

Proceedings of the National Rural Summit on Traffic Safety Culture 2009

Sponsored by the Western Transportation Institute, the Research and Innovative Technology Administration, the Montana Department of Transportation, the Federal Highway Administration and the AAA Foundation for Traffic Safety

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Table of Contents

Executive Summary.....	ii
Welcome	1
Automobiles, Highways and Attitudes.....	1
Traffic Safety Petition.....	2
Traffic Safety Culture Introduction	5
What is culture?.....	9
Traffic Safety Culture	9
Exploring Differences between Rural and Urban Traffic Safety Culture	10
Rural Traffic Safety Culture	11
Panelist Comments	13
How does culture influence behavior?.....	18
Culture, Perceptions and Social Norms	18
State Political Culture, Public Policy, and Traffic Safety	20
Improving Safety Culture with Behavior-Based Safety	21
Panelist Comments	24
Future Casting Keynotes	30
Expectationism: Key to a More Safety Oriented Culture.....	30
Pay-As-You-Drive-and-You-Save Insurance	38
The Future of Integrating Agency Traffic Safety Cultures: Lessons from Minnesota’s “Toward Zero Death” Program	39
How can culture be used to improve traffic safety?.....	40
Safety Culture in Europe: Characteristics of Successful Programs	40
The Path to a Safer Traffic Safety Culture.....	41
Changing Traffic Safety Culture	42
Panelist Comments	43
Closing Remarks.....	46

Executive Summary

Despite substantial improvements in traffic safety over the past fifty years and the recent drop in motor vehicle deaths over the past two years, traffic fatalities remain an unrecognized and underappreciated public health crisis. As traffic safety professionals, losing even one life is unacceptable but losing one life every fourteen minutes is outrageous. Accordingly, we need to treat this as a public health issue and should focus on trying to improve it, not only locally but across the nation and internationally.

We need to think about traffic safety from more than just a systems perspective. Traffic crashes are not the result of isolated factors such as an icy road, but rather the combination of factors such as a driver deciding to speed on an icy road. The impact of a crash may be focused on the driver, but the factors that precipitated the crash may reside at higher layers in the system including vehicle, traffic, infrastructure, environment and society. Indeed, society itself embodies beliefs and attitudes that impact all levels of this system – most notably the decisions that drivers may make about engaging in risky driving behavior or complying with safety interventions and laws. We need to recognize that the events that result in a crash happen in the context of society - the beliefs and attitudes society has toward traffic safety. Unless we tackle the outer shell of this system, we are not going to get the change we want inside the system. Thus, we must focus on culture and trying to change society's attitudes and beliefs toward how people act in the societal activity of driving. We must learn to drive for each other and not just ourselves.

The National Rural Summit on Traffic Safety Culture is the first national event to focus on the issue of rural traffic safety culture. The objective of the Summit was to have focused discussions amongst experts to identify critical issues in traffic safety culture, and to support a future strategic plan for research to better understand culture and apply it to improve safety. Specifically, the goal of the Summit was to enable an exploratory dialogue amongst experts and stakeholders on the effects of traffic safety culture on fatal crashes, risk behaviors, safety policy, and research funding. In support of this goal, the Summit presentations and discussions focused on *three framework questions* that are addressed in the transcripts of the presentations and panel discussion that follow:

1. What are the knowledge gaps, or key questions, remaining in traffic safety culture?
2. What is the vision for using culture to affect change in traffic safety?
3. What are the critical steps to move forward with this vision?

Feedback from Summit participants has been extremely encouraging and plans are underway for a second Summit to be held July 11-13, 2010 in Big Sky, Montana.

To be successful, we know we need to get more individuals involved in this issue; as such, we are delighted that you are reading these Summit Proceedings. We hope you will find them useful and inspiring, and will get engaged at the local, state or national level!

Welcome

Stephen Albert, Director of the Western Transportation Institute provided opening remarks and introductions at the National Rural Summit on Traffic Safety Culture 2009. Held in Big Sky, Montana on June 22nd, the event was host to over 60 individuals from 20 states and 5 countries. Summaries of the opening presentations follow. When available, links to the online presentations have been provided.

Automobiles, Highways and Attitudes

Joseph Toole, Associate Administrator for Safety, Federal Highway Administration

Mr. Toole provided a brief history of America's love affair with the automobile and the corresponding development of modern culture based on the automobile. The following is a summary of his comments.

It's an exciting time in Washington. There are a lot of changes going on and there is a lot of focus on stimulating the economy. While it is important that individuals (and society) get back to work, at the Federal Highway Administration (FHWA) we've tried to make a very strong case for how important it is to have a society that is also traveling safely.

This is an elusive topic in many ways. It is very challenging. We have over 50% of our fatalities in the nation happening on rural roads and it is really inconceivable in many ways to think that this is happening a hundred times a day across America. We need to continue to search to find answers.

A lot of significant progress has been made. We understand the physics of vehicle dynamics, of material deformity, of skid resistance, of pavement materials. We've developed crash analysis tools. We have predictive models for considering crashes in the future. We have naturalistic studies to evaluate driver behavior. Yet with all this science and all this technology, we still struggle to understand why drivers, why society as a whole, carry the attitudes they do about driving.

A few years ago we celebrated the 50th anniversary of the interstate system. We could have been celebrating the 50th anniversary of America's love affair with the automobile. If you go back throughout history, you see that the automobile became a part of our culture. It became every child's dream to own the vehicle that his father came and lusted for at all the automobile shows. It really defined a lot of society's interaction, how we came together, how we ate, and even in the extremes, how we found our faith. There are probably still places out there in the world that we find this, but the culture of the car really was a parallel to a lot of the changes in the culture of society as well.

The focus on speed came very early. There was recently a special on NASCAR; how it started with the runners of alcohol and tobacco across state lines. The focus on speed continues to this day with the idea of needing and having the vehicle that can get us to our destination in the fastest manner. This is the dream that hundreds of millions of Americans still hold. Yet, we continue to find that they are irritated by the fact that there are hundreds of millions of other drivers that have this same dream – the dream of being out on the road travelling alone. As such, we have a lot of frustration out there on the roadway as well. There are a lot of unmet expectations.

In America, we have many cultures that come together when a driver gets behind the wheel. There was an article in the paper just this weekend. Here is a quote from the article. “We live with a kind of Wild West mentality; people here seem to consider drunk driving their Montana birthright.” These are things deep in our society. The right to do as we please. The right to kill myself if I am not wearing a seatbelt or a motorcycle helmet. If you talk about this in Europe, it is inconceivable that we have a Nation where we don’t have these things as mandatory restrictions. However, in Europe you also have a society that has nationalized healthcare, where everyone in the country is paying the cost of these incidences.

The materialism in our Nation reinforces this. We have the desire to have the latest technology and the latest vehicles; to have the best, to live the fantasy and continue the risky behaviors that we have established. Change in America’s driving culture is particularly challenging because it’s permeated into so many other elements of our culture. We find this very much in the highway program, where we have worked for years and years with NHTSA (National Highway Traffic Safety Administration) and many other safety agencies trying to get primary seatbelt laws passed, and then watching the rollback of the motorcycle helmet laws.

So what do we do? The answer requires interdependence and interaction with the vehicle, as well as with all the other drivers on the road. It is not an independent act. It is something you [Summit attendees] are doing as part of societal action. It requires common responses and that is why we have laws. That is why we have regulations. It requires the ability to match drivers’ expectations with the road and being able to do that in signage and all the aspects of the roadway. It also requires us to change the expectation that it is acceptable to have 30,000 people die on our roads every year. America has accepted this unwillingly and unwittingly. When we begin looking deeper at culture, one of the places we can start is to educate America about the consequences of their own actions.

Traffic Safety Petition

Peter Kissinger, President and CEO, AAA Foundation for Traffic Safety

<http://www.ruraltscsummit.org/downloads/09presentations/KissingerIntro.pdf>

Peter Kissinger is the President and CEO of the AAA Foundation for Traffic Safety. The AAA Foundation is a research affiliate of AAA and auto clubs throughout North America that conducts and funds traffic safety research. The following is a summary of his comments.

The AAA Foundation for Traffic Safety has four strategic focus areas. We are small, but we have a robust agenda underway on both ends of the age spectrum. On one end, we have teen driver safety, and at the other senior safety and mobility. Also, we have a road safety initiative called usRAP, which is designed to benchmark the safety of road segments throughout the country. In addition, we have a major initiative on the topic we are here to talk about today – traffic safety culture.

At question is what former US Department of Transportation Secretary Norman Mineta called the “disease of mobility”, i.e., traffic safety problems should be viewed as public health issues as we are losing over 40,000 people every year in this country. This accounts for a societal loss of at least 300

billion dollars in socio-economic cost. As a traffic safety professional, one death on our Nation's highway should be unacceptable. One death every 13 minutes, which is the statistical average for what's happening in this country day in and day out, is absolutely an outrage. Yet, I contend that even many in the traffic safety community are not outraged. Motorists, citizens, legislatures, and society in general are simply not outraged. Society is willing to accept this carnage seemingly as the price they think they need to pay for mobility.

With each new administration in Washington we hear the same rhetoric. Safety is our top priority. But, is it? Historically, the rhetoric has never matched the policies and practices that have followed as administrations have come into office. These numbers don't tell the whole story, but they do tell part of the story. We are only spending 2% of the highway trust fund on safety, and 5% of Federal R&D funds on safety. Just over 50% of the highway safety improvement monies are being obligated. When the stimulus bill was being debated in Washington, there was scant debate or even mention of highway safety. Another anecdote that one of my colleagues likes to say is: "If safety is so important, then why is it that we are just now developing the first ever highway safety manual?" Thankfully we are, and that is going to have a big impact.

Internationally, the FIA Foundation has a major world-wide effort underway designed to implement a policy that at least 10% of the transportation investments in every country should be allocated to highway safety. They are making progress in both developed countries and many of the less developed countries as well. In this country, proposing that type of goal is becoming less controversial, but it still is viewed controversially in many places.

One of the focuses of this Summit is rural roads. Almost 60% of our fatalities occur on rural roads. The fatality rate is about 2 ½ times what it is in the urban areas, and yet, we've had a long-standing, consistent under-investment in rural road safety. The last time the highway bill was authorized, we made a major improvement in trying to do something about this. We created the high risk rural roads program. Congress allocated money to try and make a difference, but it still hasn't worked. State and county collaboration in some places is great, but across the board it is quite varied and often ineffective. If we can afford a full-time safe routes to school coordinator, why can't we afford a full-time rural safety coordinator? This would cut through the bureaucracy and get the money where it needs to be spent.

When we look at traffic safety culture, we certainly don't have all the answers. However, we do know that it requires continued emphasis on the traditional 4-E approach. We need continued emphasis on engineering, education, enforcement and emergency medical services, especially in the rural environment. We are also calling for a new commitment on what we are calling the 4-Cs - enhanced commitment, collaboration, communication and a change in culture.

We know that culture is multi-faceted. There is the motorist centric part of it, but there is also the stakeholder environment. In this country, we don't seem to have the political courage to pass the laws that work in other countries. Why don't we have the political courage to allocate the resources that we know will make a difference by implementing known counter-measures; counter-measures that have

been developed, validated, and proven in many locations around the country? And, It's not only national, but has regional, organizational, and most especially, rural versus urban perspectives.

The first thing the Foundation did in trying to get our hands around traffic safety culture was to commission a compendium or collection of 20+ research articles written by top experts entitled, *Traffic Safety Culture in the United States: The Journey Forward*. I am pleased that many of the authors of research papers in that compendium are with us today, but I am even more pleased that there are other people involved here today. What we attempted to do was reach out and ask people throughout North America to help us figure out "What is this thing called traffic safety culture?" How can we measure it, and more importantly what can we do to change it? One of the recommendations of the compendium was for the foundation to start and institute a regular, nation-wide survey of culture as a means of trying to get a handle on what was going on in the country. The first of those was released last year. This survey overwhelming affirmed the culture of complacency or indifference that exists in this country today. On traffic safety problems, such as drunk driving, distracted driving, driving a car without a seatbelt, and driving a motorcycle without a helmet, people recognized that they were serious traffic safety problems with serious consequences. Yet, when we asked the same people if they done any of those behaviors within the last 30 days, an overwhelming number of cases admitted they did. We have labeled that the "do as I say, not as I do attitude," and hopefully as we go forward, we can do something about it.

From the perspective of all of the sponsors of the Summit, we hope that this day will get more people engaged, it will increase the dialog, and at a minimum help us identify the knowledge gaps. We need to create a vision of how we can change the culture as we go forward, and perhaps most importantly, identify some of those critical next steps.

In your registration packages there is a draft resolution. In Washington, there is a growing chorus of key stakeholders in the traffic safety community that are calling upon Congress and the White House to organize the second ever National Summit on Highway Safety.

Back in 1924, then Secretary of Commerce, Herbert Hoover, convened the first national conference on street and highway safety. If you look into those archives, it is absolutely amazing. All of the words that were written to justify that particular event could have been written in 2009. We could have used them in the advertisement for this particular summit. I ask that some time during the day you look at the resolution in your registration packet. If you have some suggestions as to improve it, mark it up. My goal is that by the end of the day we will call this resolution back up for the consideration of everyone that's here. Hopefully we can by acclaim approve this and then send it to the White House as a concrete step to hopefully get us closer to doing something like this. We need this kind of forum in order to bring attention to this problem. We need this kind of forum to develop a national agenda that can guide all of us in this community and hopefully it will lead to an increased investment in the money that we know we need in order to do a better job.

Traffic Safety Culture Introduction

Nicholas Ward, PhD, Western Transportation Institute

(<http://www.ruraltscsummit.org/downloads/09presentations/WardIntro.pdf>)

Dr. Nicholas Ward is a psychologist who has been working in traffic safety for 15 years. During his introduction at this Summit to traffic safety culture he posed many questions to start the discussion on this topic. He discussed different interpretations of culture and what cultural blocks are preventing us from getting the laws and policies out there and accepted. The following is a summary of his comments.

We need to think about traffic safety from not just a systems perspective. Traffic crashes are not the result of isolated factors such as an icy road, but rather the combination of factors such as a driver deciding to speed on an icy road. The impact of a crash may be focused on the driver, but the factors that precipitated the crash may reside at higher layers in the system including vehicle, traffic, infrastructure, environment and society. Indeed, society itself embodies beliefs and attitudes that impact all levels of this system – most notably the decisions that drivers may take about engaging in risky driving behavior or complying with safety interventions and laws. We need to recognize that the events that result in a crash happen in the context of society, the beliefs and attitudes society has toward traffic safety. Unless we tackle this outer shell of this system, we’re not going to get the change we want inside the system. We must focus on culture and trying to change society’s attitudes and beliefs toward how people act in the societal activity of driving. We must learn to drive for each other and not just ourselves.

