



CENTER FOR
AUTOMOTIVE
RESEARCH

Behavioral Safety: A Global Benchmark to Inform U.S. Policy, Enforcement, and Public Awareness

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About the Authors

The Center for Automotive Research (CAR) is an independent, non-profit organization conducting industry-driven research and analysis. Focusing on critical areas including Technology & Manufacturing, Energy & Sustainability, and Labor, Economics, & Policy, CAR has been a trusted resource for the automotive industry for over twenty years.

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CAR's mission is to inform and advise through independent research, education, and dialogue, enabling a more viable and sustainable automotive ecosystem.

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Overview

The Center for Automotive Research (CAR), in collaboration with the Alliance for Automotive Innovation (AAI), undertook an initiative to examine and compare domestic and international crash outcomes, policies, and enforcement methods related to safe driving. This work is intended to identify differences between road safety outcomes related to behavioral safety factors, including impaired driving, risky driving, and safety device misuse.

To deliver actionable insights regarding domestic policy related to motor vehicle behavioral safety, CAR is implementing a four-part study:

1. *Examine domestic and international crash outcomes related to behavioral factors*

CAR examined and compared crash outcomes (focusing on road fatalities and fatal crashes), alcohol and drug-impaired fatalities, speeding-related fatalities, unrestrained occupant fatalities, and fatigue-related fatalities between the United States and select countries (e.g., Australia, Canada, France, Germany, Japan, and South Korea).

2. *Compare domestic and international behavioral safety policies, enforcement methods, and effectiveness*

This analysis focused on the relationship between policies, law enforcement methods, and reductions in crashes linked to risky and impaired driving in the U.S. and select countries.

3. *Compare and synthesize driving outcomes, policies, and effectiveness within U.S. states related to behavioral safety*

This assessment took a deeper look at driving outcomes and interventions within leading and lagging states to identify specific policies and enforcement methods that may be most effective in reducing risky and impaired driving fatalities.

4. *Countermeasure effectiveness and opportunities for U.S. policy, enforcement, and public awareness*

This analysis synthesizes the learnings from the three previous assessments to highlight the impact of policies and enforcement methods on risky and impaired driving outcomes and identify differences between domestic and international approaches. This report offers insights regarding potential opportunities to build upon or revise domestic policies and enforcement methods related to behavioral safety and address the increasing complexity of risky and impaired driving behaviors.

Countermeasure effectiveness and opportunities for U.S. policy, enforcement, and public awareness

Understanding the underlying reasons for motor vehicle fatalities is an ongoing and complex challenge. Road safety and driver safety are impacted by multiple interactive factors including road conditions, frequency of driving, number of vehicles on the road, and a myriad of human behavioral factors related to safely operating a vehicle, complying with traffic laws, and avoiding impaired driving. Given that reducing road fatalities continues to be an important objective for national and regional governments as well as a societal imperative, it is key to explore the reasons for road fatalities and utilize learnings from different countries that reveal the most effective approaches to increasing road safety.

In alignment with these goals, CAR completed a four-part study to examine behavioral safety factors related to fatal crashes and road safety policies by reviewing public data sources related to risky driving behaviors, policies, enforcement methods, and effectiveness in the United States and a select group of peer nations for a comparative benchmarking analysis.

The following review synthesizes CAR's analysis of U.S. and peer nation motor vehicle fatalities, along with the national policies, legislation, enforcement, and public awareness approaches utilized by six peer nations (Australia, Canada, France, Germany, Japan, and South Korea). CAR compared these approaches in conjunction with a review of motor vehicle fatality rates associated with risky and impaired driving factors including speeding, unrestrained occupants, alcohol-impaired driving, drug-impaired driving, and drowsy driving. A further review of leading and lagging U.S. states based on their relative standing for motor vehicle fatality rates examined the effectiveness of diverse countermeasure approaches using policy, enforcement, and public awareness campaigns to eliminate risky and impaired driving behaviors. Finally, this assessment synthesizes the learnings from domestic and international benchmarking and provides data-driven insights about potential opportunities for domestic legislation, enforcement, and public awareness campaigns to reduce and eliminate risky and impaired driving fatalities.

