THE ROAD TO
ZER0

EXECUTIVE
SUMMARY

Liisa Ecola
Steven W. Popper
Richard Silberglitt
Laura Fraade-Blanar

THE ROAD TO
ZER0

EXECUTIVE SUMMARY

Liisa Ecola
Steven W. Popper
Richard Silberglitt
Laura Fraade–Blanar

RAND | JUSTICE, INFRASTRUCTURE, AND ENVIRONMENT

Prepared for

NATIONAL SAFETY COUNCIL

For more information on this publication,
visit www.rand.org/t/RR2333z1

Support RAND
Make a tax-deductible charitable contribution at
www.rand.org/giving/contribute

www.rand.org

Preface

With *The Road to Zero: A Vision for Achieving Zero Roadway Deaths by 2050,* RAND continues a history of work in both traffic safety and scenario development and analysis. *The Road to Zero* develops a scenario for the year 2050 in which not a single person in the United States dies in a traffic crash. This report provides a stand-alone Executive Summary that outlines the scenario and presents the key recommendations of the larger report. The scenario presented in these reports is intended to inform and help coordinate future efforts in traffic safety across multiple stakeholders. We developed this scenario based on the results of three stakeholder workshops, held in 2017, that brought together participants in the recently instituted Road to Zero Coalition who represent a variety of stakeholders in traffic safety—professional engineering and planning organizations, public-sector organizations, safety advocates, vehicle manufacturers, technology developers, public health, emergency medical and trauma organizations, and law enforcement and judicial system representatives. This report does not necessarily represent the views of each coalition member or organization or individual that participated in the three stakeholder workshops.

This work was sponsored by the National Safety Council, which also convened the Road to Zero Coalition. It will also be of particular interest to any of the types of stakeholders listed above, in addition to local, state, and federal elected officials with responsibility for traffic safety.

The research reported here was conducted in the RAND Science, Technology, and Policy program, which focuses primarily on the role of scientific development and technological innovation in human behavior, global and regional decisionmaking as it relates to science and technology, and the concurrent effects that science and technology have on policy analysis and policy choices. The program covers such topics as space exploration, information and telecommunication technologies, and nano- and biotechnologies. Program research is supported by government agencies, foundations, and the private sector.

RAND Justice, Infrastructure, and Environment conducts research and analysis in civil and criminal justice, infrastructure development and financing, environmental policy, transportation planning and technology, immigration and borders protection, public and occupational safety, energy policy, science and innovation policy, space, telecommunications, and trends and implications of artificial intelligence and other computational technologies.

Questions or comments about this report should be sent to the project leader, Liisa Ecola (liisa_ecola@ rand.org). For more information about RAND Science, Technology, and Policy, see www.rand.org/jie/stp or contact the director at stp@rand.org.

Contents

2050: The year of zero roadway deaths

Imagine yourself in 2050, the first year in which not a single person in America died in a traffic crash.

How can that be? The United States' population has exceeded 400 million. The demand for mobility has increased with the population and improved access to transportation, especially for groups that previously had limited mobility options.

It's thanks to some amazing strides we've made since the 2010s in several different areas. Nearly all vehicles, including motorcycles, now have high levels of vehicle automation, whether they are self-driving or human-driven. Almost all cars now brake automatically, warn drivers about objects in their blind spots, park themselves, adjust their speed, and stay in their lanes. While crashes still happen, there are many fewer of them.

In 2050, those crashes are less severe, in part because of changes to how we build roads. Roadways are designed to reduce speed in safety-critical areas and lessen the chances of the most severe crash types, such as head-on collisions, while allowing faster travel in areas that are safer and where there are few potential conflicts among vehicles or between vehicles and pedestrians or cyclists. Over the past decades, planners and engineers have prioritized changes to the highest-risk roads, which are identified by collecting and analyzing detailed data.
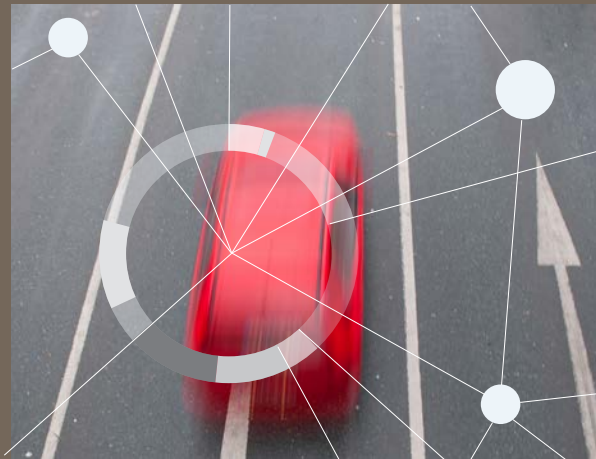
Roadway design has also evolved, becoming entirely performance-based, resulting in more-innovative configurations leading to improved safety. Techniques that are routine in 2050 include physical separation of opposing traffic lanes, safer pavements that eliminate edge drop-offs, and surfaces that help prevent skidding. The United States has been using these techniques to build new roads and redesign or retrofit existing ones for several decades now, allowing vehicles, bicyclists, and pedestrians to share the road more safely.

Remote rural roads are still more hazardous—they always have been—but safety technologies are particularly effective in preventing the most dangerous rural crashes, such as head-on collisions and single-vehicle run-off-the-road crashes. Safety on rural roads, where emergency response times are higher than on city streets, has been further enhanced by improvements in trauma care, including increased investment in emergency response, together with enhanced connectivity for faster crash notification, improved injury prediction, better communication with 911 and first responders, and more-effective emergency medical care.