The World Health Organization is predicting that by 2020 traffic crashes will be the third largest killer in the world; more than war, more than HIV. We should treat this as a public health issue and everybody should be focusing on trying to improve it, not only locally but across the Nation and internationally.

The main factor related to traffic safety is the driver. The leading cause of crashes is either the driver’s state (whether they were impaired, fatigued, distracted, drunk) or the driver’s behavior (speeding, etc). To make an effective impact on traffic safety, we should focus on this human factor to make the most effective impact on traffic safety. Specifically, we need to consider how drivers make mistakes in terms of a basic psychological model of driving: (1) perceiving the environment, (2) deciding what the things mean in the environment, and (3) responding based on that decision. It is this decision phase that society influences most greatly. That is, whereas some people behave dangerously because they did not perceive a risk in the environment, many people deliberately take risks because of values engendered by their society. Take seatbelts for example. People who are involved in a crash and die because they are unbelted are not “accidentally” not wearing their seatbelt. It’s not because they didn’t perceive they had a seatbelt in their car, and it is not because they did not have the skills that would allow them to put the seatbelt on. It’s because they decided, deliberately, to take the risk of not wearing a seatbelt – in part because their society has taught them it is normal (acceptable) not to wear it.

You can make the same analogy about drinking and driving. People don't get drunk and then drive because they didn't know they were drinking alcohol, and it's not because they didn't have the skill to put the drink down, it's because they decided to take a risk and drive drunk.

What is it about our culture that is letting people, or forcing people, or motivating people to make deliberately risky decisions such as these examples? That is what we need to be focusing on. What is the cultural impact on our decisions to take risks? If we can change culture, we can remove the social motivations and justifications to make risky decisions

But until we can define culture, it's hard to move forward with any kind of concrete effective programs that change culture.

So what is culture? There are two possible interpretations of what culture is. The first one is value set. We can see culture as the values people place on the benefits and costs of taking certain actions. In our society, we have certain perceptions that doing something has a specific benefit and a specific cost associated with it. Take wearing seatbelts for example. The perceived cost of wearing a seatbelt is probably pretty low because you don't think you are going to get caught. The same can also be said about speeding. The benefit of speeding is you get there quick, and it's thrilling and exciting, and the cost of getting a ticket may be perceived to be low. That's one way of defining culture – trying to measure the values people perceive for benefits and costs when taking a certain action.

The other definition of culture can be based on this broader theory of planned behavior where we have beliefs of what is right and wrong. We have perceptions of what is normal in our society and we try and behave in a way that is consistent with what we perceive to be normative. Thus, another way of measuring and acting upon a changing culture is to measure beliefs and perceived norms.

But culture is most often an inferred force. For example, one study examined a number of countries to try and infer culture. They looked at a list of concrete, objective, measurable factors that were related to the number of crashes. How much alcohol per capita is drunk? How many vehicles on the road? How many miles of road? What percentage of the drivers are teenagers? All these are concrete measurable things. They put this into an equation and looked to see whether countries had more crashes or less crashes than predicted based on these concrete measurable things. Their logic said – if the country was doing better than we would predict, based on all these known, concrete, measurable factors – then that country has an additional protective factor that could be labeled as a “positive safety culture.” Conversely, the countries that did worse than predicted must have a bad, negative safety culture. This data shows that the United States (US) has a poor traffic safety culture with no appreciable change over a decade – one of the worst of all countries studied.

Research now is showing that there is something unique about rural traffic safety culture in the US where the fatal crash rate is highest.

Montana has the highest percent of VMT (vehicle miles traveled) on rural classified roads in the US. In our Nation, the percentage of rural travel in a state correlates highly with the traffic fatality rate in that state. For example, Montana has the third highest per capita death rate. Montana has the highest

traffic crash related death rate per vehicle mile driven. For a traffic safety psychologist, Montana is the perfect case study.

So what is it about “ruralness” that leads to higher fatality rates? It’s not just the environment – such as higher speed roads, absence of median crash barriers, ditches and roadside hazards – or the remoteness that impacts EMS response times. It is also something about the rural culture in which people are driving.

When you look at the traffic fatality rate over many years you get a trend where we were making rapid progress in traffic safety years ago and are now we are reaching a plateau. Previous progress was the result of the usual tools to improve safety including educating safer drivers and engineering safer roads and vehicles. But we now have a plateau because these tools have achieved their benefits and we have opposition from our traffic safety culture that is resisting additional safety improvement. There is something in our culture which is stopping us from squeezing anything else out of the traffic safety system in terms of safety. In order to achieve additional progress when the effects of our traditional interventions have achieved their benefits, we have to come up with something radically new including social engineering of our traffic safety culture.

What are the key elements about these cultural blocks which are preventing us from improving driver behavior anymore? What is preventing us from getting accepted laws and policies out there? There are at least three reasons for this. One is that we have a bad case of social apathy. Second, we have this national inclination to accept risk. And thirdly, and perversely, we have a resistance to anything safety oriented which constricts our rights. We are not willing to pay for safety.

[Video examples of each were shown.]

We need to look at culture as giving us a new opportunity, a new paradigm for effecting traffic safety. Traditionally, we engineer solutions that focus on the risky behavior and not the impetus to take risk. For example, with speeding, we create smart systems in our car that warn us when we are speeding, or we develop a way of helping our vehicle be at speed (such as, electronic stable control systems), or we redesign the infrastructure to cope with the speeding driver (such as, median crash barriers). But note that this traditional approach still maintains the pathogen in our traffic safety system of drivers accepting risks and deciding to speed. Traditionally we have been trying to treat the symptom, not the actual cause. We need to look back and try to find out why people are speeding. People are speeding because they have certain beliefs and attitudes which lead them to believe speeding is normal and acceptable with a low chance of penalty.

Unless we actually change the culture, we are not going to change underlying causes of why people speed. We need to address the cause, not the symptom.

There are different ways of going about this. One thing we can do is change people’s beliefs. For example, many people believe that seatbelts don’t make a difference. However, crash-demonstration vehicles illustrate the benefit that a seatbelt would have if you had a crash. Another way is to get people to recognize that there are positive norms for safer driving. For example, one of the arguments

people say when they don't wear their seatbelt is that nobody wears their seatbelt in Montana. In fact, most people in Montana do wear their seatbelts. If you tell people the correct norm, they realize their argument has no basis and decide to wear their seatbelts again.

Culture starts with parenting. Not surprisingly, how teenagers drive is highly correlated to how well their parents have driven. The number of tickets and crashes that teenagers have correlates to those of their parents. Parents can have a strong role model influence on their teen drivers.

Part of the issue is making safe driving an attributed valued by society. We are not there yet in this country. To illustrate this, think of someone in your life who is your hero or who you admire. Why do you admire them? List the reasons why you admire them. Is being a good driver on that list? No! Why not? Shouldn't it be? In some cultures with better traffic records (e.g., England) being a good driver is something that is respected. Why not here?

It is not just a driving public's culture; it's the traffic safety policy makers' and government culture. How are we putting our money where our words are in terms of traffic safety? Are we really investing in traffic safety as much as we say it is important to us? In this country, there is more money invested in alcohol and tobacco commercials than in traffic safety. What's wrong with this picture? We are investing more in what is killing us than we are on trying to improve traffic safety.

You can try to reward the drivers for being safer. For example, you can provide future based incentives to drive safely, such as, the U.S. Government giving anybody who drives 20 years without a crash \$200,000. People would drive safer. It would be cheaper to the U.S. Government to do that than to pay for the carnage of auto crashes as they are happening. If the government provides some kind of benefit to be safe, you then want your government to make you safe by investing tax payer money into safety programs that work.

What is culture?

Peter Kissinger, AAA Foundation for Traffic Safety moderated this session. Presentations were given on the definition and component factors of culture, both broadly and in the context of traffic safety. Following the three speakers, three panelists each provided a few comments followed by a brief question/answer period. Summaries of the speaker presentations and panelist comments follow. When available, links to the presentations online have been provided.

Traffic Safety Culture

Deborah Girasek, PhD, Uniformed Services University of the Health Sciences

<http://www.ruraltsccsummit.org/downloads/09presentations/Girasek.pdf>

Dr. Deborah Girasek presented findings from a recent AAA sponsored survey. She researched literature to define traffic safety culture. Culture is multi-dimensional and certain factors demonstrate how the traffic safety culture was broken down in her survey. Deborah introduces ways to encourage support for programs that are necessary for traffic safety. The following is a summary of her comments.

Dr. Girasek expressed her appreciation to the AAA Foundation for Traffic Safety for funding the work she was about to present and informed the audience that she was not speaking for any agency of the federal government. She then described how she had approached the task of defining traffic safety culture. She began by conducting a literature search on safety culture. She found that much of what has been written about organizational safety culture could not be readily applied to the measurement of traffic safety culture on the national level. The dynamic and complex nature of culture generally, however, was relevant.

Phase Two of her work involved a Delphi Technique, which is a method of querying experts to get their input on a topic of interest. In this case, Dr. Girasek contacted a multidisciplinary group of national and international experts on traffic safety and culture to get their reaction to her working list of traffic safety culture (TSC) components. After incorporating that group's input, she circulated a revised model and asked participants to rate potential aspects of traffic safety culture that could be included in the survey instrument she was developing to measure TSC. Dr. Girasek combined her Delphi Technique results with input from cognitive interviews to develop a questionnaire that was mailed out to a random sample of 1700 US households.

Forty-six percent of that sample returned completed surveys, which yielded data for a Factor Analysis. Factor Analysis involves a series of statistical techniques that can be used to suggest how an abstract construct, such as TSC, is structured. Her results, which must be considered preliminary, yielded fifteen factors that involved attitudes towards the government, social norms, financial investment, driving behaviors, support for public policies, law enforcement, private sector involvement and citizen participation.

Dr. Girasek concluded her talk with discussion of how her measurement tool could be used in the future, assuming that subsequent studies support its validity and reliability. The possibilities included identifying

subgroups of the population who particularly support or fall short on TSC, studying beliefs and attitudes that are associated with weak or strong TSC and evaluating interventions designed to change TSC. She reminded the audience that we must also confirm TSC's hypothesized connection to public health outcomes (i.e., traffic deaths and injuries).

Exploring Differences between Rural and Urban Traffic Safety Culture

Mick Rakauskas, Research Fellow, ITS Institute, University of Minnesota

(<http://www.ruraltscsummit.org/downloads/09presentations/Rakauskas.pdf>)

Mick Rakauskas discussed the results of an ITS Institute survey. Knowledge of higher crash risks in rural areas helps to identify factors that enable us to explore the differences between urban and rural. He emphasized the importance of acknowledging common threads which would allow focus on intervention and target people at higher risk. The following is a summary of his comments.

As a brief introduction, Mick touched on the differences between rural crash risk and urban crash risk noting that the road fatality rate is much higher in rural areas. Even when accounting for the age of population and other factors, individuals in rural areas tend to have more risks than their urban counterparts. The higher road fatality rating in rural areas indicates some underlying factors that need to be explored.

What are these factors? It has been shown that environmental differences play a large role in the crash risk factor, one being, the response time. In a rural environment, spread out populations decrease response time for emergency vehicles. What are other factors? We attempted to answer this question via a survey.

There is not, unfortunately, one rural culture world-wide. However, it would be very beneficial to identify common threads among the rural cultures; threads that we could focus on to make our interventions more useful and more targeted. Whether it is in a rural or urban environment, focusing on the problem will help us get to the solution faster and more effectively.

Safety Culture needs to be considered a public health issue. Our concentration towards interventions for populations exhibiting the highest amounts of risk should be our main focus. Identifying common threads in regards to the rural culture would be to our benefit.

The multi-staged project I am going to talk about today focused on six counties within Minnesota (three urban, three rural). We created surveys that were distributed between the rural and urban counties and then measured all the data related to behavioral fatality factors. The surveys opened a new light to psychology and the people behind the behavior. Our conclusions are pulled from three different focus areas; interaction with the actual environment, common risk factors, and potential traffic safety interventions.

We also followed up with a driver simulation study in the Humans First Simulator's high fidelity motion-based environment. We focused on behaviors in situations that are a danger in both rural and urban

areas – i.e., running a red light, stop sign compliance, lane position maintenance, etc. Our environment was actually based on a real environment – a trunk highway with a country road intersection. When we switched the environment, it had suburban and urban buildings, but we had drivers do the same tasks to see if behavior was due to the environment or perhaps due to the fact they were a “rural” or “urban” driver.

Lastly, we conducted a third study that took a higher level view of more high risk drivers. We took older drivers as well as younger drivers (teens) and their parents and had a focus group discussing the issues surrounding countermeasures and interventions specific to their age group.

The results? First was the interaction with the environment – mobility emerged as a main theme in both rural and urban areas. Second was the driving environment. Results from the driving simulator showed that “rural” drivers had more lane variation than their urban counterparts potentially suggesting that drivers were less afraid of going off the lane. Other differences reported via the survey; rural drivers reported speeding less frequently, driving more often when drunk, and not wearing their seatbelt as much as their urban counterparts.

In 2006, a report showed that vehicle type may also play a role in crash fatality differences in urban and rural areas. It further illustrated that people who drive different types of vehicles may, in fact, have different opinions on wearing seatbelts. Occupants in SUVs and trucks were reported to wear seatbelts less often. We also found this true in our survey with pickup trucks drivers. Truck drivers stated they wear seatbelts less frequently than other vehicle drivers and they felt it was less dangerous to not wear a seatbelt. When we dove deeper into the data and separated the urban and rural areas, we found that this result was mostly pulled from rural areas. Now we have discovered an interesting interaction between both location of where the driver is from and the type of vehicle people choose to drive. As such, fatal crash risk in rural areas may be due to both the combination of higher acceptance of crash precipitation factors such as driving under the influence, as well as a lower frequency of participating in injury prevention factors like wearing a seatbelt.

Actual safety interventions need to be aimed towards specific risk markers. This will allow us to focus on specific populations to more effectively drive results from interventions and also assist with effective enforcement resulting in saved lives.