Methodological Approach

This analysis utilized public data sources from each of the following seven countries: the United States, Australia, Canada, France, Germany, Japan, and South Korea. Following a collection of data sources from the United States and these six peer nations, it was possible to identify similar and diverse methods for reporting motor vehicle fatalities and provided a clear understanding as to any data limitations that need to be considered when examining national trends as well as national comparisons of motor vehicle outcomes.

For each country included in the comparative analysis, we provide the following information.

Motor vehicle fatalities and fatal crash rates

This report focuses on motor vehicle fatalities due to the importance of fatalities as a metric for road safety. Focusing on fatalities without including other motor vehicle injuries enabled more consistent benchmarking across multiple jurisdictions, countries, and reporting methods.

Crash Rates and Standardization

Motor vehicle fatalities were derived and examined using the following metrics, unstandardized annual fatalities, fatality rates (standardized per 100 million vehicle miles traveled (100 M VMT) and fatality rates per capita), and shares of total fatalities to provide comparisons among national metrics and state-level reports.

Behavioral Safety Factors

Fatalities and fatal crash data are reported for overall motor vehicle fatalities and fatal crashes, along with the following behavioral factors related to risky and impaired driving:

- Speeding-related fatalities and fatal crashes
- Unrestrained occupant-related fatalities and fatal crashes
- Alcohol-related fatalities and fatal crashes
- Drug-related fatalities and fatal crashes
- Fatigue-related fatalities and fatal crashes

Domestic and International Benchmarking Comparisons

Australia, Canada, France, Germany, Japan, and South Korea. Analysis focused on differences between the U.S. and each country, as well as the average of the six peer nations, as data were available. Data were available from each country for an initial range of eight years, spanning from 2016 to 2023, aligning with available data from NHTSA's FARS database. When possible, data beginning from 2000 were obtained for long-term trend observations, including years that specific laws were enacted, including domestic speed limit and seat belt legislation.

In addition to the domestic and international comparisons between fatality trends at the national level, this analysis examined a subset of U.S. states selected based on their fatality rates. These states were taken from the upper and lower ranges of the national distribution and included in each comparison. Six states were chosen for each type of risky and impaired driving factor, and these states varied for each factor. While the performance of these states was one element for inclusion as a leading or lagging state, states were also included based on distinguishing factors such as different laws, enforcement, and public awareness approaches.

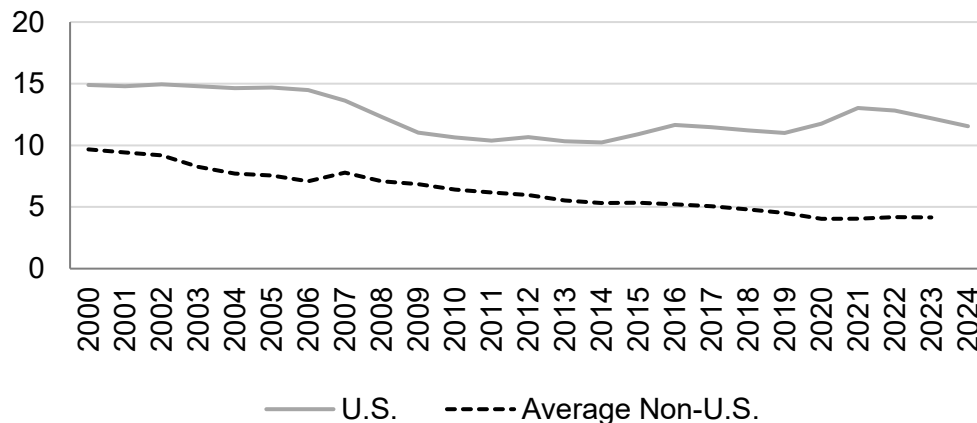
Benchmarking included a review of the annual trends of fatalities between nations and states, examining the magnitude of change in relation to specific legislation, enforcement, and public awareness efforts. National and state data comparisons were based on percent change in fatality rates, standardized by distance traveled, population, or as shares of total motor vehicle fatalities.

