |
| g. Increase your speed to get past the vehicle quickly | 1.05 | 0.35 | 0.13 | 0.67 |
| h. Keep the overhead light turned on | 3.50 | 1.75 | 6.88 | 2.83 |
| **9. What is the most common cause of minor accidents among teens?** | | | | |
| e. Slippery roads | 8.39 | 2.45 | 5.80 | 7.83 |
| f. Alcohol | 9.44 | 8.74 | 10.26 | 9.58 |
| g. Speeding | 46.50 | 43.71 | 48.85 | 48.18 |
| h. Poor visual search patterns | 35.31 | 44.76 | 34.95 | 34.01 |
| **10. A car going twice as fast as another would strike an object how much harder?** | | | | |
| e. Four times as hard | 47.55 | 71.68 | 44.26 | 47.64 |
| f. Three times as hard | 7.34 | 4.90 | 7.56 | 7.15 |
| g. Twice as hard | 43.71 | 23.43 | 47.50 | 44.67 |
| h. A little harder | 0.00 | 0.00 | 0.40 | 0.27 |
| **11. What is most important in preventing a vehicle from going off the road in a curve?** | | | | |
| e. Resistance of the air around the vehicle | 1.40 | 0.70 | 3.64 | 3.64 |
| f. Friction between the tires and the road surface | 63.29 | 87.06 | 65.99 | 76.38 |
| g. The weight of the vehicle | 13.64 | 5.94 | 7.42 | 7.83 |
| h. The power steering system | 19.58 | 6.29 | 22.54 | 11.88 |

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **DE Group Wave 1 Percent of Responses** | **DE Group Wave 2 Percent of Responses** | **Non-DE Group Wave 1 Percent of Responses** | **Non-DE Group Wave 2 Percent of Responses** |
| **12. Your traffic light changes to yellow as you approach an intersection. In most cases, what action should you take?** | | | | |
| e. Stop, if you can do so safely | 95.10 | 96.50 | 94.74 | 94.74 |
| f. Signal for a right turn and slow | 1.40 | 1.75 | 1.35 | 1.48 |
| g. Go through if no other vehicles are coming | 2.10 | 1.05 | 2.56 | 1.75 |
| h. Accelerate to clear the intersection | 0.70 | 0.70 | 0.67 | 1.62 |
| **8. Beer's effects on your reflexes and judgement:** | | | | |
| e. Are less than if you drink wine | 1.05 | 2.45 | 1.48 | 1.89 |
| f. Depends on the amount of alcohol in your blood stream | 82.87 | 80.77 | 83.81 | 82.19 |
| g. Is greater than if you drink champagne | 3.85 | 4.20 | 3.37 | 4.18 |
| h. Are less than if you drink hard liquor | 10.84 | 11.54 | 10.66 | 10.39 |
| **15. To safely drive into a curve, you should:** | | | | |
| e. Brake as you enter the curve | 59.09 | 47.90 | 64.10 | 56.14 |
| f. Accelerate while in the curve | 3.85 | 3.85 | 5.13 | 4.99 |
| g. Complete your braking before entering the curve | 31.47 | 46.15 | 27.80 | 36.57 |
| h. Stay to the outside of the curve | 5.24 | 1.05 | 2.56 | 1.35 |
| **16. Which of the following best describes where you should be looking when driving:** | | | | |
| e. At the road directly in front of your vehicle | 3.85 | 1.05 | 3.64 | 4.86 |
| f. Several car lengths straight ahead of your vehicle | 9.09 | 8.74 | 9.04 | 10.26 |
| g. Several car lengths ahead and side to side | 42.66 | 34.27 | 45.48 | 49.39 |
| h. As far ahead as you can see and side to side | 43.71 | 54.90 | 41.03 | 34.68 |
| **17. What is the most common cause of serious injury accidents among teens?** | | | | |
| e. Speeding | 35.66 | 43.36 | 38.06 | 42.51 |
| f. Alcohol | 54.55 | 43.71 | 48.72 | 44.80 |
| g. Poor visual search patterns | 7.34 | 11.19 | 10.93 | 8.91 |
| h. Slippery roads | 1.05 | 0.35 | 1.75 | 3.10 |

| Safe Driving Knowledge Items by item Response Table | Driver Education Status | | | |
|---|---|---|---|---|
| **Please note the correct answers are highlighted.** | **DE Group Wave 1 Percent of Responses** | **DE Group Wave 2 Percent of Responses** | **Non-DE Group Wave 1 Percent of Responses** | **Non-DE Group Wave 2 Percent of Responses** |
| **18. The most common type of accident at entrances to freeways (expressways) is:** | | | | |
| e. Head-on accidents | 4.55 | 3.50 | 3.24 | 1.75 |
| f. Side impact accidents | 58.04 | 64.34 | 59.51 | 62.48 |
| g. Rear end accidents | 31.12 | 26.57 | 31.71 | 31.71 |
| h. None of the above | 4.90 | 4.90 | 4.99 | 3.64 |
| **19. Because of their faster reaction time, teens deal with which of the following situations better than typical 40 year old drivers:** | | | | |
| e. Driving in bad weather | 4.20 | 8.39 | 7.29 | 9.99 |
| f. Recovering from a run-off-the-road event | 12.59 | 11.54 | 9.99 | 11.07 |
| g. Reacting to a change in a traffic signal | 43.71 | 46.85 | 48.18 | 43.99 |
| h. None of the above | 38.81 | 32.52 | 33.60 | 34.55 |
| **20. Which of the following accident types result in the greatest number of deaths to teenage drivers and their passengers each year?** | | | | |
| e. Rear end accidents at stop lights on city streets during rush hour | 19.58 | 16.78 | 19.03 | 16.60 |
| f. Run-off-the-road accidents at curves on country roads at night | 44.06 | 50.35 | 44.13 | 46.96 |
| g. Head-on accidents on straight suburban roads in rain | 22.38 | 24.48 | 23.89 | 26.45 |
| h. Multiple-vehicle accidents on freeways in fog | 12.59 | 7.34 | 11.74 | 9.85 |
| **21. On a wet road, hydroplaning can be caused by:** | | | | |
| e. Low tire tread depth | 2.80 | 3.15 | 3.10 | 2.97 |
| f. Too much speed | 11.54 | 10.49 | 12.96 | 13.23 |
| g. Tire under-inflation | 1.05 | 0.70 | 2.02 | 1.62 |
| h. Any of the above | 84.27 | 85.31 | 80.70 | 81.65 |