Rural Traffic Safety Culture

Peter Kissinger, CEO and President, AAA Foundation for Traffic Safety

<http://www.ruraltscsummit.org/downloads/09presentations/Kissinger.pdf>

Peter Kissinger continues a description of the AAA Foundation’s Traffic Safety Culture initiative, with emphasis on the differences between rural and urban cultures. The AAA Foundation’s second annual survey on Traffic Safety Culture included over 2,500 interviews in English and Spanish, large enough to ensure statistically represented findings. Overall conclusions included: 2 out of 5 respondents say local governments are not doing enough to make roads safe; only 2 out of 5 support a \$.10 per gallon increase in gas tax to improve dangerous roads; nearly half are concerned about friends driving and of that

percentage, 4 out of 5 have actually confronted the person of concern. The following is a summary of his comments.

The AAA Foundation has piloted a program called usRAP, using it to rate or benchmark the relative risk for the road segments in this country. When survey takers were asked how they would use information from usRAP, 3 out of 5 would consider avoiding dangerous roads in their areas even if they were more convenient. Nearly 3 out of 4 would want to use road safety information to plan trips on unfamiliar roads if it was available.

In addition, once again, we saw affirmation of the “Do as I say, not as I do attitude” that I described earlier.

An example of this is cell phone use. Nearly 9 out of 10 drivers say using cell phones are somewhat or a very serious threat to their safety. Over 4 out of 5 admitted that using a cell phone while driving makes it more likely they will crash. Yet, despite this knowledge, 2 out of 3 still used cell phones while driving in the month previous to the survey. Similar statistics were seen relative to speeding.

In looking at differences between urban and rural respondents, we found that rural areas have a smaller percentage of college graduates with a majority of drivers having only completed high school. In addition, trucks outnumber SUVs in rural areas.

When we look at driving behaviors, we saw that urban versus rural respondents were more likely to talk on the cell phone and speed on freeways (15 mph over the limit).

With respect to the acceptance of dangerous driving behaviors; drinking and driving, text messaging, and running red lights were unanimously unacceptable among both rural and urban, but there were significant differences between rural and urban respondents in regards to running red lights and speeding on freeways. Generally, the perceived social norms within the surveyed group were lower than what people were actually doing and two significant differences between rural and urban respondents were found in driving while drunk and the lack of seatbelt use.

With respect to “Support for Safety Measures”, there was little distinction between rural and urban levels of support for alcohol interlocks, universal seatbelt laws, and universal helmet laws. However, there were significant differences between urban and rural respondents. In the rural environment there was lower acceptance of seat belt laws and increasing the licensing age to 18, but higher support for speed cameras.

In summary, rural respondents:

- Involved fewer college grads and more high school only graduates
- Drove more pickup trucks and fewer SUVs
- Indicated they were less likely to speed on freeways and talk on the cell phone
- Were less accepting of running red lights and speeding
- Had a greater acceptance of drinking and driving and not wearing seatbelts

- Voiced more support for speed cameras and less support for seat belt laws and higher licensing ages

Panelist Comments

Lawrence Lonero, Partner, Northport Associates

Lawrence Lonero has extensive experience in road safety operations, planning, program development, implementation, evaluation, and strategy. The following is a summary of his comments as provided in the panel discussion.

Ivan Brown said years ago that if you look at road safety problems, they are basically institutional. We often lose sight of that. We get focused on the individuals and lose sight of the fact that there are also institutional cultures and questions of organizational behavior. Institutional changes are much harder to actually implement. If you go back to the beginning of the modern era, Ralph Nader said, "Basically, we have to make cars protect people because we don't know how to make people drive safer." In 1965 you could have made a good argument of that.

This led to the Motor Vehicle Safety Act which resulted in a large drop in traffic fatality rates. This has been recognized by the CDC as one of the major public health accomplishments of the 20th Century. We are now looking at culture to see where improvements can be made after this victory.

While there is significantly more traffic now compared to 30 years ago, we do have a smaller number of fatalities. The point of view of some organizational cultures is that the road safety war has been won. This accounts for a considerable portion of the apathy that we are looking at.

John Lee, Director of Human Factors Research, National Advanced Driving Simulator, University of Iowa

John Lee focused his discussion around three questions. When does culture matter? What exactly is culture? How do we change culture? The following is a summary of his comments as provided in the panel discussion.

There are three areas that deserve discussion. First is the question of when does culture matter? It's an interesting variable that may or may not account for a lot of variance in the behavior we have observed. The second is what exactly is culture? We have to define it if we are going to change it. If we are going to have some influence on safety through this concept of culture, we need to define it to identify the leverage points. Finally, how do we change culture and what are the theoretical perspectives that might allow us to grapple with actually making the changes?

One way to look at how culture matters is to consider the types of constraints that influence behavior. At the highest level there are organizational or societal constraints, laws that are posed to guide behavior. In driving, those laws are only partially influential. At the other end of the spectrum you have individual adaptation; drivers who adjust their behavior according to what they see around them on the

road. In driving that is only partially effective in getting drivers to do the right thing. The feedback isn't perfect. For example, we don't see the dangers associated with speeding. Culture is a bridge between those two. Culture fills the gap between the regulations and the poor feedback we get from the individual moment to moment level. Culture guides what is appropriate in driving. That is particularly important in rural environments where it's even more difficult to enforce the laws.

It is difficult to enforce the laws because of the distinctive nature of the system. In a rural environment individual adaptation may be less effective. The hazards are sometimes unexpected and random and unable to adapt to. The rural environment is a place where culture may be particularly influential as a factor influencing behavior and safety.

Although culture is influential in safety, we have to approach it with caution so that we don't attribute culture to other factors such as the adaptation to the environment that people engage in. For example, the data we have seen on the tendency to run red lights in rural environments. This may be an effective adaptation due to the fact that there is sparse traffic and you can get away with running the red light in a rural environment.

What is culture? There are three interacting factors that influence culture. Culture really is an emergent property of a dynamical system and the nature of that specifically is that you have beliefs and fundamental assumptions. Bruce Springsteen may be one of the best people in terms of articulating this with one phrase from his song: "These two lanes will take us anywhere," the idea is that cars and driving are our deliverance of freedom and opportunity. There is another component of American culture that influences our passive response to safety. This component is a fatalistic attitude. Some people believe their safety is up to God's will. They'll crash or not according to God's will. That is part of the puritan legacy of predestination and irresistible grace. It doesn't matter what we do if God is in control, it's up to him. That legacy is powerful; the idea that we are a shining city on the hill that people look toward. That phrase from 1630 was recycled fairly recently by Reagan. Unfortunately in the context of driving safety, we are really not that shining city on the hill. These fundamental beliefs really play a major role in driver safety.

Another component of culture is attitudes and norms. What is "normal" in driving governs a lot of what we do. When I was moving from the University Iowa to the University of Wisconsin, a friend of mine at the University of Iowa, trying to discourage me, sent me an article from the New York Times describing the culture of Wisconsin with respect to drinking and driving. Although Iowa and Wisconsin border each other they have very different cultures in that regard. Iowa is on the top of the safety side and Wisconsin on the bottom. Wisconsin, interestingly, has the highest per capita consumption of brandy in the US. Wisconsin drinks more brandy than the rest of the US combined. That's an interesting cultural twist, but more disturbingly, they have no limit on the age in which people can drink. [The United States currently has a uniform drinking age of 21, largely because the federal government enacted legislation that would withhold a portion of federal highway aids from any state that did not adopt 21 as the minimum age for purchase and public possession of alcohol containing beverages. In response to the federal legislation, Wisconsin enacted 1985 Wisconsin Act 337, effective September 1, 1986, stating no

one under the age of 21 may legally purchase, possess, or consume alcohol-containing beverages except when accompanied by a parent, guardian, or spouse of legal drinking age, and in certain other limited circumstances.] If you go into a bar with your kids, you can order a beer for them and it's up to the discretion of the bartender as to what age is appropriate. In the New York Times article, the bartender said, "Well, you know, I serve 11-12 year olds, that's not a problem, at 8 or 9 I draw a line." That is a cultural influence that is very powerful. It defines the attitudes and norms and normal behavior in Wisconsin for drinking; 12 year olds in a bar with the parents.

Another component of culture is actions and artifacts. These are the things left in the environment, the things that are observable. For example, the dress code is an artifact that reflects the culture and influences. The crosses that we see alongside the road are a really powerful artifact that can be inserted to influence behavior. Another idea that I have been contemplating is the placement of a light on the top of the vehicle that is an indicator of your impairment. Whether it's because of alcohol, distraction, or fatigue, when you are impaired as judged by your car, this light goes off, alerting others around you to that state. This would allow them to adjust, but also make your behavior more public. This artifact could be a powerful influence.

Finally, how do we change culture? If you consider culture as a dynamical system, it's an emergent property of a dynamical system. This means that the behavior, the artifacts that we see, influences the norms and then also influences ultimately the beliefs and fundamental attitudes. The mathematics that governs this behavior is complicated. However, there is a really nice treatment of it by Thomas Schelling, who won the Nobel Prize for dealing with this problem. Mr. Schelling looked at the problem relating micro-motives to macro-behavior. This is basically traffic safety in a sense. He leads into his book on this topic with a discussion of hockey players wearing helmets. In 1969, Teddy Green died from a blow of a hockey stick to the head. This initiated the push toward more universal hockey helmet wearing, which parallels seatbelt wearing. Here is an interesting quote from a hockey player. "It's foolish not to wear a helmet, but I don't because other guys don't. If the league made us do it, we'd all wear them and nobody would mind."

In this context, one of the really important ideas or constructs is that of externality. That is where your behavior influences my behavior. That creates a circular situation where my behavior influences the value or costs of what you do, then your behavior influences the value and costs of what I do. That circular logic is what Thomas Schelling worked out in terms of multi-player game theory, and is very appropriate for driving safely. This idea of putting a little red light on top of the car makes an externality that could really have a powerful influence on driver safety. If everybody knew you weren't wearing your seatbelt or if they saw immediately in the vehicles around them, how many people were, that could resolve a lot of these discontinuities between people's behavior and what they believe other people are doing.

Rob Foss, PhD, Director, Center for the Study of Young Drivers, University of North Carolina

Dr. Rob Foss provided attendees with a definition of culture pointing out that culture is about similarities, not differences. He noted that the traffic safety field has been remiss in not recognizing the role culture plays in how and why people drive the way they do. The following is a summary of his comments as provided in the panel discussion.

I was very pleased several years ago when I discovered the AAA Foundation for Traffic Safety was pushing the traffic safety culture issue. I am a social psychologist and consequently am profoundly aware of the way social structures and cultural values influence how individuals behave. When AAA undertook this effort to promote attention to the role of culture in traffic safety, it opened the door for others to recognize and examine the ways these cultural influences affect driving and behaviors related to driving safety.

Today I want to interject one very brief definition of culture that I have found useful. It is a simple textbook definition – culture is the shared ways of life among a group of people. These shared life-ways and values are passed on to subsequent generations socially, as opposed to things that are passed along biologically.

To summarize, culture is about similarities, not differences. There are individual differences within every group and every group has a culture. However, in examining culture in the context of its influences on traffic safety, we should draw our attention to the kinds of things (values, beliefs, etc.) that are shared within the group.

As a field [traffic safety], we have been terribly remiss in not recognizing culture and certainly remiss in not taking advantage of it. Deborah Girasek, from the University of the Health Sciences, made a nice point of how red light cameras and camera speed enforcement are failing to be embraced all over this country. I don't think it is because the citizens of this country actually oppose the cameras as much as that we in the traffic safety field haven't done a good job of introducing them. We didn't take into account the misperceptions that would emerge given existing values within US culture, which are highly individualistic. For example, red light cameras are seen as a money making operation. And while that may not be why people actually oppose them, it is a reason they cite frequently. How might we overcome this perception or objection? One approach might be to announce with great flair, when cameras are introduced, that every penny garnered from these cameras will be used to reduce taxes. Rather than citing communal good, tap into something that is very individualistic – presumably an anti-tax value we have in this country. Say these are for the public good; they are for the safety of others, but that the money that is generated isn't going to some organization, its going right back into the pockets of individuals in the community via reduced taxes. This approach tries to tap into the highly individualistic values that characterize this country rather than assuming the general public sees the matter in the same way the traffic safety community sees it.

One of the things we were asked to talk about, or try to address a little bit as panelists, was what are critical next steps? Where do we need to be going? Another one was how do we change culture? I want to touch on each of those very briefly. I have a question for the audience. How many

anthropologists are out there? Raise your hand if you are an anthropologist. Raise your hand if you are a rural sociologist. Raise your hand if you are a cultural geographer. Okay, nobody raised their hand in response to any of those.

My point is this, there is a vast amount of knowledge out there in disciplines other than our own and we ought to consider some of the fundamental tenets found in the literature in culture anthropology. John Lee's article in the AAA Traffic Safety Culture Volume is done with Jane Moeckli, a cultural geographer and they bring in some of that knowledge. If we are really to grasp this culture thing and make the most of it, we need to tap into the body of knowledge found in the field of anthropology. Sitting here are mostly psychologists and engineers. It strikes me as naïve that we are presuming that we can really understand culture by reading a little bit about it. It's as if a bunch of cultural anthropologists got together and talked about how to best design a bridge. One of my suggestions is that we try to reach out very aggressively to the cultural anthropology community.

Lastly, I would like to briefly discuss changing culture. It is a daunting challenge. Changing individual behaviors, as Larry Lonero mentioned, is something that we have worked on for a long time, and while it isn't easy, we have found ways to do it. Culture, on the other hand, is a hard thing to get a handle on, but one way to effect change is through social policy.

An example of this is graduated driver licensing. If someone had said 15 years ago, we are going to change the way we license young drivers in the United States by asking or encouraging parents to not allow their child to drive without a parent in the car for six months to a year following licensing, people would have said it could never happen. Even with all the education programs in the world. By trying to alter behaviors one individual at a time we wouldn't have gotten very far. But by taking a different approach, using policy to change the social structure within which we all live, it has become something that we just do now. In virtually every U.S. state, it is expected that you will not drive for the first six months to a year without a parent or other adult in the car with you. It surprised a lot of traffic safety people how quickly this was accepted.

How does culture influence behavior?

Nicholas Ward, PhD, Western Transportation Institute moderated this session. Presentations were given that provided evidence and showcased models of how culture affects behavior broadly and in the context of traffic safety. Following the three speakers, three panelists each provided a few comments followed by a brief question/answer period. Summaries of the speaker presentations and panelist comments follow. When available, links to the online presentations have been provided.