Improvements in digital infrastructure in rural areas, together with widespread adoption of vehicle-to-vehicle communication, have also meant reductions in crashes, because vehicles can share safety information with one another and with their environment and use this information to avoid collisions. Although the safety gap between rural and urban areas has not quite closed, thanks to technology, it is narrower now than ever.

Given that it's impossible to eliminate human error entirely, planners and engineers began thinking of ways to design roads and vehicles to accommodate human error to make the entire system safer.

The safety effects of these changes have been extended by policies and practices that protect the most-vulnerable road users and incentivize safe driving and adoption of advanced safety technology. Reducing speeds in cities has helped reduce pedestrian and cyclist deaths. Insurance companies have incentivized use of automated vehicles, especially by high-risk drivers. Some cities and companies that manage a variety of mobility options through a single account—"mobility services"—have made it easy to get around without having to drive, and they have been early adopters of advanced safety technology.

A wide variety of groups involved with traffic safety committed to implementing evidence-based safety measures and began adopting a "Safe System" approach in the first decades of the 21st century. This turned the traditional thinking about safety on its head—instead of seeing humans as the offenders, responsible for most crashes because of their bad habits, planners and engineers began thinking that the system itself needs to be safe.

Other techniques that are now routine include physical separation of opposing traffic lanes, safer pavements that eliminate edge drop-offs, and surfaces that help prevent skidding.

Given that it's impossible to eliminate human error entirely, planners and engineers began thinking of ways to design roads and vehicles to accommodate human error to make the entire system safer. This was paired with efforts toward creating a "safety culture" that emphasizes the value of safety in every decision made by every person. Safety has become a shared responsibility among those who use the system and those who design and operate the system. A whole generation is now using these approaches.

In 2050, businesses are investing in safety and sharing in the benefits of healthier employees and a more supportive community. Innovative finance methods, such as social impact bonds that pay investors for positive outcomes, have created opportunities for large-scale renewal and improvement projects. Other forms of public-private collaborations—not unlike the push for electrification of rural areas in the early 20th century—have helped upgrade safety in rural areas.

As the number of crashes began to fall, individual attitudes about road safety and personal responsibility changed substantially. In much the same way that people changed their minds about alcohol-impaired driving in the 1980s and 1990s, drivers in 2050 feel that their communities expect them to comply with speed limits and to not drive distracted. Widespread community road-safety action programs have connected individuals with the larger movement and resulted in a further dramatic advance in norms and social expectations—for example, that nobody drives impaired and everybody wears a seat belt.

Eliminating roadway deaths has lifted Americans' quality of life in very obvious ways. On an individual level, parents no longer worry about teens driving, adults don't fret about "taking the keys away" from an aging mom or dad, and people going home after a night on the town call an automated vehicle to drive them home. On the broader level, the financial effects and time savings are considerable. In 2010, it was estimated that crashes cost the U.S economy roughly $835 billion, and there were 15,000 crashes per day. Now, 40 years later, police and emergency responders can shift attention to other needs, states and insurance companies can spend less on medical expenses, and the federal government can spend less on disability payments. Reaching zero fatalities on our roadways is a crusade that was once thought quixotic, but it's the world of 2050.

Why zero?
Is this really
possible?

Back in the world of 2018, the idea of a future with literally zero roadway deaths seems like a pipe dream. Roadway deaths—deaths due to traffic crashes—have been increasing, not decreasing, over the past two years. In 2016, more than 37,000 Americans died on the roads—5,000 more people than died in 2011.

The United States has made good progress in road safety over the long run, despite this recent backsliding, but incremental progress is no longer acceptable given the increasingly rapid advances in technology and the wealth of knowledge about how to prevent crashes. Inspired by the goals and progress in other countries, the broader traffic safety community is now working together to achieve a common vision—that by 2050, nobody would be killed in a traffic crash on U.S. roads.

Why zero? That raises the question, "What level of death on the roads should we as a society accept?" How many of our own family members, classmates, neighbors, or people in our community losing their lives to crashes would be considered an appropriate number? These deaths are preventable—the safety community deliberately calls them *crashes*, not *accidents*, for this very reason. *Accident* implies unforeseeable circumstances or a twist of fate, but crashes can be prevented. The number of roadway deaths has long been accepted as a "price" of mobility, but 37,000 deaths is more than 100 Americans killed per day. Imagine the outcry if plane crashes or natural disasters killed 100 Americans every day.
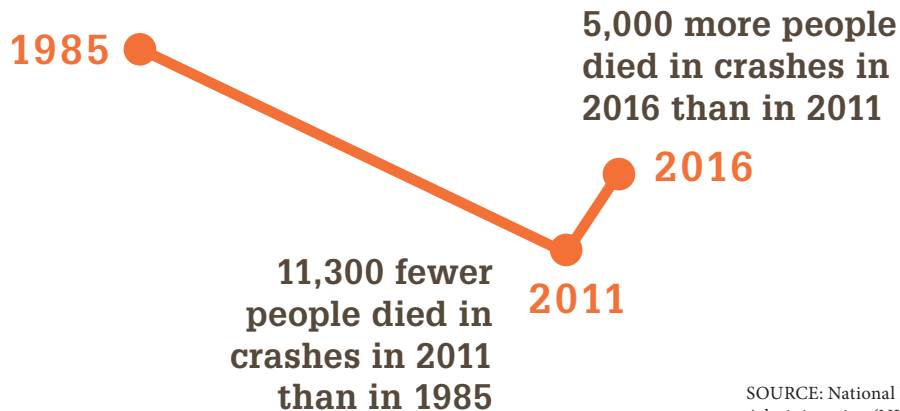
As to whether this is possible, the country has seen enormous improvements in safety in other areas. As of 2017, no commercial U.S. airline passenger flight has had a fatal crash since 2009, thanks in large part to a collaborative government/industry safety management system. The number of people who smoke has fallen by more than half in 50 years, thanks to education campaigns and laws limiting where people can smoke.