Domestic and International Motor Vehicle Fatalities

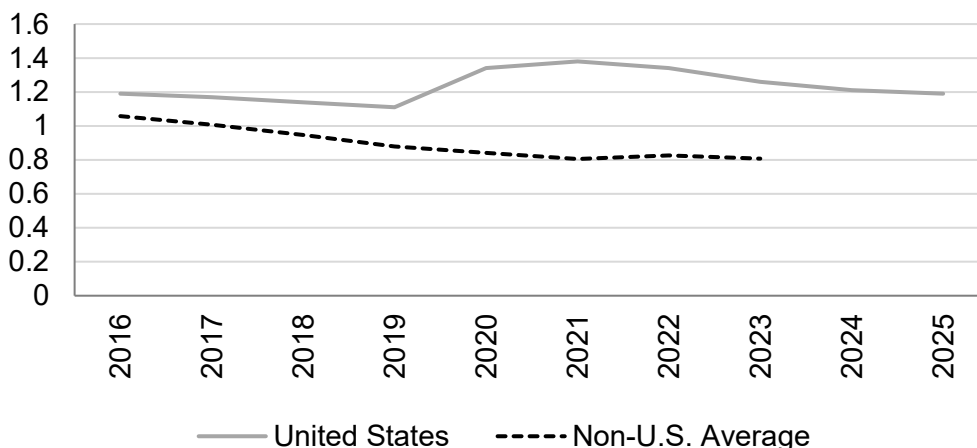
Motor vehicle crashes continue to claim lives in the U.S. and around the world, reflecting a persistent and deeply consequential road safety challenge. In 2024, motor vehicle crashes claimed 39,254 lives in the United States alone. Between 2016 and 2023, six peer nations experienced substantially lower annual motor vehicle fatalities, including Australia, Canada, France, Germany, Japan, and South Korea. The U.S. reports significantly higher crash fatality rates than any of the six peer nations in this comparison, even when accounting for population (comparing fatalities per capita) or accounting for distance traveled (e.g., 100 million vehicle miles traveled, 100 M VMT). Per capita, the U.S. reports on average twice the fatalities relative to peer nations from 2016 to 2023, and 38% more fatalities per 100M VMT on average than these countries from 2016 to 2023.

Since 2000, fatality rates among these peer nations have declined whereas per capita fatality rates in the U.S. have only decreased slightly. Although U.S. drivers tend to travel greater distances, resulting in greater exposure to crash risk, overall motor vehicle fatality rates per 100M VMT have remained relatively stable, aside from increases observed in 2020 and 2021.