Culture, Perceptions and Social Norms

Jeff Linkenbach, PhD, Director, National MOST of US Institute

<http://www.ruraltsccsummit.org/downloads/09presentations/Linkenbach.pdf>

*Dr. Jeff Linkenbach focused on the importance of changing perceptions in order to change social norms. In his presentation entitled, **Culture, Perceptions and Social Norms**, he touched on work being done, how it relates to research over the past couple decades and how progress is viewed. Dr. Linkenbach indicates that correcting misperceptions of norms will change behaviors and transform community norms. The following is a summary of his comments.*

The changing of perception is possible if we (Summit participants) examine what are the paradigms? What is the lens from which we view our work? Why a safety culture? The main reason we look at impacting culture is because we know that it works to increase safety. Even though we are talking about and redefining traffic safety culture we have decades of research in terms of other fields such as anthropology, sociology, and organizational work cultures that we can rely on. The good news is we are not starting from the beginning and we are able to build on this incredible body of knowledge. We need to start looking at culture from a positive perspective and not just reactively trying to reduce problems.

Questions and inquiries need to be from a positive paradigm if we want to grow positive behaviors. Look through the lens of what is working rather than define a culture by the extreme few behaviors of what is not working. This is a whole process and body of research known as “appreciative inquiry” – ask questions and inquire from a positive paradigm. Research has shown we often see what we expect to be there, not what is really there.

There is often a tremendous gap between what is really going on compared to what we perceive to be going on amongst others. We need to identify and close these gaps. A true norm is actual behavior or actual attitude that is held by the majority of a population or subpopulation. A descriptive norm is what most of us practice. Injunctive norms are what we think is okay, acceptable or unacceptable. Research demonstrates that both of these are critical for effective interventions. There are different types of norms along the lines of majority held behavior and attitude. We often define the goodness of our communities, cultures, and our norms by the extreme behaviors of a few, this is not a norm. We need to be clear on what is normative and what is not.

Our model, the Positive Community Norms Process, ties social norms theories in with other theoretical perspectives. For example, a traditional frame, researched from Minnesota data, focuses on the 25%

who are not in compliance, taking the risks, compared to the positive community norm. We say, why not build on the goodness, the norms of the many already in place? In the past five years of research in intervention and public health communications, we have found both norms. When we speak in terms of policy or reaching out to the public population, it is imperative that we weave together the concern for the issue and hope of a solution. It is critical as policy makers and influential stakeholders to be clear about norms and non-norms.

A normative misperception understanding is also critical. It is an over or underestimation of the true norm, the prevalence of what is really going on. We have found that impacting perceptions of norms allows us to correct the misperceptions and influence culture. With traffic safety issues, the misperception of norms (of overestimating risk and underestimating the protective factors) is not always the case. Based on data from 10 years ago (graph found in presentation on page 15) we researched young males having three drinks and found they will typically overestimate the amount of alcohol consumption and risk taking behavior in their peers. Protective factor is the intervention to keep a friend from drinking and driving. This intervention is not an advertised event. In reality most people misperceived what was going on around them. There are a number of reasons why we don't see things happening around us and this is the basis for our study.

Correcting misperceptions of norms also influences policy development. We presented researched data to state legislators stating that two thirds of the Montana population wanted to see the blood-alcohol concentration law changed to be more conservative. This change would give law enforcement officials additional tools for the reduction of drunk drivers. However, about 85% of these same people we surveyed thought they would be an anomaly. They truly believe no one will see it the same as they do.

Identifying and correcting normative misperceptions, the over or underestimating the true norm, is critical to changing norms. We can construct public conversation, public information campaigns and other interventions to correct the misperceptions of the norms and thereby influence culture and behavior.

When we talk about transforming and impacting positive traffic safety cultures, we can absolutely quantify the different variables and construct interventions achieving change. We know in order to be successful we have to impact bystander behavior as well as focus on the individuals. If we are looking at shifting culture, we need to look at all of the different elements of the culture.

We need to acknowledge the need for hearing and steering public conversations, to correct misperceptions of norms, and shift culture. Fear-based approaches do not work as well as communicating from a positive frame. When we see a gap, we have the opportunity to launch an intervention because there is energy ready to resolve itself. We see the injunctive norm as an incredible opportunity to move things forward.

Here is the key – the solutions already exist in our communities. Our job is to uncover, amplify, shine a light on it and give it a voice. That is a huge paradigm switch from the way we often look at things. We

have extensive research on the Navajo Nation showing dramatic behavior changes in a very resistant culture.

The last few decades we have seen an 18-21% reduction in high-risk drinking in a two-year period of time involving some big campuses. In Montana we conducted an experiment cutting the state in half and looked at east versus west for DUI behavior. The experiment intervened in half of the young adult population and did nothing in the other half. We then measured the differences. The bottom line is that we can measure results. We have good data and great tools to capture the spirit of our work. Lila Walker, an Australian Aboriginal woman, summed it up best “if you’re here to help me, we are done, but if you’ve come because your liberation is tied up in mine, then let us begin.” This passion is what I am hoping we have with this Summit and the work that we are all doing together.

[Videos shown]

The videos we just saw show examples of how we translate data and intervention in connection with the reduction of drinking and driving behavior. A video from a former governor in Montana captures the essence of what we have talked about at this Summit.

It is important for us to honor cultures. Ultimately if we invest in correcting misperceptions of norms we can change behaviors and transform community norms.

State Political Culture, Public Policy, and Traffic Safety

Lilliard Richardson, PhD, Truman School of Public Affairs, University of Missouri

<http://www.ruraltscsummit.org/downloads/09presentations/Richardson.pdf>

Dr. Lilliard Richardson’s research focuses on state politics, state culture, and traffic safety laws such as policies controlling alcohol and seeking to reduce incidences of impaired driving. He demonstrates how political culture influences state decisions when accepting or ignoring federal suggestions for safety programs. The following is a summary of his comments.

States have distinct political cultures that connect to the traffic safety culture. Each state is responsible for traffic safety policies. Encouraging alcohol policies are difficult because of the different cultures in each state. Programs such as alcohol control, rehabilitation, and check points are state sponsored. While the federal government may withhold highway funds to persuade states to adopt some policies such as .08 blood alcohol content (BAC) laws, most policies for alcohol control and punishments for drinking and driving vary considerably from state to state. State policymakers respond to a variety of pressures, including constituent attitudes, public health arguments, and interest groups such as the alcohol industry, which is less supportive of any programs that reduce demand.

There are a variety of philosophical approaches to reducing the problem of impaired driving. States differ widely in their reliance on these different approaches and often change over time. For example, some rely more heavily on the control of alcohol through the use of higher taxes, limitations on sales, and regulations of businesses serving alcohol, but other states rely more on punishment of impaired

driving offenders. The alcohol industry and those supporting a libertarian view generally argue for less regulation of any kind, but others may take on a more neo-prohibitionist view on alcohol control, a more punitive view on increasing sanctions or some combination of both approaches.

There is a great deal of data and legal research on alcohol related safety legislation by NHTSA. This data measures the differences in state control on alcohol issues. At the present, data indicates most states are gradually leaning towards tougher restrictions on both alcohol control and punishment of impaired driving offenders.

Analysis relying on cross-sectional time series regression methods can be used to explore the factors influencing state adoption of different regulatory approaches. For example, partisanship, campaign finance laws and a governor's veto power have a strong influence on traffic safety regulation. In addition, federal fiscal pressure through the use of various types of funding has been effective in encouraging states to adopt certain policies such as the .08 BAC penalty.

Citizens' trust in government also directly affects safety culture. The absence of that trust will create resistance to our policy interventions. We must understand each cultural group to better format arguments to not only the public, but also to legislatures. With carefully targeted interventions, we can convince citizens to accept policies that assure the safest possible solutions to dangerous safety issues.

Improving Safety Culture with Behavior-Based Safety

Michael Cantor, PhD, Quality Safety Edge

<http://www.ruraltscsummit.org/downloads/09presentations/Cantor.pdf>

*Dr. Michael Cantor addresses three **driver safety** phenomena from the perspective of the familiar behavioral model: (1) the surprisingly high crash rate at rural railroad crossings, (2) the decline in effectiveness of the center high-mounted stoplight, and (3) the effect of added feedback and reinforcement on key safe-driving behaviors. The following is a summary of his comments.*

The familiar behavioral model is a useful way to analyze and remedy road safety problems. According to the model, a given behavior, e.g. putting on the brakes, is controlled by the *antecedent stimulus* that precedes it, e.g. a stop sign, and by the *consequences* that follow it, e.g. a waiting police officer.

Generally, antecedents are effective to the extent that they are conspicuous and informative. Color, size, graphics, and typeface matter greatly in the design of road signs. Less obvious perhaps, antecedents attract attention to the extent that they convey useful information, i.e. tell you something you don't already know. The spot on the wall is conspicuous, but no one pays attention to it.

The "spot on the wall" effect is a real problem where road signs – and *advertising* – are concerned. A picture frame shop in Atlanta solved the problem in a simple, effective way. The owner of the shop has



an old, rusty sign out front which for thirty years has elicited smiles and comments from passersby near and far. Why? *Information*. Every Friday, rain or shine, the shop's owner changes what the sign says. It might be "Everything's free! April Fool!" or "Best frame shop on Briarcliff. . . according to friends and family" or "We have upped our appreciation of art, so up yours." The sign gets attention and when someone needs a picture frame they know where to go. The point – no information, no attention.

Rural railroad crossings. An information analysis sheds light on the vexing problem of car-train collisions, which are over-represented in rural areas. At grade level intersections where more than 20 trains pass per day, FHWA standards call for active barriers to thwart drivers bent on "beating the train" to the intersection. Where there are fewer than 20 trains per day – mostly in rural areas – FHWA allows a crossbuck with a flashing red light or with no light at all. So, as the day-rate of trains declines, the relative frequency of crashes increases. Why?

One answer is that the crossbuck is *redundant* with respect to what the driver knows from experience – "trains are extremely rare here." So, the crossbuck, even the kind with blinking red lights, is ignored for the very same reason that we ignore oft-repeated TV commercials – no information, no attention. It's common to try to compensate for the redundancy by increasing the conspicuity of the stimulus. Indeed, radio advertisers famously turn up the volume on their overused commercials. That strategy might work at first, before the stimulus *habituates*, but it won't work for long.

Habituation, incidentally, is the likely cause of the steep decline in the effectiveness of the Center High-Mounted Stop Light, from a 35% reduction in rear-enders in 1986 when they first appeared to the current 4.3% reduction.

The following characteristics of road signage would tend to encourage behavioral compliance:

- Quickly understood graphics – such as curvy road signs.
- Quantitative information, if possible – such as digital signs that show your actual speed. But feedback alone loses effectiveness. A bit of reinforcement is needed as well.
- Tell what to do or not do – "Slow Down, Atlanta!"
- Express a consequence for compliance or non-compliance – "Slow Down. Children are everywhere!"
- **Surprise** – tell more than what the viewer already knows. "Five collisions have occurred at this intersection in 2009."

Here are a few possible interventions that might reduce rural car-train crashes:

- **Install a mechanical barrier** - not cost effective for train rates less than 20 per day, according to FHWA studies.
- **Increase train traffic** – not practical.
- **Display the *actual* train frequency by time of day** on a sign – it would correct drivers who believe train frequency is negligible.
- **Erect a programmable digital sign** (solar powered) with *randomly changing messages* that could include something like:
 - Trains pass here X times per day. Is the red light blinking? *A question tends to elicit an active response.*
 - 35 fatalities occurred at intersections like this last year: *yield*, look, and listen. *“Yield” is preferable to “stop” since “stop” is unenforceable---and encourages law-breaking.*
 - Crain for a train . . . and save a life. *Puns and humor, inherently surprising, attract attention.*
 - Train coming? Yield, listen and look. *Scrambled order of familiar words.*
 - RR crossing: Yield, look, and _____!
 - Watch for trains: Stop, _____, listen!

Behavior-based strategies have contributed mightily to industrial safety. In a hospital, how do you get employees to avoid back strain when lifting patients? On the factory floor, how do you encourage workers to wear eye protection? In a warehouse, how do you encourage personnel to immediately clean up spills? The time-honored method has been to post safety signs---“Wear your eye protection.” But such antecedents quickly become wall paper. Another common strategy has the supervisor correct an employee observed breaking a rule. However, supervisors can’t be everywhere on the job site. Another common practice is to post signs such as “20 days since our last lost-time accident.” But such feedback is way too infrequent and lacks the specificity that changes behavior.

Behavior-based safety practice gives responsibility for safety compliance to the employees. By agreement, *Employee A* observes the behavior of his or her peer, *Employee B*. He then marks a checklist of safe behaviors, and reinforces correct practice (“Great. Bend your knees, not your back”). Importantly, instead of counting rare *incidents*, e.g. lost-time accidents, behavior-based safety practice counts and gives feedback on *many* peer-to-peer observations. Impressive, long-term reductions in lost-time accidents have resulted in many types of industry.

Behavior-based safety and the driver. Peer to peer observation isn’t workable with truck drivers, since they mostly work solo. Two basic methods of self-observation have been developed for them. In the first, an area of high risk such as “intersections” is targeted. Intersection crashes account for 48% of all crashes and roughly a third of those are of the T-bone/side impact type. The intervention has the driver count the number of times he looks both left and right before starting from a green traffic light. A dispatcher arranges to call the driver at random times, asking for the driver’s count of observations. Alternatively, the driver reports his observations when he gets back to the garage. Either way, the

driver is systematically reminded to “look both ways”. Third-party observers have shown that this approach significantly increases *looking* behaviors compared to a baseline without the self-observation procedure.

A second approach automates the data collection process. A small data recorder, much like the “black box” in an airplane, is mounted on the inside windshield and continuously records video of the road ahead. Three accelerometers are configured to trigger if there is a hard brake, a hard turn, “jack-rabbit” acceleration or a crash. A light and sound tells the driver that the device has triggered. At the same time, the camera saves video 30 seconds before and after the event has occurred. If there is no event, any saved video is overwritten.

An instance of hard braking usually, but not always, indicates a lack of “big picture.” A quick swerve may indicate that the driver missed a vehicle in his “blind spot.” The driver’s goal is to drive consistently and minimize triggers. Associated software keeps track of a driver’s accumulated trigger events and lets a supervisor build a “hierarchy of risk” among drivers in the fleet, thereby promoting safe driving with feedback and reinforcement. As always, feedback alone wears off; sincere congratulations for a job well done must come with the feedback. Consistent 20% drops in collisions for an entire fleet are typically reported. In addition to systematically promoting safe driving and better gas mileage, video feedback devices protect companies from false blame.

