

SAFETY BENEFITS OF HIGHWAY INFRASTRUCTURE INVESTMENTS

INTRODUCTION

Studies have found that a significant portion of vehicle crashes are caused by human errors. However, a vast body of research has demonstrated that certain modifications to highway infrastructure can decrease the probability that drivers will make errors; that errors will lead to crashes; and that crashes will result in life-altering injuries or death.

The purpose of this study was to estimate the reduction in serious injuries and deaths that could potentially be achieved through investment in highway infrastructure safety measures, and to estimate the level of investment required to achieve those benefits.

KEY FINDINGS

An investment of \$146 billion in cost-effective highway infrastructure safety improvements has the potential to save an estimated 63,700 lives and prevent 353,560 serious injuries over 20 years. The present value of these safety benefits is approximately \$348.4 billion.

Types of infrastructure safety improvements that account for the majority of these benefits include:

- Converting key intersections into roundabouts (nearly 30% of total safety benefits),
- Installing roadside barriers and clearing roadside objects (nearly 20% of total safety benefits),
- Adding sidewalks and signalized pedestrian crossings on the majority of roads (nearly 20% of total safety benefits),
- Installing median barriers on divided highways (14% of total safety benefits),
- Installing shoulder and centerline rumble strips (nearly 9% of total safety benefits), and
- Paving and widening shoulders (approximately 3% of total safety benefits).

Cost Effective Safety Improvements Could Save 63,700 Lives and Prevent 353,560 Serious Injuries Over 20-Year Period

ABOUT

Established in 1947 by AAA, the AAA Foundation for Traffic Safety is a not-for-profit, publicly funded, 501(c)(3) charitable research and educational organization. The AAA Foundation's mission is to prevent traffic deaths and injuries by conducting research into their causes and by educating the public about strategies to prevent crashes and reduce injuries when they do occur. This research is used to develop educational materials for drivers, pedestrians, bicyclists and other road users. Visit www.AAAFoundation.org for more information.

MORE INFORMATION

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METHODOLOGY

The potential safety benefits and costs of investments in highway infrastructure improvements were derived by projecting benefits and costs of highway infrastructure improvements estimated in previous studies onto all roads of the same types nationwide. Those previous studies were conducted by the U.S. Road Assessment Program (usRAP, www.usrap.org) on approximately 12,000 centerline-miles of roads in nine states (AL, IA, IL, KS, KY, MI, UT, WA, WI) using algorithms developed to recommend cost-effective safety improvements for specific sites along a jurisdiction's roadway network based on the presence or absence of specific roadway design and traffic control features correlated with the risk of crash occurrence and risk of severe injury or death in the event of a crash.

Examples of infrastructure safety improvements considered include installing guardrails or rumble strips, adding turn lanes at intersections, improving traffic signal phasing, converting intersections to roundabouts, and providing or improving facilities for pedestrians and cyclists.

The main study results are estimates of the safety benefits and corresponding economic costs of implementing all highway safety improvements whose benefits were greater than their costs (benefit-cost ratio > 1). Estimates of the safety benefits and economic costs associated with more stringent criteria for implementation (i.e., only implementing highway safety improvements with higher expected benefit-cost ratios, e.g., benefit-cost ratio ≥ 2) are also provided in the report.

Both the costs and benefits of highway infrastructure improvements reported here are likely conservative. The types of roads considered in this study were urban and rural freeways, urban and rural principal arterials, rural minor arterials, and rural major and minor collectors. Together, these types of roads account for approximately 64% of all motor vehicle crash fatalities that occur each year in the U.S. Including all types of roads clearly would have identified additional opportunities for safety improvements, which would have led to larger estimated costs and benefits. Furthermore, the study did not attempt to project or account for possible future growth in traffic volumes, which would likely increase the safety benefits of investments in infrastructure safety improvements. Finally, only safety benefits were considered; estimates of the economic benefits of highway infrastructure improvements reported here do not include any possible non-safety benefits.

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