Domestic and International Fatalities per Capita

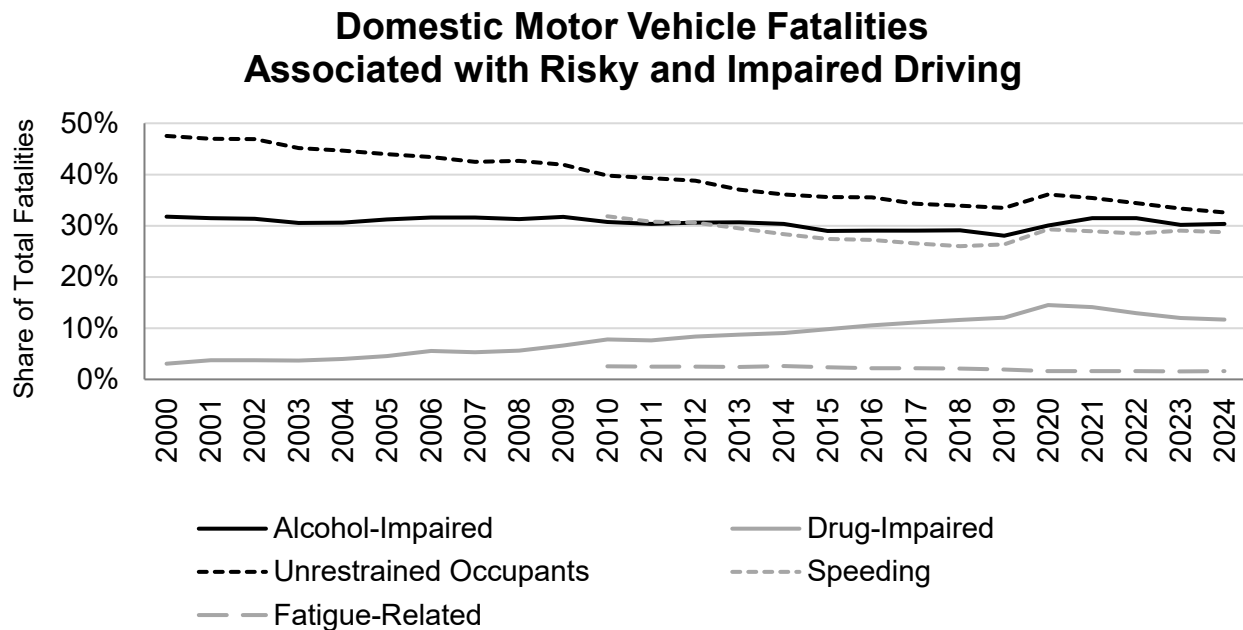


Domestic and International Fatalities per 100M VMT



Motor Vehicle Fatalities associated with Risky and Impaired Driving

Examining motor vehicle fatalities associated with risky and impaired driving has the potential to provide greater insight into crash risks and help to identify opportunities to prevent avoidable crashes and fatalities. When risky and impaired driving behaviors are compared to one another in the U.S., unrestrained occupants account for the highest share of fatalities between 2000 to 2024, followed by alcohol-impaired fatalities, speeding-related fatalities, drug-impaired fatalities, and fatigue-related fatalities.



The share of unrestrained occupant fatalities within the U.S. decreased from 2000 to 2024, while the proportion of both alcohol-impaired fatalities and speeding-related fatalities have remained stable during this time. Although the risks associated with unrestrained driving, alcohol-impaired driving, and speeding are well-established, these preventable behaviors continue to be leading contributors to motor vehicle fatalities in the United States.

The proportion of drug-impaired fatalities has increased from 2000 to 2024; however, it is possible that this trend may be attributable to factors beyond a general increase in drug-impaired driving, including greater attention to drug-impairment and increased availability of drug testing. Drug-impaired fatalities are likely to be under-reported with the challenges of detecting a myriad of different licit and illicit substances. With the legalization of cannabis in the U.S., it is increasingly important to understand the potential for drug-impairment to impact road safety.

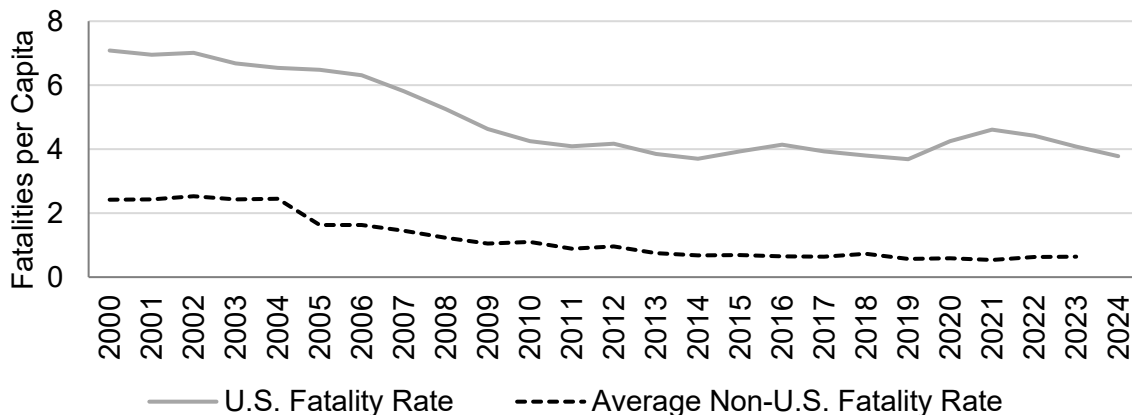
Since fatigue-related fatalities were first identified in fatal crash data in 2010, their share of overall motor vehicle fatalities has remained relatively low and stable. Given the challenges of determining whether fatigue played a role in a fatal crash, fatigue-related fatalities are likely under-reported, limiting a clearer understanding of fatigue as a contributor to motor vehicle crashes. Considering the mismatch between the rate of fatigue-related crashes and the proportion of the public that admit to driving while fatigued, it is critical to identify effective methods to eliminate fatigue-impaired driving.