At least 90% of roadway crashes are due to driver error. Many of those errors can be systematically prevented by applying principles of behavioral psychology.

Panelist Comments

Captain Glenn Hansen, Howard County Policy Department, Maryland

Captain Glenn Hansen provided information on automated enforcement in his comments. He discussed the public’s perception of automated enforcement, privacy issues associated with automated enforcement and educating the public so that solutions will be accepted. The following is a summary of his comments as provided in the panel discussion.

In 1995, we were fortunate to receive grants through the Federal Highway Administration to test the technology of automated enforcement. There were four grant recipients throughout the country. The technology had already worked in Europe extensively as well as in Africa and Australia. We knew the technology was going to work.

What made our grant and our pilot the only successful one out of the four is that we focused on what the community would accept; what they understood as the problem, how they were going to address the problem, and how this was going to be a solution to the problem. We looked at things that were already being done as well as things that we thought would not be acceptable within our community. We had to address privacy issues, where the funds would go, and what level of penalty would be acceptable to our community. Perception is everything so we took a very slow, careful approach, and

helped our community understand what the problem was before starting to introduce solutions that may work.

There is a micro view and a macro view in automated enforcement. Looking within the traffic safety community we may find that we have an intersection problem, we have people being killed here because of right angle crashes. But the macro view is at least as important, and that is, does my community understand the problem? Is my community accepting of this as a solution? If you were on a flight in the United States ten years ago and they said you have to stand in a security line for over an hour and you couldn't take hair gel, you'd be up in arms. However, after 9-11, everybody accepted the fact that you have to stand in that security line, that you had to go through very onerous security measures because they understood. It wasn't unreasonable before, it's not any more reasonable now, but now people understand it. That is what the difference is.

I had the opportunity to visit the Dutch National Police to talk about automated enforcement. At the time, they were doing a collision reconstruction. Vehicles were traveling over a bridge in a heavy fog and numerous cars had collided with each other. They were carefully calculating through marks on the ground the speed of every car so they could charge every individual driver that was speeding. When there is a crash in my jurisdiction we take the most heinous violator and hope everybody else will show up as a witness so we can charge that one violator. When I was in visiting the Dutch National Police in Amsterdam, you could go into a coffee house and order marijuana just like you could order coffee in Starbucks. Yet they were charging everybody with a speeding violation, and their penalties were much more draconian than what we do today. I asked them about this. The police officers there didn't understand why I was asking. If you are speeding and you are going down the highway, you are putting other people at risk. If you are smoking marijuana in a coffee house, you are harming yourself and nobody else.

Many people believe they can use automated enforcement to enforce running stop signs or use it for enforcing speed on green. To enforce speed on green, traffic cameras that are already used for red light cameras would calculate your speed. We could be issuing tickets for speed on green, and the question is, should we? Do we really have a problem with speeding at these locations or are we just falling in love with the technology and looking for new ways to use it? All of our officers have GPS in their cars. Some of those officers disable them because they don't want people to know where they are at any given time. The U.S. Marshall Service is responsible for judicial security. They've initiated a new program where if judges have threats against them, they'll give them a transponder. The judge can press a button in an emergency, and the U.S. Marshall Service will know where they are and will be able to come help them. However, not all judges want them. People don't want everyone knowing where they are all the time. To have a GPS based device that is taking a video of your face when you are going to be involved in an incident is very controversial. However, in rural situations this could be beneficial. Having a transponder in your car when you go rolling off into the snow helps law enforcement and emergency services find you. The video images of the driver's face could help investigators determine if you were distracted, asleep or attentive at the time of the crash. The technology is not the issue. The issue is getting people to accept the technology.

We have changed directions in law enforcement, and traffic law enforcement is not hailed as the job it used to be. In my community we have about four homicides in a year. We also have 20 traffic fatalities. The four homicides receive a lot of attention and some of them were totally unpreventable. The 20 traffic fatalities, most of them preventable, received little attention. People tend to get used to traffic accidents. This is much to our detriment and is something that we all have to fight against.

There are some grass roots programs that have been very successful. For example, Mothers Against Drunk Drivers. They were a grass roots initiative that gradually over time and with a lot of effort were able to personalize those victims. They were able to help people understand. In Mr. Linkenbach's talk about uncovering norms, he makes the point that it is not normal behavior to drive around drunk.

How do we uncover the norms? What are the next critical steps? We need to look at what has been successful. Automated enforcement does fail in some places, but it certainly doesn't fail in all places. If you look at the data we saw this afternoon, Maryland does not rank very high in holding repeat offenders accountable. As the trend continued on we fell farther and farther behind the pack. We could be considered a very liberal community where we don't hold people accountable as much as we could. When we first began discussing automated enforcement, people thought it was unconstitutional. It was Big Brother, it was a terrible thing, it hasn't been done, it shouldn't be done, but yet it has been successful and is stable over time. You have to look at what are the keys that get you there. We need to decide what change is going to be most effective. Is it an incremental change, do you want to do this piece by piece, or is it radical change? There are ways of doing it piece by piece so we can start personalizing this and start changing culture. We have to decide what to do and then decide how to deliver it.

Part of the issue in the United States is we are broken into different states, different communities and local jurisdictions. How do you then deliver the message once you have it? Saying we want to add devices to your automobiles so we can track what you are doing for your own safety, that's great if you give up your total freedom of privacy. We need to examine ourselves. Sometimes we preach to the choir. You have to look at what is our viewpoint versus everybody else's viewpoint. In order for solutions to work, we have to figure out a way of taking everybody else's viewpoint into account. This is a public health issue, people just don't think about it that way. This is something that affects all of us. Public health does affect all of us, it costs everybody. How do we address it in a way that is going to be acceptable for our community? We need a broader audience and we need to do it step by step.

Colonel Mike Tooley, Montana Highway Patrol

Colonel Tooley provided a "view from the streets" in his comments. He discussed the public's perception of traffic safety, their perception of traffic safety interventions and the resulting methods or ways of improving traffic safety. The following is a summary of his comments as provided in the panel discussion.

The public perception of traffic safety has been measured, and the general public seems to have the right answers. They know that traffic safety is important; however, there is often a disconnect between perceptions of safe behavior and actions. Highway patrolmen often hear questions or comments like

the following: “How many of you are left on the highway? I’m in a hurry and I need to get from point A to point B in a certain amount of time.” The individual that makes such comments is showing, by their actions, that traffic safety is not that important. In my experience, 20% of the population’s perceptions are accurately reflected in their actions on the highways.

Another highway safety problem that has grabbed my attention here in Montana was the recent arrest and conviction of an individual for his 11th DUI offense. Public reaction to this has been strong. My question is - where was public opinion when this suspect had his first offense? I think that an 11th offense DUI suspect is an addict. The first offense DUI suspect is a criminal and we should be dealing more with the first and second offense than we currently do. First and second offenders are often given no more than a slap on the wrist and are sent out to re-offend – up to eleven times. At which point we (society) get angry. Our reaction is a little bit too late.

Moving beyond the public’s perception of traffic safety, what is their perception of traffic safety interventions, including enforcement? We have already talked about red-light cameras in Montana; they didn’t work out and cities that installed them (such as the City of Bozeman) now have to take them out. The Montana State Legislature felt that the cameras were primarily a revenue raising item despite all the safety information to the contrary. It is not a revenue thing, it is a safety thing.

People want to be independent - so what can a group such as this one do? We need to frame what independent really means. To me, independent means going where I want, when I want. With safety interventions that is still possible, but we may need to adjust individuals perceptions on what does and does not affect their independence. Through marketing, in particular social norms marketing, this reframing of what independence is can be made. We need to show individuals that they don’t lose any rights; they just get to their destination in a safer manner.

Finally, the third question I believe we need to address is how culture can be used to **improve** traffic safety. Everyday highway patrol troopers are out, on the ground, trying to keep our roads and the traveling public safe. It is like standing on a lakeshore trying to sweep back the water with a broom. Every day I sweep and everyday my troopers sweep, but the water is still there. After nearly 25 years in the Highway Patrol it has finally dawned on me – we need to lower the level of the lake! That is what culture change can do – lower the level of the lake.

In the next twenty-five years, culture change is going to be the only real effective change in highway safety. We have already used all the interventions, improved all the roads, improved the vehicles, and added “safety” technologies in an attempt to reduce accidents, injuries and deaths. Now it’s time to deal with the driver. How do we do that?

The individuals here at this event are experts in this field and we have some of the answers. 40,000 people are killed every year on our roads, I know this, but this number is awfully big and not really personal. We have to figure out how to make it personal. In the last eighteen months, I have lost three troopers to errant drivers; either distracted driving or DUI driving. That is a much more personal number. I know that number, as well as their badge numbers, and I will never, ever forget that. So, how can we

take something that personal and put it out to John Doe sitting in front of his TV or the guy that's about to get behind the wheel intoxicated? That is the level of marketing we need to get to; real lives, real changes needed.

The Montana Department of Transportation has done a great job with this type of message through the "Route to Live" video. The number of people being killed in one-vehicle rollovers while not wearing seatbelts has dropped dramatically in the weeks and months since the campaign began. An individual watching can say "that could be my wife on television talking about me having been killed because I didn't wear my seatbelt." The video makes it easier to personalize the statistics and those types of messages we need to continue.

We also need to work with the legislature to pass laws that enforce the safety recommendations. 80% of individuals will comply with a law once it has passed. Getting the legislature on board early and helping them design some of these interventions is the way to build consensus. As we work toward changing culture in Montana, particularly with DUIs, we can't do it alone.

Rob Foss, PhD, Director, Center for the Study of Young Drivers, University of North Carolina

Dr. Foss discussed one element of culture – social norms – and how powerful they can be in influencing behavior. The following is a summary of his comments as provided in the panel discussion.

A social norm is simply a behavioral expectation that applies to all members of a group, whether it's a family, a college fraternity, citizens of a state, or citizens of an entire country. Norms are known, understood and complied with widely by group members – even though they may not be consciously aware of these expectations. Those who don't comply stand out and very quickly realize they've made a mistake. In our efforts to influence behaviors related to traffic safety, we often overlook the extremely powerful effect that social norms have on behavior. Norms are always there – as part of the cultures of the groups we belong to – and they strongly influence us even when we don't know they are there. We can use this characteristic of human social behavior to move people by highlighting the normative nature of many safe behaviors or by correcting misperceptions about them.

If people understand what behavior is highly typical and expected within their social world – be that seatbelt use, driving considerately, staying off their Blackberry or iPhone – they will tend to go along with it. There will always be a few deviants. Laws are frequently formal codifications of generally understood and accepted norms, which are enacted in an effort to reign in those who won't go along with what their peers expect them to do.

To illustrate the power of norms and how strongly they influence us, even when we are not consciously aware of them, consider the notion of personal space. Every culture has normative expectations for how we position ourselves spatially in relation to others. There are substantial cultural differences regarding how close is appropriate to stand next to someone else. The appropriate distances are a function of the nature of the social relationships. For a close personal acquaintance, a family member especially a child, in the US, it's appropriate to stand very close, even to touch. In a relationship with someone who is an acquaintance, it is acceptable to stand close but not as close as you would to a family member or child. The appropriate distance to stand from a stranger is even larger. When these understood norms are

violated, it makes both people quite uncomfortable. Try standing face-to-face within 12 inches of a stranger or casual acquaintance and you will be able to directly 'feel' the power of this invisible, but very real influence. In other cultures it's appropriate to stand almost nose to nose with a stranger. Although the powerfulness of particular norms varies, the principle is the same – humans sense and respond to these expectations that characterize the cultures they inhabit. By taking advantage of this understanding, we can subtly, but effectively move a wide range of safety-related travel behaviors in the direction of safety since most safe actions are in fact normative. The problem is that people often don't realize this and, consequently, are influenced by a misperception of what is typical. There is a substantial body of research on this matter that we would do well to heed.

Future Casting Keynotes

During lunch, three speakers identified new perspectives on modifying driver behavior by changing culture. Their presentations follow (when available, links to the online presentations have been provided).

Expectationism: Key to a More Safety Oriented Culture

Gerald Wilde, Professor Emeritus, Queen's University, Canada

(<http://www.ruraltscsummit.org/downloads/09presentations/Wilde.pdf>)

Due to technical problems, Dr. Wilde's comments were not captured in such a way to allow a written summary of his presentation. He graciously provided a paper which his presentation was based upon. The following is a summary of this paper.

Professor Wilde began by presenting a quandary to the audience. There would seem something puzzling about some engineering measures aimed at reducing traffic accident loss. *On the one hand* there are technical interventions that seek to protect drivers from the consequences of risky or inattentive driving (seatbelts, padded dashboards, collapsible steering columns, airbags, etc.). These devices *decrease* the likelihood of death or injury if the drivers are inattentive or take risks.

On the other hand, there are technical interventions that *increase* the probability of accident if drivers are inattentive or take risks. Examples are speed bumps and narrow lanes.

Does it make sense to adopt these two conflicting strategies for safety at the same time, as in fact they often are implemented by city roads and safety engineering departments? Can one have it both ways? Is it reasonable to expect that *both* increased protection and increased threat are helpful to safety? Or are we dealing here with poorly conceived safety policies? Whatever the answer to this puzzle may be, it will be argued here that neither approach - either making the physical environment "safer" or more "threatening" - has major consequences for the safety of road users. This is because people are, sooner or later, capable of adjusting their behaviour to changes in environmental conditions to the effect that the risk they experience continues to match the amount of risk they are willing to accept.

That is *the first major tenet* of the theory of risk homeostasis – on the road, as well is in any other domain of human activity, people choose to behave in such a way as to maximize the net benefit of their actions. That is, they attempt to maximize the difference between the benefit they expect will accrue to them and the amount of loss they feel they might occur. The degree of risk taking people expect will maximize their net benefit, and therefore try to maintain in any risky activity, has been labelled the "target level of risk," because that is the level of risk people feel best serves their interests.

According to the *second major tenet* of the theory, people will adjust their behaviour when they become aware of changes in the to-be-expected gains and losses by adopting either riskier or safer ways of conduct. Thus, it is argued that safer behaviour can be promoted by measures that enhance the benefit of being accident-free.

The *third major feature* of risk homeostasis theory is that it focuses on accident risk per time unit of exposure (i.e., temporal, per hour or per year) to the risky activity, not on spatial accident risk per km or 100 million kilometres driven. Making a clear distinction between these two ways of defining the accident rate is fundamental to any discussion about the goals of traffic accident prevention and the means to achieve them.