In addition, the experiences of other high-income countries show that more-significant change is feasible. In 2013, the U.S. roadway death rate was more than twice the average of other high-income countries, and almost all of those countries have seen greater improvement than the United States over the past two decades. Sweden, where the idea of Vision Zero began, has seen declines in its crash death rates of 50 percent or more, using the Safe System approach. A number of U.S. states and cities have also embraced this Vision Zero strategy.

While it will take a generation, the success of other countries and some U.S. cities demonstrates that a combination of approaches makes this an achievable goal.

Why zero? That raises the question, "What level of death on the roads should we as a society accept?"

Decades-long progress in reducing roadway deaths has begun reversing in the past five years

1985

5,000 more people died in crashes in 2016 than in 2011

2016

11,300 fewer people died in crashes in 2011 than in 1985

2011

SOURCE: National Highway Traffic Safety Administration (NHTSA), Fatality Analysis Reporting System (FARS).

The urgency: Roadway deaths are moving in the wrong direction

The more than 37,000 people killed in crashes in 2016 represent a troubling reversal in previous progress. For the past several decades, all the important measures of roadway deaths—the total number, the number per population, the number per miles driven—were going down as a result of several factors, including changes in driving patterns, increased seat belt use, improvements in vehicle design, more-forgiving roadway designs, and stronger graduated driver's licensing programs for teen drivers. After reaching an all-time low in 2011, these trends began reversing in 2015, and got even worse in 2016. **The figure, above,** shows the extent of the problem.

Proportion of roadway deaths relative to proportion of population[*]

19%	**14%**
Older teens/young adults	
71%	**49%**
Men	
49%	**19%**
People in rural areas	
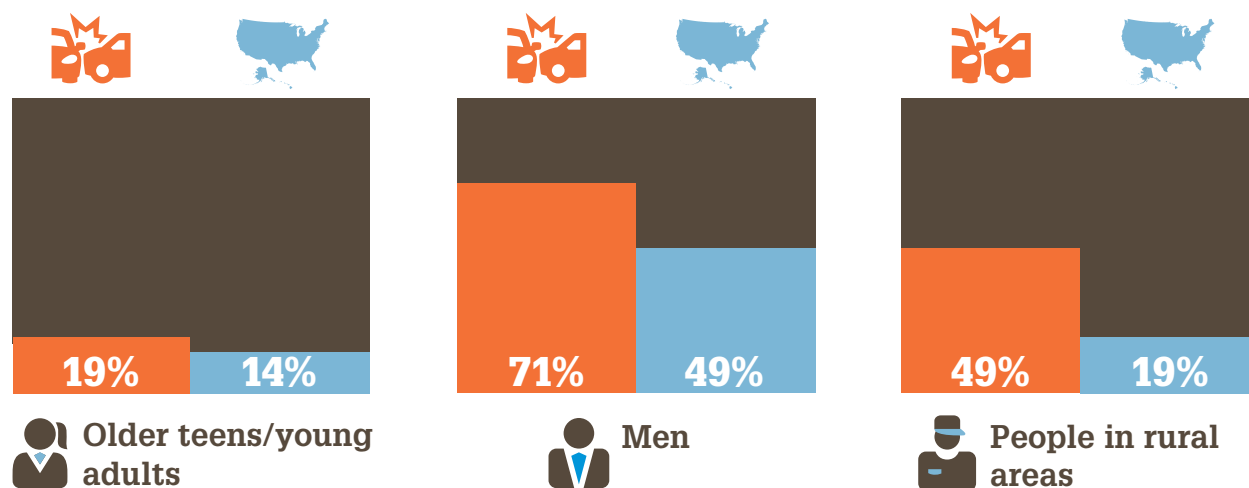
We know who is dying and why

Who dies on U.S. roads, and why? While crashes affect every state, type of road user, and demographic group, three groups are more frequently affected than others:

Young people are affected disproportionately, as crashes are the leading cause of death for people age 15 to 24. Because so many victims are young, crashes are also a leading cause of years of life lost—that is, the number of years people would have lived had they not died of an illness or injury. Crash risks for teen drivers are higher than for any other age group.

Men die more often in crashes than women, in all categories of crashes; 71 percent of people killed in crashes are men. By crash type, the percentage of fatalities that are men ranges from 49 percent of car passenger deaths to 99 percent of large truck deaths.

Rural road users are disproportionately affected as well. In 2015, an estimated 19 percent of the U.S. population lived in rural areas, yet almost half of roadway deaths occurred on rural roads. Rural roads are more dangerous than urban ones; for the same number of miles driven, more than twice as many people die in rural areas.

The figure, above, shows these comparisons.

While not a demographic category, pedestrian risk has increased dramatically in recent years. Of the 5,000 more people who died in motor vehicle crashes in 2016 than in 2011, 1,500 were pedestrians. In 2015, pedestrian deaths accounted for 15 percent of all traffic fatalities, and about three-quarters of pedestrian deaths occurred in urban areas.

We can classify the reasons that people die in car crashes in three ways.

1. What causes the crash

Crashes stem from many factors. A main one is that current vehicle and roadway designs require that drivers be constantly alert and vigilant. However, drivers predictably become distracted, inattentive, tired, or otherwise impaired. This misalignment between human behavior and system design underlies the great majority of fatal crashes.