When habitual non-users of seatbelts are made to buckle up, they can be expected to feel better protected. Better protection, in case an accident were to happen, allows them to drive faster at the same risk of accident loss per hour of driving as before. A carefully conducted field experiment has demonstrated that habitual non-users of seatbelts do indeed speed up when told to wear their seatbelt, and also follow more closely to the car in front.¹

Other interventions also allow higher speeds without a change in the accident loss. Examples are more crashworthy cars, wider traffic lanes, guardrails, anti-lock brakes, airbags, and there are numerous others. These allow more kilometres driven per accident and thus a lower accident rate per kilometre.

The distinction between *the accident rate per unit distance driven* on the one hand and *the accident rate per head of population* on the other is neatly illustrated by USA data depicted in Figure 1. The accident rate per unit distance of mobility, which is expressed here as the number of deaths per 100 million miles of vehicle movement, shows a marked and more or less regular *decline* from 1923 to 1996. The total mileage per head of population, in thousands of miles per inhabitant, shows exactly the opposite: a marked and more or less regular *increase* which is directly proportional to the decrease in fatal accidents per unit distance driven.

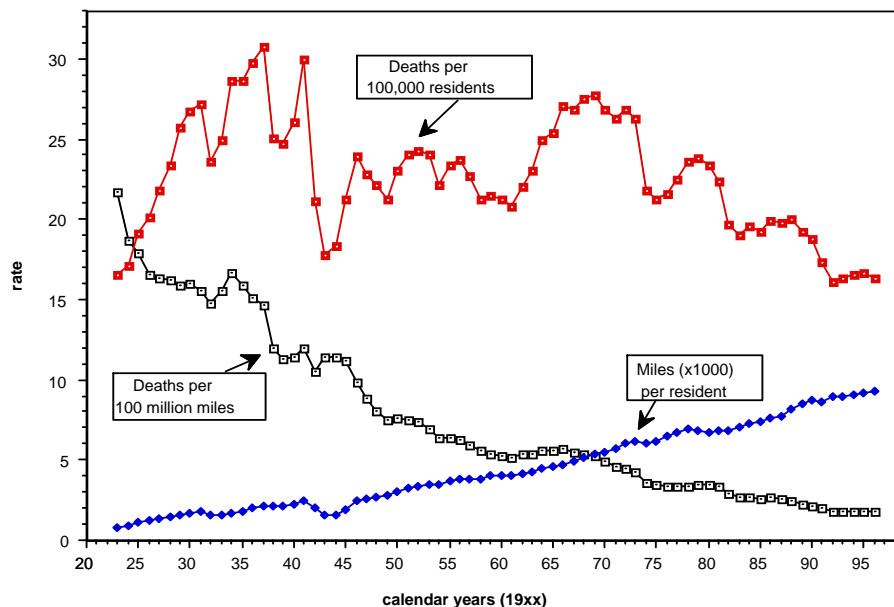


Figure 1: The traffic death rate per distance travelled, the traffic death rate per capita, and the road distance travelled per capita in the USA, 1923-1996.²

¹ Janssen, W.H. (1994). Seatbelt wearing and driving behavior: an instrumented-vehicle study. *Accident Analysis and Prevention*, 26, 249-261.

² Graphed from data published by the National Safety Council (Chicago, various years), see Wilde, G.J.S. *Target Risk 2*. Toronto: PDE Publications, 2001, p. 60.

These dissimilar patterns raise the question as to what is the appropriate yardstick for traffic safety improvement. In other cases of violent death, suicide for instance, it is obvious that we will not express success by showing that there are fewer suicides per km of available rope or per cubic meter of cooking gas. We would express success as a reduction in the number of suicides per head of population.

But in the case of traffic accident reduction it can be argued that both goals are perfectly legitimate. A reduced death rate per kilometer driven indicates economic success as well as in terms of performance, because fewer deaths per kilometer driven is equivalent to more kilometers driven per death. For this reason it might be more appropriate to call the interventions that produce more kilometers per death “mobility promotion measures,” not “safety measures”, because more kilometers driven per death is not equivalent to fewer traffic deaths in the population.

Against the criterion of public health, fewer road accidents per capita mean fewer people in the morgue or in hospital, and that may also be viewed as the primary goal of accident prevention. Regardless of which criterion one chooses, it is of paramount importance that the two yardsticks of success should not be mixed up, as has often happened in discussions about what works and what does not in road safety, with the result that the arguments about risk homeostasis theory and opposing views often have become mindlessly, and thus needlessly, confused.³

The economy and annual variations in the per capita death rate. In Figure 1 we noted the lack of correspondence between the annual variations in the spatial and the temporal rates of death on the road. Both figures show major fluctuations in the per capita death rate from year to year. If these are not due to reductions in the death rate per kilometer driven, what is their origin?

In Figure 2 these fluctuations are plotted against the annual unemployment rate in the US. In virtually every pair of consecutive years, the per capita road death rate rises with reductions in the unemployment rate and drops with increases in the jobless rate, as has also been noted by others.⁴

The same general pattern has been found to hold true for Chile, Sweden, Finland, Canada, the UK, the Netherlands, West Germany (i.e., prior to unification with the DDR), and Switzerland. This pattern of findings observed in several countries raises the following question: why should the annual variations in the per capita traffic death rate be so dependent on the fluctuations in a nation’s economy?

It is suggested here that it is because the economy has a major bearing on what we have called the target level of risk, i.e., that level of risk at which drivers expect that the net difference between the expected benefits and the expected loss in the act of driving will be maximal. There are four utility factors that influence the target level of risk:

1. The *expected advantages of risky* behavior alternatives. Examples: gaining time by speeding, making a risky maneuver to fight boredom, rush production to meet a deadline, trying to catch up after having been delayed.

³ Evans, L. (1986). Risk homeostasis theory and traffic accident data. *Risk Analysis*, 6, 81-94.

⁴ Partyka, S.C. (1984). Simple models of fatality trends using employment and population data. *Accident Analysis and Prevention*, 16, 211-222.

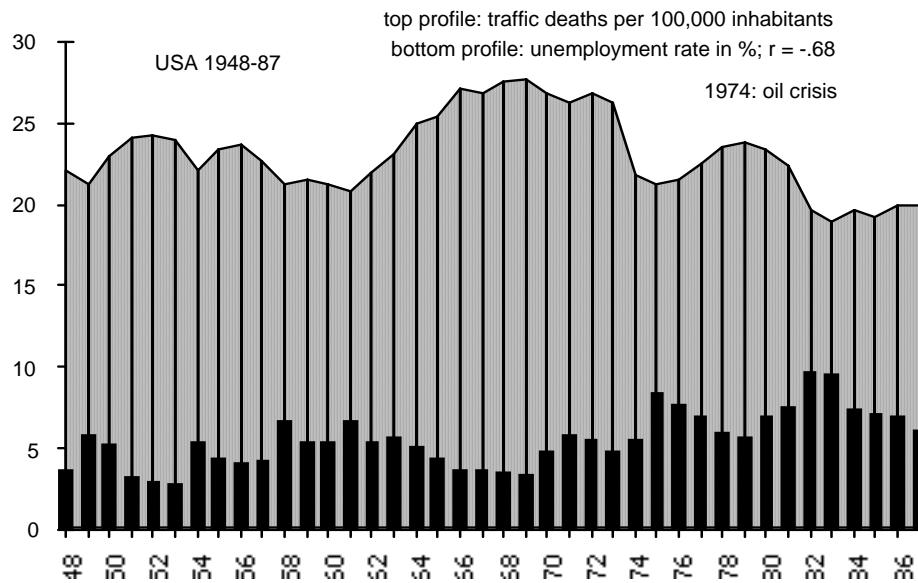


Figure 2: Annual variations in the unemployment rate and the traffic death rate per capita in the USA, 1948-1987.⁵

2. The *expected costs of risky* behavior alternatives. Examples: automobile repair expenses after an accident, insurance surcharges for being at fault in an accident, equipment wear and tear.
3. The *expected benefits of safe* behavior alternatives. Examples: an insurance discount for accident-free driving, building a reputation of social responsibility.
4. The *expected costs of safe* behavior alternatives. Examples: using an uncomfortable seatbelt, being called a coward by one's peers, time loss.

The first and fourth utility factors enhance the target level of risk, while the second and third have a reducing effect. While not all of the influencing factors are economic in nature - some being of a psychological, socio-economic, cultural or mere ephemeral nature - it is clear that a booming economy stimulates Factors 1 and 2, while reducing the relative weight of Factors 3 and 4.

Obviously, road users do not act as if they were economists or accountants equipped with a computer to calculate the optimal level of risk at any moment of time. Moreover, the necessary data for such calculations are not even available. Instead, what road users do is to rely on their intuition and earlier experiences. They make their decisions on the basis of what feels right. *The level of perceived risk is not a number.* Nor are hunger, thirst, the feeling of thermal (dis)comfort, (un)happiness, nostalgia, despair or hope for the future; however, with the help of psychological (psychometric) scaling techniques the intensity of these feelings can be expressed in numerical form (within individuals at least). And so can the perceived level of risk and its variations.⁶

⁵ Quoted from Wilde, G.J.S. (2001). *Target Risk 2*. Toronto, PDE Publications, 2001, p. 72.

⁶ See Wilde, G.J.S. (2001). *Target Risk 2*, Toronto: PDE Publications, pp. 22-23.

The risk-homeostatic process. Risk homeostasis theory posits that individuals at any moment of time compare the amount of risk they perceive with their level of risk and will adjust their behavior in an attempt to eliminate any discrepancies between the two. Each action carries a certain level of injury likelihood such that the sum total of all actions taken by people over one year determines the accident rate for that year. This rate, in turn, in combination with the attendant personal experiences on the road and communications in the mass media, has an effect on the level of risk that people perceive subsequently, and thus upon their subsequent decisions, and so forth anon.

This homeostatic mechanism is depicted in Figure 3. This constitutes a case of *circular* causality: a change in the degree of caution displayed in behavior brings about a change in the injury rate, while a change the injury rate also leads to a change in behavior. The phenomenon of circular causality can also be seen in the functioning of a thermostat⁷: this instrument controls the actions of the heating/cooling unit in the home, which determines the temperature, and the temperature in turn controls the actions of the thermostat. There will be fluctuations in the room temperature, but averaged over time, the temperature will remain stable, until the thermostat is set to a new target (set-point) level.

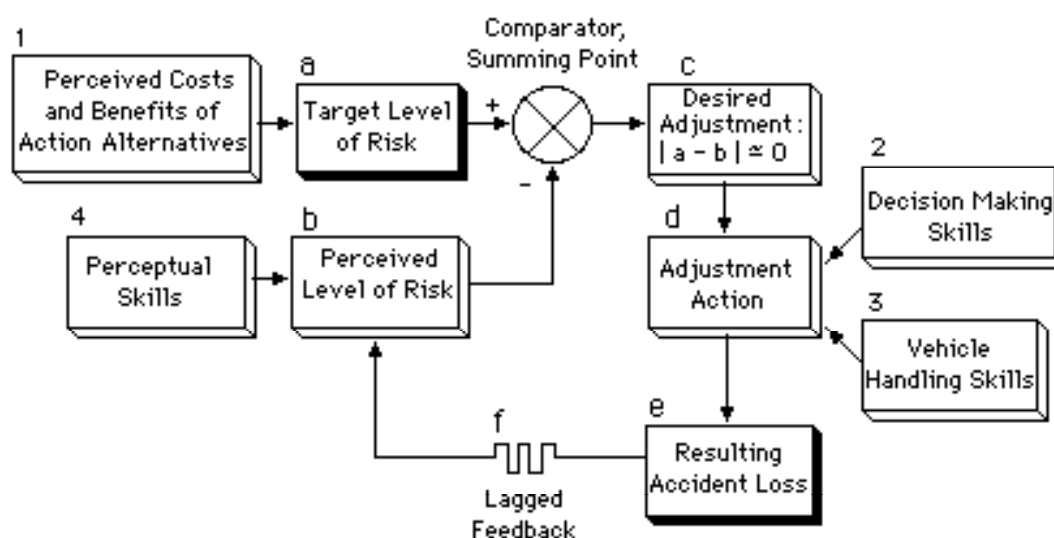


Figure 3: Homeostatic model relating the accident rate per head of population in a jurisdiction to the level of caution in road-user behavior and vice versa, with the average target level of risk as the controlling variable.⁸

Similarly, the target level of risk is seen as the controlling variable in the causation dynamic of the injury rate.

From this follows that the basic strategy of (not per unit distance of mobility, but per capita) injury prevention should be to reduce the level of risk that people are willing to accept. Because the nation's per capita accident rate reflects the target level of risk in the population, the art of traffic safety management is synonymous with the art of reducing that target level.

⁷ As well as in basic physiological functions in the human body, like blood pressure or core body temperature. See Wilde, G.J.S. (2001). *Target Risk 2*, Toronto: PDE Publications, 2001, pp.36-39.

⁸ Copied from Wilde, G.J.S. (2001) *Target Risk 2*. Toronto: PDE Publications, p. 33.

Because of the closed-loop nature of the control process, all other variables, such as variations in skill or environmental conditions can only produce minor and/or short-term fluctuations, and even these are often reduced or virtually eliminated through anticipatory adaptation (“feed-forward control”).⁹

Further empirical evidence. In the fall of 1967 Sweden changed over from left-hand to right-hand traffic. This change-over was followed by a marked reduction in the traffic fatality rate. About a year and a half later, the accident rate returned to the pre-change-over trend. In terms of Figure 3, what happened was a sudden surge in box **b** as a result of the change-over coming into effect. Perceived risk (box **b**) was suddenly significantly higher than the target level of risk (box **a**). Road users adjusted their behavior by choosing much more prudent behavior alternatives (box **d**). As a result, the fatal injury rate dropped (box **e**). After some time (box **f**), however, people discovered - through the mass media as well as their own experiences - that the roads were not as dangerous as they had first thought they had become. The level of perceived risk dropped below the target level of risk (back to box **b**). Consequently, road users opted for less cautious behavior alternatives and the fatal injury rate rose again. The same pattern was seen in Iceland after it changed the direction of traffic in 1968.¹⁰

In the period from 1994 to 1996, about half of all 50 American states plus the federal district had laws compelling all motorcyclists to wear a helmet, while the other half of jurisdictions did not. Through a comparison of the law states with the no-law states over this period, it was found that the helmet laws failed to have a significant impact on the fatality rate per 10,000 registered motorcycles.¹¹ The authors mention “risk compensation” as a possible explanation, and quote several earlier authors on the topic of crash helmet legislation in the US also identified risk compensation as an explanatory factor.