2. Who survives the crash

Many factors determine crash survival. The presence and use of safety features in cars—seat belts, airbags, improved door locks, and many others—are responsible for saving tens of thousands of lives each year. Roadside safety hardware, such as breakaway sign poles and smoother redirecting guardrails, makes crash outcomes less severe. Occupants that buckle up are more likely to survive crashes. Motorcycle helmets save lives as well. Speed is also an important factor in surviving a crash, whether inside or outside the vehicle—the lower the speed, the less severe the outcomes.

3. Who gets medical treatment

Of all crash fatalities, about half survive the initial crash but later die from their injuries. Enhanced emergency medical personnel capabilities, use of a medical helicopter, and reaching an appropriate trauma center can improve crash survival.

We know how to reduce roadway deaths

The substantial improvements in road safety that the United States has seen over the past several decades can be attributed to many factors. One is better vehicle technologies developed by automakers, better in terms of avoiding crashes and protecting those in the vehicle—such technologies save 27,000 lives every year. Technologies such as airbags and electronic stability control are already standard, but advanced driver assistance systems (ADAS), such as automatic emergency braking, blind spot monitoring, and lane departure warning, are being offered on more and more vehicles.

Another factor involves the ways in which roads are designed and constructed to increase road safety. In more-rural areas, these include designs for roadsides that reduce the number of obstacles that cars could strike if they run off the roads, pavements that reduce skidding, and increased use of rumble strips, crash cushions, and guardrails. In more-urban areas, they include designs for urban intersections that reduce the speed of turning cars, broad use of roundabouts to bring down vehicle speeds in intersections, and shorter pedestrian crossing distances that make it safer and easier for people to cross busy streets.

Credit is also due to a wide range of safety experts: engineers, researchers, and public safety and public health professionals who have garnered extensive evidence on which countermeasures are most effective. Strong leadership from safety-minded policymakers at the local, state, and federal levels has resulted in the adoption of laws, regulations, and funding for effective policies. Examples of effective policies include increasing the minimum drinking age from 18 to 21 years old and reducing the legal blood alcohol level to 0.08 percent. When coupled with education and enforcement, such policies cut the number of alcohol-impaired driving deaths by half. The enactment and enforcement of mandatory seat belt use laws in nearly every state have increased seat belt use from less than 20 percent to 90 percent.

Further safety gains can be made with current safety approaches, as some of the most effective policies have not been used to their full potential. However, with 260 million registered vehicles, 215 million drivers, 4 million miles of roads, and steadily increasing annual vehicle mileage, the cumulative risk on U.S. roadways will outpace past and current countermeasures unless we double down on our efforts.

In recent years, more attention has been given to two fundamental concepts, *safety culture* and the *Safe Systems* approach.

In recent years, more attention has been given to two fundamental concepts, *safety culture* and the *Safe Systems* approach. Safety culture is the broad set of attitudes and beliefs that underlie people's decisions. Safety culture affects judgment about priorities in individual behavior and support for collective decisions about what is most important

Vision Zero begins with a commitment to focus on the changes necessary to eliminate roadway deaths rather than being satisfied with incremental progress, and goes on to include the creation of a transportation system that accommodates predictable human error without resulting in roadway deaths.

in our communities. Getting to zero deaths will involve countless individual and collective decisions, and a strong safety culture is an essential prerequisite.

The Safe System approach is integral to the Vision Zero movement that started in Sweden in the 1990s and began spreading to the United States a decade later. Vision Zero begins with a commitment to focus on the changes necessary to eliminate roadway deaths rather than being satisfied with incremental progress, and goes on to include the creation of a transportation system that accommodates predictable human error without resulting in roadway deaths.

In the United States, the *Toward Zero Deaths National Strategy* was launched in 2014, adopting the zero-focused imperative along with a strong commitment to creating a safety culture, and the strategy has since been adopted by many states. More recently, a number of U.S. cities have adopted the Vision Zero approach with particular dedication to building a Safe System.

Both the safety culture and Safe System movements are potentially powerful tools for achieving the changes needed to reach zero roadway deaths.
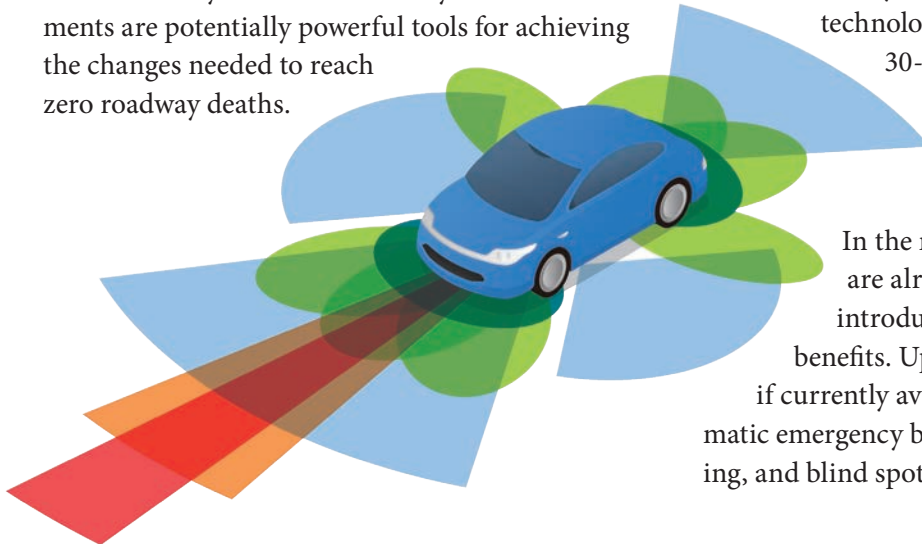
With the right policies, technologies, and strategy, we could prevent all roadway deaths

From 1985 to 2011, roadway deaths per 100,000 population declined in the United States by more than 40 percent, and deaths per mile traveled by more than half. What would it take to eliminate roadway deaths altogether?