Driver training or a mandatory course of driving on slippery roads does not reduce accident risk.¹² Such training does indeed improve skill, but it apparently increases confidence even more than skill, with the end effect that driver education graduates show a *higher* accident rate per capita.¹³ A recent Swedish study showed that the more traffic safety education children in kindergarten and primary school had received, the higher their traffic injury rate. This was attributed to the greater independence and mobility, including the use of a bicycle, which better-trained children were allowed by their parents as they felt that their children had received superior traffic education.¹⁴

These data - together with the evidence in traffic, sky-diving, computer use, cigarette smoking, storage of medicines as well as financial risk taking studied in a laboratory setting¹⁵ - suggest that the concept of risk homeostasis provides a general theory of human behavior in the face of risk.

Incentives for safety. In an effort to counter the erroneous impression received by some critics¹⁶ that risk homeostasis theory casts a pessimistic perspective on the preventability of accidents and lifestyle-

⁹ Wilde, G.J.S. (2001). *Target Risk 2*. Toronto: PDE Publications, p. 49.

¹⁰ Wilde, G.J.S. (2001). *Target Risk 2*. Toronto: PDE Publications, p. 42-43.

¹¹ Branas, C.C and Knudson, M.M. (2001). Helmet laws and motorcycle rider death rates. *Accident Analysis and Prevention*, 33, 641-648.

¹² Christensen, P. and Glad, A. (1996). Mandatory Course of Driving on Slippery Roads Does Not Reduce the Accident Risk. *Nordic Road & Transport Research*, 8, 22-23.

¹³ Brown, J.D., Groeger, J.A. and Biehl, B. Is driver training contributing enough towards road safety? In J.A. Rothengatter and R.A. de Bruin (Eds.), *Road users and traffic safety*. Wolfeboro, New Hampshire: Van Gorcum, pp.135-156.

¹⁴ Johansson, B.S. (1997). Trafiktränade barn löper större olycksrisk. *VTI Aktuellt*, No. 4, June, p. 9.

¹⁵ Trimpop, R.M. (1994). *The psychology of risk taking behavior*. Amsterdam: North-Holland, Section 9.2.

¹⁶ McKenna, F.P (1985). Do safety measures really work? An examination of risk homeostasis theory. *Ergonomics*, 28, 489-498.

dependent ill health, we will now turn to effective intervention efforts that follow directly and logically from the theory.

The “bad” news regarding the traditional engineering or training measures, as discussed above, is that although these measures may well increase the amount of driving per death on the road, they fail to reduce the traffic death rate per head of population. People will continue to maintain their target level of risk in response to such measures and show behavioral adaptation

The *good news* is that it is not all that difficult to alter people’s target level of risk. As findings discussed below will demonstrate, people’s target level of accident risk can be reduced, and thus their involvement in accidents, by offering good things he or she is able to look forward to on the condition that an accident of their own fault does not occur to them. These good things function as effective incentives in enhancing actual safe conduct. The incentives may be significant and long-term as staying alive for the birth of a grandchild, or trivial and short-term, as 30 Euro or 50 dollars award for accident-free driving in the next two months.

The large body of studies on incentive systems for accident-free operation has shown that they are a very powerful method for the reduction of injury rates. Incentives, i.e., future rewards (for instance in the form of cash or other bonuses) contingent upon fulfilling a specified future condition, increase the perceived benefits of safe behavior alternatives (as stated previously).¹⁷ There have been many studies of the effectiveness of incentive schemes, both in industrial settings and traffic, and their most productive features have been identified and detailed elsewhere.¹⁸ Injury rate reductions ranging from 10% to 90% have been observed and this at very favorable benefit/cost ratios, usually exceeding 2 to 1, but often very much higher.¹⁹ A German incentive program has been in force for over three decades without showing signs of waning effectiveness.²⁰

The only undesirable side effect of such program that has been noted so far is the underreporting of accidents, but this phenomenon is limited to relatively minor injuries and property damage. It is easy to hide a broken toe, much more difficult to hide a corpse.

An incentive program for safe driving in California, which led to a 22% reduction in accidents in the first year of operation and to 33% fewer accidents in the second, was observed to be especially effective in young drivers.²¹ A Norwegian program that promised substantial insurance rebates for accident-free driving by novice drivers produced a 35% reduction in accident frequency.²² An American team-based incentive program aimed at transit bus operators yielded a 25-35% reduction in accident rates as

¹⁷ An alternative effort to motivate people to act more safely takes the form of increasing the expected costs of risky behaviour alternatives (Factor 2 in Section 3 above). For a number of reasons that have been suggested elsewhere, this approach has not shown to have much effect on safety, and will, therefore, not be discussed here. See Wilde, G.J.S. (2001). *Target Risk 2*: Toronto: PDE Publications, Sections 11.1 and 11.2

¹⁸ Wilde, G.J.S. Incentive Programmes. Chapter 60.16 in Jeanne. M. Stellman (Editor-in-Chief), *ILO Encyclopaedia of Occupational Health and Safety* (4th edition). Geneva, CH: International Labour Office, 1998.

¹⁹ Fox, D.K, Hopkins, B.L. and Anger, W.K (1987). The long-term effects of a token economy on safety performance in open pit mining. *Journal of Applied Behavior Analysis*, 20, 215-224.

²⁰ Gros, J. (1989). Das Kraft-Fahr-Sicherheitsprogramm. *Personalführung*, No. 3, 246-249.

²¹ Harano, R.M. and Hubert, D.E. (1974). *An evaluation of California’s ‘good driver’ incentive program*. Report No. 6, California Division of Highways, Sacramento.

²² Vaaje, T (1991). Rewarding in insurance: Return of part of premium after a claim-free period. *Proceedings, OECD/ECMT Symposium on enforcement and rewarding: Strategies and effects*. Copenhagen DK, Sep. 19-21, 1990.

compared to randomly selected controls within the same company. The ratio between program benefits and costs was estimated at almost seven-to-one. After the program was withdrawn, the safety records of the incentive group dropped to a level that was still better than that of the no-treatment employees, but no longer significantly so.²³

The remarkable effectiveness of incentive programs is arguably due to the fact that these programs enhance people's perceived value of the future. The prospect of future satisfactions seems to cause people to look forward to the future with positive expectation. Thus, they will realize they have more to lose and thus have a greater desire to be alive and well when that future comes, and be more inclined to take action to protect their health and safety.

And indeed, there is evidence accumulating that individuals who are marked by a high valuation of the future relative to the present display fewer unsafe behaviors and unhealthy lifestyles.²⁴ In a Canadian study of late adolescents and young adults, a significant positive association was found between safe driving practices, regular seatbelt use and moderate alcohol consumption, a wholesome diet and regular physical exercise on the one hand, and a high valuation of the future, and more deliberate planning for that future, on the other.²⁵ An earlier study of Quebec motorists had found that individuals characterized by a comparatively high valuation of the future had more favorable attitudes to automobile safety, fewer demerit points, and fewer road accidents.²⁶

The notion of "expectationism". The theory of risk homeostasis (sometimes known as "risk compensation" or "behavioral adaptation") was primarily developed and validated in the area of road safety. Some of the supporting data, however, come from quite different behavior domains including smoking and settling in flood-prone territories.²⁷ This is not surprising because the mechanisms that are involved in risk homeostasis are probably universal. Moreover, the accident-prevention strategy that logically follows from risk homeostasis theory has been found effective in many areas. Incentives for safety and health may be viewed as one example of a wider class of "expectationist" interventions (as distinguished from technological interventions). Expectationist are the interventions that offer people more positive anticipations regarding their future than is currently the case and thus motivate them to be more cautious with life and limb. If the per capita rate of accidents and lifestyle-dependent poor health essentially depends on the level of risk people are willing to take, as we have argued here, then the concept of expectationism would seem to offer a meaningful rationale for prevention.

²³ Haynes, R.S., Pine, A.R.C., and Fitch, H.G. (1982). Reducing accident rates with organizational behavior modification. *Academy of Management Journal*, 25, 407-416.

²⁴ Björgvinsson, Th. and Wilde, G.J.S. (1996). Risky Health and Safety Habits Related to Perceived Value of the Future. *Safety Science*, 22, 27-33.

²⁵ Björgvinsson, Th. (1998). Health and safety habits as a function of the perceived value of the future. Doctoral dissertation, Dept. of Psychology, Queen's University, Kingston, Ontario.

²⁶ Chebat, J.C and Chandon, J.L. (1986). Predicting attitudes toward road safety from present and future orientations: An economic approach. *Journal of Economic Psychology*, 7, 477-499.

²⁷ Lave, T.R. and Lave, L.B. (1991). Public perception of the risks of floods: Implications for communication. *Risk Analysis*, 11, 255-267.

Pay-As-You-Drive-and-You-Save Insurance

Allen Greenberg, Program Analyst, Congestion Management and Pricing Team, Federal Highway Administration

(<http://www.ruraltscsummit.org/downloads/09presentations/Greenberg.pdf>)

Allen Greenberg compares different types of insurance programs and discusses their benefits and costs. He informs Summit members of new technologies that measure various aspects of vehicle operations and explains their usefulness. He also compares instrumented vehicle studies from several countries and the before-after data collected. The following is a summary of his comments as a luncheon speaker.

There are many costs in owning and using a vehicle, insurance is just one of them. Legislative updates concerning uninsured motorists report that 9% to 15% of Montanans are uninsured. High fines have not lowered this percent because of the low probability of getting caught and the present state of our economy. Providing insurance for a lump sum deters purchase. Studies indicate a great deal of the public benefits if insurance is converted to pay-as-you-drive (PAYD). How much you drive your vehicle is important when determining risks. Nobel prize winning economist William Vicory envisioned calculating risks related to how, where, and how much you drive and then charging for insurance commensurate with usage-based risk.

In recent years, a number of research projects have involved instrumented vehicles, many of which have been reported about at annual Transportation Research Board (TRB) conferences in Washington, D.C. One speaker summarized this research. He noted that some insurance companies—most notably the U.K.'s Norwich Union, have gathered similar data. While companies would not share their own data, their subsequently deployed PAYD pricing models suggested that the companies were convinced of the actuarial benefits of such pricing. So why, pay-as-you-drive policies? Many are aware of the 100-car Naturalistic Study in northern Virginia that is a precursor to the upcoming 2500-car NHTSA study. They found that one-eighth of the drivers that were most dangerous had over 100 times the crash risk of the drivers that were the least dangerous. A similar Israeli study that monitored 103 vehicles found that the least safe drivers had crash risks over sixteen times higher than the safest drivers. A 3rd study in Sweden that combined incentives with vehicle monitoring reduced speeding frequency from 15% to 8%.

The first U.S. application of pay-as-you-drive was Progressive Insurance's "Autograph" in Houston, Texas between 1998 and 2001, the most sophisticated application seen in this country to date. Participating vehicles were equipped with GPS systems measuring vehicle usage, including length of travel (in minutes), time of day of travel, and the area in which you drove. Individualized usage-based rates, reflective of the driver's risk profile and the level of insurance coverage, were charged. Subsequent to this pilot, Progressive launched Trip Sense (which it subsequently discontinued) and then My Rate, a usage-based discount program, which it currently offers in nine or ten states. Another discount program is offered by GMAC insurance for OnStar equipped vehicles, where discounts up to 54% are available to low mileage drivers. Mile Meters is a new company offering insurance only in Texas. They sell by the miles. For example, you can purchase 2,000 miles telling them when to start (for example 64,241 miles)

and when to end (66,241 miles). If you have an accident in that mileage frame you are covered. The State of Texas allows you to print out an insurance card that is mileage dependent.

PAYD systems cut vehicle miles (estimated by about 8% by the Brookings Institution) and reduce accidents. Further, data shows congestion-reduction benefits, such as occurred when vehicle miles traveled in the U.S declined by 3%. This decline in VMT led to over a 30% reduction in peak traffic congestion, which lowers as well, air pollution, carbon emission, and infrastructure costs. If insurance companies plan on being competitive with low mileage drivers, they need to offer PAYD insurance.

The Future of Integrating Agency Traffic Safety Cultures: Lessons from Minnesota's "Toward Zero Death" Program

Bernie Arseneau, Director, Policy, Safety and Strategic Initiatives Division, Minnesota Department of Transportation

<http://www.ruraltscsummit.org/downloads/09presentations/Arseneau.pdf>

Bernie Arseneau explained the function, advantages, and new approach of TZD (Towards Zero Death). He discussed the five predominant issues related to fatalities in Minnesota and how the Minnesota Department of Transportation averaged data and risk management to determine where their funds would be best applied. Subsequent to this, important changes were made that lowered fatalities. The following is a summary of his comments as a luncheon speaker.

Everyone accepts safety as a necessity; it applies to every component of transportation. The purpose of the TZD (Towards Zero Deaths) program is to focus on fatalities. A key to this programs success is the focus on the friends and families of the fatalities.

Seatbelts save lives; my son is alive today because he was buckled up when he fell asleep at the wheel. Fatal crash reports indicate we can't be sure our young people are buckling up. Our vision is to reduce fatalities to zero; our mission is to continue to reduce fatalities on an annual basis.

Minnesota made three major changes to accommodate the new safety approach. (1) We brought safety partners together, (2) we started investigating all roads, and (3) we identified low cost and systematic solutions.

A definite key to success is to look at data by types of crashes vs. number of fatalities. Five predominant issues related to fatalities are: seatbelt use, intersections, lane departure, speed, and alcohol.

We disperse funds according to the amount of fatal crashes. Our central safety fund is split between state and city. Due to our data research and funding, fatalities have decreased substantially.

A focus on culture, data, and risk management reduces accidents and saves lives. As we build relationships, eliminate barriers between safety stakeholders, and take smart risks, our country becomes a safer place to travel.

How can culture be used to improve traffic safety?

Duane Williams, Montana Department of Transportation moderated this session. Presentations of case studies sighting examples where culture has been used or changed to promote safer driver behavior and improve traffic safety were given. Following the three speakers, three panelists each provided a few comments followed by a brief question/answer period. Summaries of the speaker presentations and panelist comments follow. When available, links to the online presentations have been provided.

Safety Culture in Europe: Characteristics of Successful Programs

Divera Twisk, PhD, SWOV Institute for Road Safety Research, The Netherlands

(<http://www.ruraltscsummit.org/downloads/09presentations/Twisk.pdf>)

Dr. Divera Twisk compares traffic and safety issues between Europe and the United States. She emphasizes a need for the creation of a system that has safety embedded in it. Divera explains changing vehicle speeds is an advantage in a city environment and develops a positive safety environment. She summarizes – if we concentrate on leadership and ambitious targets, safety will improve. The following is a summary of her comments.

It is obvious that safety culture and traffic safety in the United States is directed towards drivers. In Europe 50% of traffic deaths are pedestrians and cyclists, which gives us a different perspective. For this reason we created our safety system.

In Europe the *Safety Target System* reaches all individuals, not just drivers. Human error and violations are the contributing factor in 96% of accidents and 65% of crashes. The *system safety* approach is effective in our country because we address all individuals using roads.

Years of development evolved into the roads we have today and the safety does not match our progressive technology. Safety culture is about a system as a whole, addressing infrastructure, vehicle equipment, violations, errors, cyclists, and pedestrians.

In the Netherlands we have developed a system called “*Sustainable Safety*.” This system has been created by utilizing information studies such as; human factors, cognitive economics, and physical tolerance. Research has proven a substantial decrease in fatalities by implementing roundabouts and the reduction of speed in areas of unprotected road users.

Research concludes the United States stands below average in safety, compared to other countries. Even though people resent some of the laws of our traffic safety system, a two year trial proved lowering the speed in a city reduced fatalities. The Netherlands has an overall average of a 70% reduction in the last 34 years, which places it as one of the safest countries in connection with traffic.

I suggest using research to base changes to traffic safety laws and subsequently culture. The average person misperceives risks and therefore is not an adequate source of information. The Netherlands and AAA performed a survey which involved Europe and the United States. This survey consisted of speed cameras, alcohol locks, red light cameras, and questions concerning safety measures and traffic rules.

The overall result indicated the United States acceptance levels were perceived higher than the Netherlands. This acceptance level indicates the United States population will accept change.

In the Netherlands we created positive image traffic safety videos which allowed us to influence people who oppose change. There is proof that ambitious targets improve safety worldwide.

The Path to a Safer Traffic Safety Culture

Brent Bair, Managing Director, Road Commission for Oakland County, Michigan

(<http://www.ruraltscsummit.org/downloads/09presentations/Bair.pdf>)

Brent Bair described programs that have reduced fatalities. He provided facts about Michigan that have contributed to their success towards a safer road environment. Brent emphasized that data and ultimate use of the data are the keys contributing to Oakland County's overall safety consciousness and helped change Oakland County's traffic safety culture. He informed Summit members about federal funds that are granted to those projects that achieve greater crash reduction than other projects. The following is a summary of his comments.

Michigan is the only state with county road commissions. The road commission receives funds directly from the state. The Road Commission for Oakland County (RCOC) has over 2,700 miles of county roads (including rural gravel roads), 1.2 million people, and the worst road congestion in Michigan. With all this, RCOC oversees a road system among the safest in the world in terms of fatalities per hundred million vehicle miles.

One contributing factor to Oakland County's safety is the Traffic Improvement Association (TIA) of Oakland County. TIA is dedicated to improving mobility and reducing accidents. TIA provides crash data, data analysis, traffic evaluations, school evaluations, and provides marketing materials on seatbelt, alcohol programs, and educational programs that aid data collection. TIA has created an elderly mobility training program allowing elderly citizens to recognize their peripheral vision and improve other skills. TIA's alcohol enforcement program is the longest standing NHTSA grant in the United States.

Crash data and projects to address those crashes are the major focus in RCOC's road construction and maintenance activities. RCOC performs safety analysis even for simple pavement resurfacing projects, to determine, for example, if there are curves that need to be flattened, or passing lanes that need to be added. Safety audits are used for multi-million dollar projects. Extensive safety related field reviews are performed frequently, which help identify improvements. As an example of safety related data analysis, it was determined drunk drivers were not recognizing flashing red stop lights at night and were causing many fatal accidents. The signals were changed to a 24 hour stop and go, and fatal accidents declined significantly.

RCOC developed a highway risk management program that allowed RCOC to achieve the goal "changing the culture of the organization and improve the safety of the roads" as well as, reduce the risk of liability lawsuits. Employee involvement became a successful tool for RCOC's safety programs. Employees travel roads daily and they were trained to look for potential safety problems and report them.

Using Federal Highway funds obtained via the regional MPO, the Oakland County Federal Aid Task Force allocates those federal funds to projects. The Task Force consists of the Road Commission, and Oakland's cities and villages. All compete for use of the federal funds. Projects that will yield greater crash reductions are given priority for use of the federal funds. An estimated three-quarters of a billion dollars of federal funds has been spent under this safety-oriented approach.

An independent panel of traffic engineers from around the country visited road agencies in various states focusing on intersection safety improvement strategies. They compared RCOC to those other agencies in the country, especially after all of RCOC's safety activities were brought to their attention and they were introduced to TIA. Their findings are summarized in the following quote, "It is because of the system put in place by RCOC that the organization can show that over a period of nearly 40 years, despite a four-fold growth in travel, traffic fatalities have been reduced by more than 91%." RCOC's success is due to consistency – continuous top management support, availability of crash data and analysis, and employee participation. A culture of safety!

Changing Traffic Safety Culture

Mike Todd, Fort Peck's Center for Native Health Partnerships

Mike Todd demonstrated how highway safety can be successfully integrated into a unique culture. The following is a summary of his comments.

At Fort Peck, we've introduced highway safety culture into our tribal culture through the stories of our elders. When we initially started, we looked at our culture as a whole, and then we examined the stories of our elders. Throughout Native American populations, regardless of where you are, elders are the most respected.

With this knowledge in-hand, we worked with the Montana Department of Transportation and the Safe on Our Roads program to ask our elders for input, stories, etc. We hoped to reduce the number of DUIs, traffic fatalities, etc. Fort Peck Reservation has a population of about 8,000 people, and averages 400 DUIs a year. Our DUI rate is very high.

The tribal elders gave us advice. Among other things, they told us that a long time ago the sole purpose for our living was so our next generation would be here. We took that and placed it into a DUI and seatbelt message – our sole purpose for living. If you buckle up, your children will be here and their children will be here.

A 70% unemployment rate and extreme poverty often drives our people to drinking. It has been going on for generations. So how do you reach the people? We work primarily with radio ads – no local TV station. We also started going to the Pow Wow community and little by little began plugging our culture into highway safety culture via contests, dances, etc. Today it continues to grow. DUIs are down and we haven't had an alcohol related death in Fort Peck in thirteen months. To communicate within cultural groups you must be creative in your communications.

Safe on Our Roads has also focused on seatbelt use. In the last three years, seatbelt use has increased from 12% to 35-45%. Rather than create a whole new traffic highway culture, we plugged traffic highway safety culture into our culture. One example is a contract we developed for the program. It states:

- I'll wear my seatbelt,
- I'll not get in with somebody who has been drinking and driving,
- I won't drink and drive,
- and I'll properly put my kids into a seatbelt or a car seat.

Today we have over 800 signed contracts. We also use an integrated approach and work with Fort Peck Community College and Tribal Health.

In our culture, we believe that everybody is related. We have a responsibility to one another, to help keep one another safe. Our next commercial will reflect this:

To me, Fort Peck is the most beautiful place on Earth. I can't go anywhere else and shake hands with my relatives, I can't go anywhere else and hug my grandma, I can't play with my nieces and nephews, so I ask you, my relatives, why are you dying because you choose not to buckle up, because you choose to drink and drive? So I am asking you, my relatives, to stay with me and choose to buckle up and not drink and drive.

Panelist Comments

Robert Hull, Director of Traffic and Safety, Utah Department of Transportation

Robert Hull emphasized the need to address communication issues and discover the right methods that link to the public. The following is a summary of his comments as provided in the panel discussion.

It is imperative to find a method of effective communication to deliver: (1) what we expect, (2) our goals for our programs, and (3) the contribution needed from the public. There are many successful programs we can examine and critique to help us understand how to influence our culture changes. Like Minnesota, Utah has a zero fatality program. We've found that it is very important that the goal of the program, our expectations of the program and what we are trying to accomplish be clear to the public.

How do we go about doing this? In addition to all the examples we saw today, we also need to include the internet. Technology advances, particularly on the internet, are shaping our culture. An example of this is Facebook. It has become a major communication method for many people and it is different than past methods. Social sites like Facebook and My Space work off a peer-to-peer exchange model. How can we utilize this to spread our message?

Wes Lum, Chief, Office of Safety Innovation and Cooperative Research, California Department of Transportation

Wes Lum presented information on California immigrant populations and urban drivers. He emphasized the necessary recognition of driving habits from different cultures. Wes also discussed how important it is to involve other non-engineering experts (public relations, insurance industry, etc.) to effect cultural change. The following is a summary of his comments as provided in the panel discussion.

Improving safety by activities not related to engineering, and utilizing safety culture as one, is an important issue at this Summit.

Our top management in the California Department of Transportation has discovered, over 90% of contributing factors in traffic safety are from behavioral issues. They are now asking us to address the problem [safety culture], and not the symptom [crashes].

California is a state of immigrants and their driving habits may not always be compatible with the fast pace of California. In addition, lack of understanding of traffic laws may be an issue. We need to find ways to communicate with them within the context of their culture.

Another cultural effect in California is urban drivers traveling along rural highways. They bring their driving habits, which may or may not fit, into a rural area. For example, recreation vehicle drivers are usually part-time drivers of big vehicles. Do they know how to drive on a mountain road? More often than not, they end up with 20 vehicles following them with no opportunity to pass and they don't or won't pull over. Urban areas, particularly Los Angeles, have a higher number of aggressive drivers, younger generation of cell phone and text users, as well as larger numbers of motorcycle fatalities.

Our policies need to include the insurance industry and public relations as we focus on traffic safety and cultural change. They will be a key asset for the success of our goals and breaking through the barriers of society. We are not trained in communication, so it is very important to utilize our resources.

Bernie Arseneau, Director, Policy, Safety and Strategic Initiatives Division, Minnesota Department of Transportation

Bernie Arseneau observed his career involvement in connection with safety initiatives. He attributed culture changes in Minnesota to the focus on safety and predicts technology to be the vehicle to improve safety across the county. The following is a summary of his comments as provided in the panel discussion.

I started my career with Minnesota Department of Transportation 26 years ago, mainly in conjunction with the traffic side of this business. I have seen culture change dramatically. Did culture change because of the focus on safety or culture? I believe it is both. If you impact safety, you generate the interest that creates action and modifies culture. We can impact culture using marketing value and the benefit of safety, as well as implementing actual safety strategy regardless of behavioral, vehicle, or infrastructure based. The fact is we are affecting culture.

The federal government and AASHTO are requesting a substantial reduction of fatalities, reducing 40,000 fatalities by 1,000 per year for the next twenty years. That is a bodacious goal but it can be done. We can utilize online resource and peer to peer exchanges to help us develop communication, and free our own epidemic or pandemic of improving safety across this county.

Closing Remarks

Montana Director of Transportation, Jim Lynch provided closing remarks to Summit participants. He pointed out that each state is unique and that each must determine their own solutions to improve safety culture. He presented challenges that Montana faces and highlighted what they are going to improve traffic safety. The following are his comments.

Montana is over six hundred miles across with vastly different geographies east to west. 76% of travel within the state occurs in a rural area on rural roadways. Often statistics are used to compare other states, but I would argue that all statistics are local. They're our basis, the groundwork from which we can build. They are not the groundwork that we compare ourselves to North Dakota, Wyoming, California or Vermont. They are about Montana and they only relate to Montana.

For example, according to a recent report on the safest place to drive in the country, Massachusetts was rated best and Montana is the worst. In this room there are individuals who have driven in both Montana and Massachusetts. The results of a quick poll say that they would much prefer to drive in Montana, but that is not what the statistic says. If you look back to the statistics about rural vs. urban roadways, you'll remember that 76% of Montana is considered rural while only 8% of Massachusetts is in the same category. So what is going to happen with a car accident in Montana versus Massachusetts? Rural accidents (which Montana has a majority of) usually occur at high speeds. If the occupant is not wearing a seat belt, they will likely receive a life-threatening injury. In Massachusetts, only 8% is rural so where are the accidents going to predominantly be? In an urban area, with the vehicle probably going 25-30 miles an hour, maybe bumper to bumper or sitting in an intersection waiting to move. If you get in an accident while not wearing your seat belt, chances are the injuries will not be life threatening. So automatically there is a big difference that the statistics do not make clear.

Another factor that influences the accident fatality rate is emergency response time. On average, a wreck in Montana has an hour and twenty minute response time. Obviously this is outside the 30 to 60 minute "window" considered crucial to survival. In Massachusetts the average response time is fifteen minutes. So, once again, assuming the same accident in the same environment in both states, you will likely have a fatality in Montana and an injury in Massachusetts.

Other factors that make Montana unique:

- single vehicle run-off the roads are primarily caused by wildlife;
- commutes in Montana often cover many miles and travelers may be tired and fall asleep; and
- we have predominantly two-lane roadways versus multiple-lane highways.

It is crucial to recognize these other factors so that we know what we can do from an infrastructure standpoint and what we can do from a cultural standpoint.

Many cultures exist in Montana – Native American, young, old, recreational users, ranching, etc. Each has a culture of its own. Montana has seven Native American Indian Reservations. Each has their own laws, constitution and culture. Fatality rates on the reservations were very high (15% - 20% of all

Montana fatalities). It was an identified problem for many, many years. Historically, an “expert” would walk into a meeting and try to tell residents what their problems were. We would get a lot of “deer in the headlight” looks and no change or improvement.

In 2005, the governor put together a Native American team consisting of advisors, staff personnel, and state department directors. At the time, Native Americans made up 6.4% of the total state population, but they accounted for 20% of all Montana traffic fatalities. With this information, we held a Tribal Safety Consensus Planning Forum where we brought all the tribal leaders together and said – “we have a problem”. Not, “you have a problem”. Discussions opened up and it was recognized by all in attendance that we were losing our young people; we were losing our elders that we rely on to teach the young. We then put together focus groups and began to build a program that is much more effective than past programs. We have changed the message from telling them what to do, to reminding them of the reasons they have to buckle up or to choose to not drive drunk.

Working with the Native American population in Montana has been a real eye-opener. In learning to work within their culture boundaries, we discovered that a lot of the issues we see and the methods we use within this culture can also be applied to other Montana residents ages 18 to 34 years. They also have their own culture – how they work, how they live and how they think.