We know that full deployment of the most-effective safety policies, including laws and enforcement, can reduce roadway deaths. But so far, the combined potential of all our safety efforts has not been sufficient to achieve zero roadway deaths. However, that situation is changing with the emergence of advanced vehicle technology: For the first time, achieving zero road deaths by 2050 seems feasible. Advanced technology could close the gap in a 30-year period, but it must be supported by policies and programs that are known to be proven effective.

In the near term, technologies that are already in production or nearing introduction promise dramatic safety benefits. Up to 10,000 lives could be saved if currently available ADAS, such as automatic emergency braking, lane departure warning, and blind spot detection systems, were fully

effective and on every vehicle. Passive alcohol impairment detection systems, such as the Driver Alcohol Detection System for Safety (DADSS), could save more than 7,000 lives annually if all cars were so equipped.

In the longer term, when vehicles with high levels of automation are fully developed, self-driving systems promise to have a tremendous impact on safety. Automated vehicles are not likely to have reached their full potential by 2050, but they are very likely to provide a significant safety benefit. Because cars today are lasting longer than ever before—the average age of a passenger car is 11.5 years—full fleet penetration will take decades.

While preventing crashes is the highest priority, improving post-crash response also represents a significant opportunity for saving lives. Twenty percent of trauma deaths could be prevented with optimal trauma care. Improved trauma care will be essential in addressing both fatalities and severe injuries in motor vehicle crashes.

Reducing roadway deaths to zero in 30 years is feasible. It could be achieved by doubling down on efforts to deploy the safety and medical approaches now available, accelerating the implementation of advanced technologies, and prioritizing safety in both individual and collective decisions.

The Road to Zero Coalition has taken on this challenge

The Road to Zero Coalition was established by assembling a wide-ranging group of stakeholders to provide a major push to achieve zero roadway deaths. This is the largest and broadest coalition that has ever focused on roadway safety in the United States. The RTZ Coalition was launched in 2016 in reaction to sharp increases in roadway deaths and has brought together more than 650 professional associations, businesses and industry associations, safety groups, government agencies, and nonprofit organizations. With a clear, compelling, and unifying vision, the RTZ Coalition is a powerful force for change.

The National Safety Council commissioned the RAND Corporation to develop a process for the RTZ Coalition to create an overall vision and strategy to reach zero deaths. The process included convening three intensive workshops in 2017 to bring together disparate stakeholders to discuss vision, goals, obstacles, approaches, strategies, tactics, and ultimately a scenario of how zero deaths could be achieved by 2050 and what that future might look like. *The Road to Zero: A Vision for Achieving Zero Roadway Deaths by 2050* is the result of that process. While the report describes one of potentially many scenarios, it incorporates the perspectives and suggestions of a wide variety of road safety stakeholders.

The Road to Zero Coalition was established by assembling a wide-ranging group of stakeholders to provide a major push **to achieve zero roadway deaths.** This is the largest and broadest coalition that has ever focused on roadway safety in the United States.

The overall strategy combines three approaches

To reach zero, the RTZ Coalition determined that three interrelated approaches are needed:

1. Double Down on What Works.

The United States has both an accumulated body of evidence-based countermeasures and a well-established network of experts who can deploy them. The RTZ Coalition envisions engaging political leaders and decisionmakers to support policies and identify new or shared resources for research, roadway design and construction, vehicle engineering, law enforcement, consumer education, and trauma care. Because motor vehicle crashes represent the single largest cause of workplace fatalities, the coalition will look to establish partnerships with businesses at the state and community levels as an important source of new energy for such change.

2. Accelerate Advanced Technology.

Existing and emerging technologies promise large advances in safety. ADAS—such as automatic emergency braking, adaptive cruise control, and lane-keeping—are already being introduced into the fleet. Each year, these technologies are offered on a greater number of new vehicles and their safety performance improves. The rate of technology development, both in vehicle systems and in overall connectivity, is expected to increase rapidly. To accelerate the deployment of these vehicle and infrastructure technologies and maximize their potential reach in a 30-year time-frame, the RTZ Coalition envisions new partnerships among manufacturers, technology providers, emergency medical and trauma systems, public safety/health groups, and the public sector to identify and prioritize safety applications and opportunities, to evaluate safety benefits, and to increase consumer interest and adoption through education and incentives.
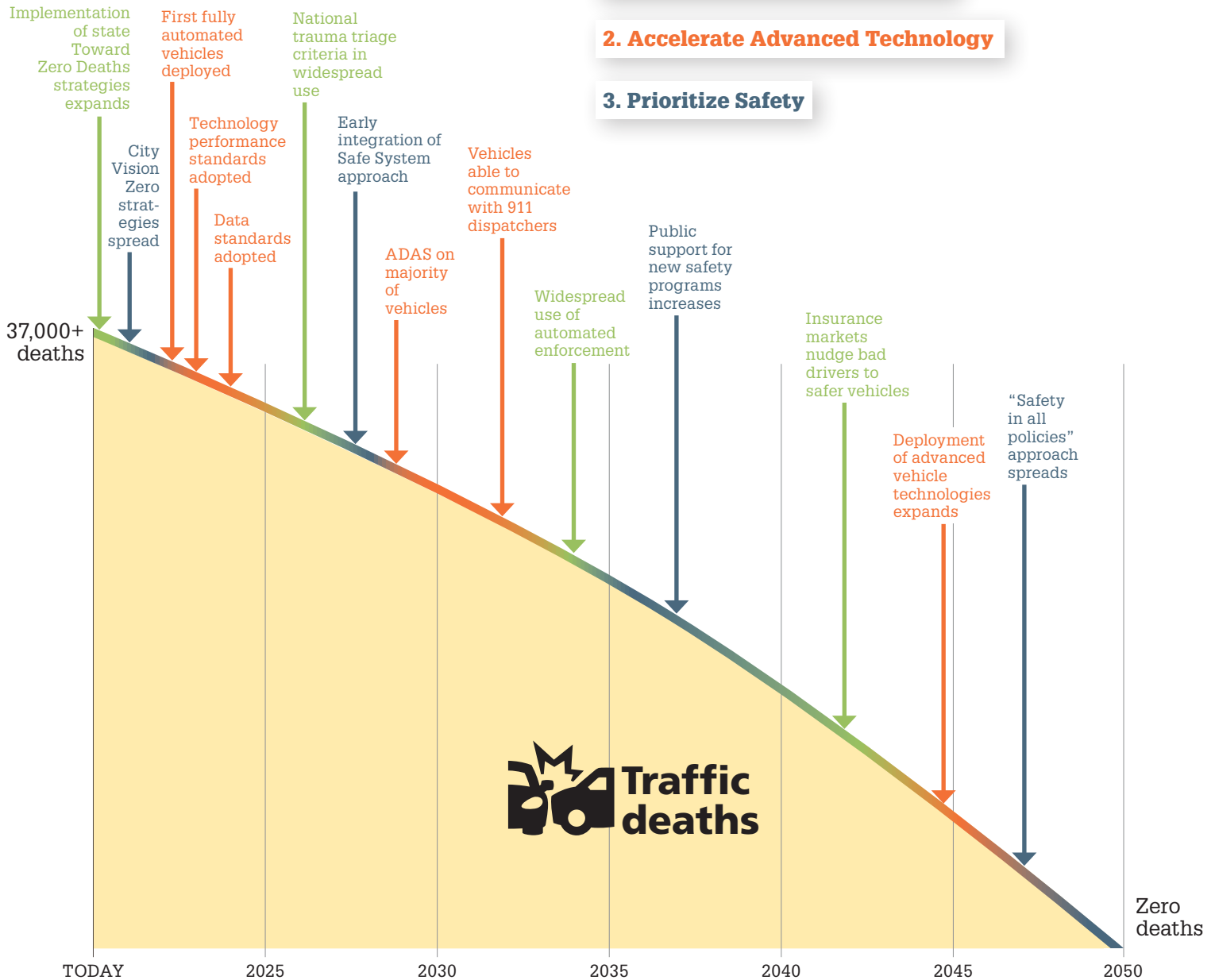
3. Prioritize Safety.

The third approach focuses on methods to facilitate change. Key among these are creating a safety culture and adopting a Safe System approach. A pervasive safety culture is an essential ingredient for reaching zero roadway deaths and can be nurtured through awareness, education, and constant reinforcement. Safety needs to be among the highest priorities in decisions ranging from where to cross the street to where to devote federal funds. There are many opportunities to nurture a safety culture. For example, fostering development of community road safety action programs may prove effective in engaging citizens, corporations, and governments and changing social norms. Adopting the Safe System approach involves a fundamental shift from the common assumption that crashes generally happen because of people's behavior. Instead, a Safe System approach assumes that people will occasionally, but inevitably, make mistakes behind the wheel and that the overall transportation system should be designed to be forgiving so that these mistakes do not lead to fatal outcomes. The Safe System approach also involves commitment to analyze safety problems, identify changes that bring the best return on investment, and implement these improvements throughout the system to prevent further occurrences.

Three approaches working together to reduce roadway deaths to zero

1. Double Down on What Works

2. Accelerate Advanced Technology

3. Prioritize Safety

Implementation of state Toward Zero Deaths strategies expands

First fully automated vehicles deployed

National trauma triage criteria in widespread use

City Vision Zero strategies spread

Technology performance standards adopted

Early integration of Safe System approach

Vehicles able to communicate with 911 dispatchers

Data standards adopted

ADAS on majority of vehicles

Public support for new safety programs increases

Widespread use of automated enforcement

Insurance markets nudge bad drivers to safer vehicles

Deployment of advanced vehicle technologies expands

"Safety in all policies" approach spreads

37,000+ deaths

Traffic deaths

Zero deaths

TODAY   2025   2030   2035   2040   2045   2050

These three approaches are essential and inter-connected; none of the three will work effectively independent of the others. They are complementary, mutually dependent, and synergistic. (**See figure on page 15.**) For example, a growing safety culture will foster safe behaviors, such as driving sober and within the speed limit, and create a strong market for advanced safety technologies (including automated vehicles). As people become accustomed to the safety benefits of advanced technology and improved roads, they will become less tolerant of risky behavior and more supportive of the changes needed to build a Safe System. The effect of each change is intertwined with the others and mutually supportive—a "virtuous cycle."

These three approaches are essential and interconnected; none of the three will work effectively independent of the others. They are complementary, mutually dependent, and synergistic.
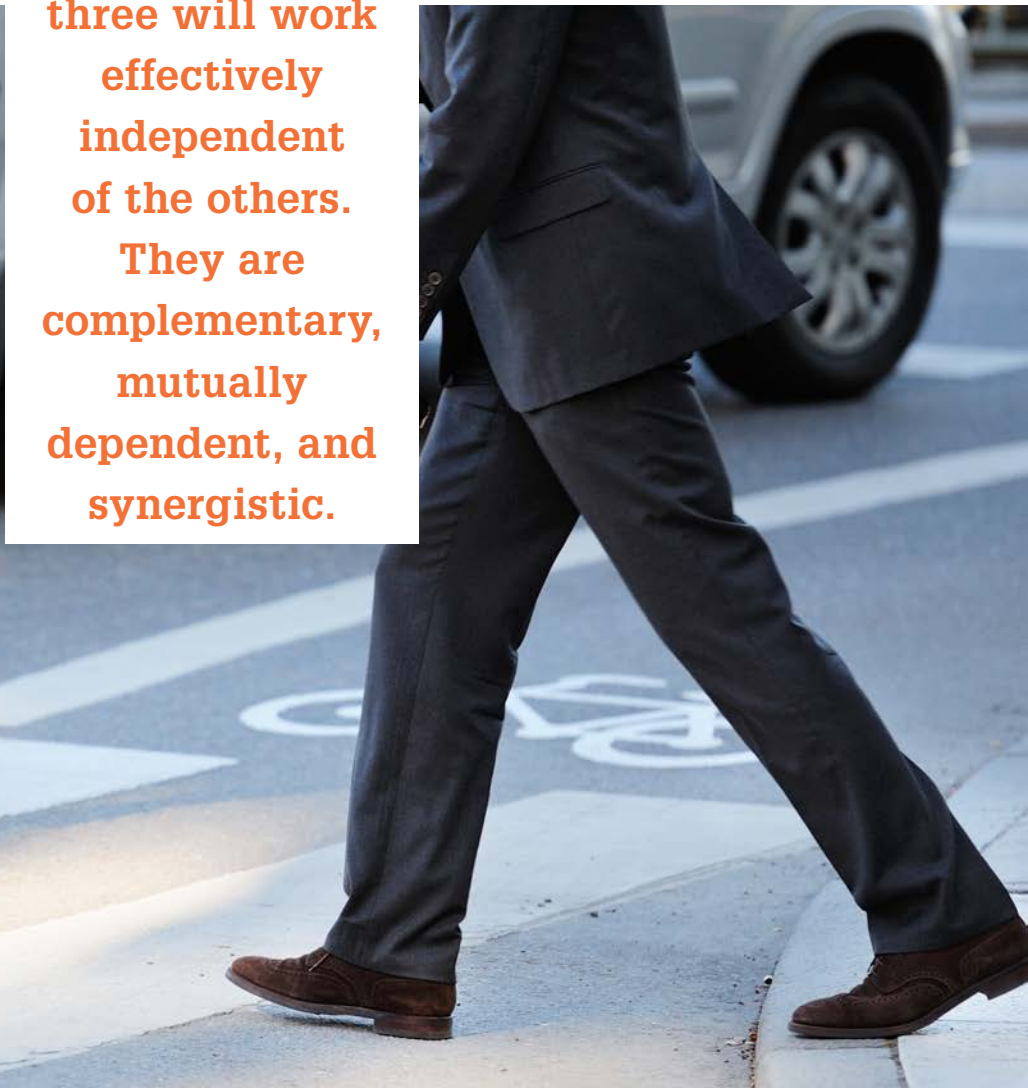
Actions taken now can lay the groundwork

Each of the actions listed below will further the goal of reaching zero roadway deaths. These actions can be championed by members of the RTZ Coalition and others who are dedicated to eliminating preventable deaths on our roadways. Although traveling the full length of the Road to Zero will take time, a number of short- and mid-term actions will show immediate benefit and build momentum toward zero deaths. The strength of this movement is in the diversity of partners and in their dedication to working individually and collectively to overcome the persistent social burden of roadway death and injury.

Federal officials:

Provide leadership that prioritizes achieving zero roadway fatalities by 2050.

Promote and support best practices that reduce roadway fatalities, particularly those identified in the *Toward Zero Deaths National Strategy*.

Encourage consistent adoption of safety policies and practices where essential for efficiency and interoperability.

Encourage public-private partnerships at the state and city levels to address local safety problems.

Work with industry to facilitate the development and safe deployment of advanced safety technologies, such as the public-private partnership that is developing the DADSS technology.

Use incentives and standards as appropriate to accelerate effective safety technology into the market.

Support new methods for achieving change, including promotion of a safety culture, support for the Safe System approach and Vision Zero principles, public-private partnerships, and innovative funding strategies such as social impact bonds.

Support efforts to achieve safety goals in rural areas.

Explore opportunities to align safety and research and development funding with state and local needs and improve return on investment.

Partner with industry and other stakeholders to develop platforms and systems to collect and analyze data that will generate the information needed to target safety interventions.

Assess strategies for improving vehicle safety, including partnerships and incentives as well as regulation.

Encourage consumer education to accelerate adoption of vehicle safety technologies.

State and local officials:

Provide leadership that prioritizes achieving zero roadway fatalities by 2050.

Commit to adopting best practices in safety laws, programs, and other investments, particularly those identified in the *Toward Zero Deaths National Strategy*.

Provide leadership and guidance for creating a safety culture and advancing Safe System and Vision Zero principles in government, industry, and communities.

Enact and provide adequate resources for the enforcement of strong traffic safety laws.

Coordinate efforts to ensure consistent state-to-state approaches to deploying automated vehicles in traffic.

Work with business to identify priority safety needs, support new policies, and align resources.

Incorporate Safe System principles to identify problems, allocate resources and develop policies, and adjust policies as necessary to accommodate important Safe Systems changes, such as adjustments in speed limits.

Take advantage of evidence-based safety and trauma care methods, such as those identified in recent national reports.

Consider consumer education and other incentives to accelerate adoption of advanced vehicle safety technologies.

Take advantage of financial incentives provided at the federal level.
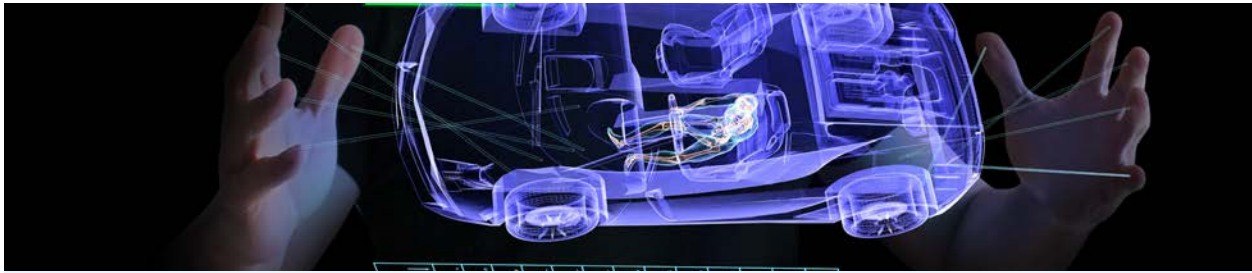
Take more ownership of safety issues that can be addressed at the state level.

Examine insurance laws to enhance data sharing and permit risk-based pricing where appropriate.

Auto manufacturers and technology developers:

Work with stakeholders to identify priority safety needs and accelerate widespread adoption of the most-promising life-saving technologies as quickly as possible.

Work with governments and other stakeholders on adoption of the Safe System approach and promotion of a strong safety culture.

Participate in efforts to improve data sharing, while enhancing privacy and cybersecurity for the common benefits of product development and research.

Work with stakeholders to educate consumers about the safety benefits and the safe use of advanced technologies.

Continue investing in emerging safety technology research.

Address vulnerable road users in safety research and design.

Emergency medicine and trauma academics, practitioners, and advocates:

Prioritize investment in trauma system needs and identify methods with greatest return on investment, especially for rural areas.

Work with local and state governments to prioritize trauma system investments and improve trauma care.

Participate in forums about data and emergency communications.

Adopt national trauma triage criteria for crash victims.

Collaborate with government and business on adopting the Safe System approach and promoting a strong safety culture.

Safety researchers and advocates:

Educate policymakers at the local, state, and federal levels about the potential of dramatic reductions in motor vehicle deaths and opportunities for change, and when appropriate, urge the adoption of strong laws and regulations.

Educate consumers about the far-reaching effects of traffic crashes, injuries, and deaths, and about the potential for change.

Educate professionals who are engaged in managing the transportation system about the need for a safety culture and the Safe System approach.

Encourage adoption of the safety laws and programs and initiatives identified in the *Toward Zero Deaths National Strategy*.

Coordinate with other advocacy groups and stakeholders on major safety campaigns.

Develop partnerships with industry groups on issues of common interest.

Continue research into evidence-based countermeasures that will reduce crashes and their severity.

Business community and fleet owners:

Work with local and state governments to utilize the full range of data sources to identify regional safety problems, select solutions, and create change.

Adopt and enhance safety policies for employees and fleets.

Adopt and maintain a strong safety culture.

Demonstrate new technologies and increase consumer interest and acceptance through early adoption.

Insurance companies:

Work with governments and industry to create a strong safety culture and support implementation of the Safe System approach.

Participate in forums about data sharing and protecting consumer privacy.

Educate consumers about the need for improved safety laws and programs, as well as the benefits of advanced safety technologies.

With better streams of data and regulatory flexibility, differentiate individual drivers and vehicles more precisely and tailor incentives accordingly.

Law enforcement and judicial system:

Enhance enforcement of existing and new safety laws.

Participate with local leaders in supporting the safety initiatives identified in the *Toward Zero Deaths National Strategy* and in local Vision Zero efforts.

Incorporate the latest standardized crash reporting protocols and share data as possible with other city, state, and federal agencies.

RTZ Coalition Steering Group

Jackie Gillan and Allison Kennedy, **Advocates for Highway and Auto Safety**

Ian Grossman, **American Association of Motor Vehicle Administrators**

King Gee and Kelly Hardy, **American Association of State Highway and Transportation Officials**

Jill Ingrassia and Jennifer Ryan, **American Automobile Association**

John Bozzella and Paul Scullion, **Association of Global Automakers, Inc.**

Collin Mooney and Adrienne Gildea, **Commercial Vehicle Safety Alliance**

Jonathan Adkins and Russ Martin, **Governors Highway Safety Association**

Jeffrey Paniati and Jeff Lindley, **Institute of Transportation Engineers**

Adrian Lund and Jessica Cicchino, **Insurance Institute for Highway Safety**

Catherine McCullough, **Intelligent Car Coalition**

Domingo Herraiz and Jennifer Rolfe, **International Association of Chiefs of Police**

Debbie Weir and J. T. Griffin, **Mothers Against Drunk Driving**

Linda Bailey, **National Association of City Transportation Officials**

Brian Roberts, **National Association of County Engineers**

Dia Gainor, **National Association of State Emergency Medical Service Officials**

Deborah A. P. Hersman, **National Safety Council**

Leah Shahum, **Vision Zero Network**

Imagine that, in 2050, not a single person in the United States dies in a traffic crash. This report describes how changes in policy, technology, and social norms can substantially improve road safety, and the steps that can be taken to set the United States on the road to zero deaths from traffic crashes by 2050.

$18.00

JUSTICE, INFRASTRUCTURE, AND ENVIRONMENT

RR-2333/1-NSC