Eliminating Unrestrained Occupant Motor Vehicle Fatalities: Current Approaches and Potential Opportunities

Seat belt use is perhaps one of the most longstanding and most effective behavioral safety countermeasures. Despite decades of restraint laws, enforcement efforts, and public education campaigns, high rates of unrestrained occupant deaths continue to persist in the United States.

In 2024, 12,793 individuals lost their lives in motor vehicle crashes involving unrestrained occupants. Notably, the U.S. experienced a per capita rate of unrestrained occupant fatalities at least seven times higher than that of Canada, Australia, France, and Japan between 2016 and 2023. This gap between U.S. and international fatality rates has persisted despite a decrease in unrestrained occupant fatality rates in the U.S. and peer nations from 2000 to 2024. The U.S. average unrestrained occupant fatality per capita rate from 2016 to 2024 was 4.12, compared to 0.15 in Canada, 0.45 in Australia, 0.53 in France, and 0.34 in Japan.

Domestic Unrestrained Occupant Fatality Rates Remain Higher than Peer Nations



Key Takeaways

- **The U.S. consistently reports substantially higher rates of unrestrained occupant fatalities than six peer nations (including Australia, Canada, France, Germany, Japan, and South Korea), despite the variability in seat belt laws and enforcement penalties across these countries.**
- **Unrestrained occupants consistently account for the greatest share of U.S. traffic fatalities** among risky and impaired driving behaviors.
- **The U.S. is the only country among these six peer nations that permit secondary enforcement seat belt laws**, under which officers may cite non-use only after stopping a driver for another violation.
- **Within the U.S., states with primary enforcement laws consistently report lower shares of unrestrained occupant fatalities** than states with secondary enforcement laws or no seat belt law.
- **The U.S. is also the only country that does not require rear-seat occupant restraint use nationwide.**

- **States that utilize primary enforcement and rear occupant restraint laws tend to have substantially lower unrestrained-occupant fatality rates** than states with secondary seat belt or no seat belt enforcement and more limited rear occupant restraint laws.
- **Enforcement penalties remain relatively modest across the U.S. compared to peer nations**, despite seat belts being one of the most effective and widely recognized traffic safety interventions.

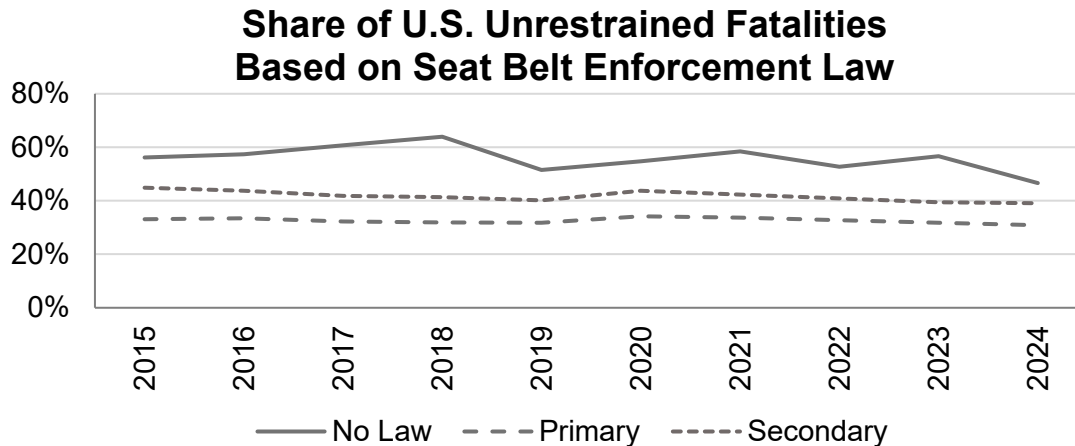


1. Introduce nationwide primary restraint enforcement laws

Within the U.S., there is a clear association between primary seat belt enforcement and lower rates of unrestrained occupant fatalities. Only 32 U.S. states, however, currently have primary seat belt laws. The evidence supports nationwide adoption of primary enforcement as an important strategy for reducing unrestrained occupant fatalities.

All six peer nations have enacted primary restraint enforcement and reporting substantially lower unrestrained occupant fatalities per capita than the United States. From 2016 to 2024, the U.S. averaged 4.12 unrestrained occupant fatalities per capita, compared with 0.15 in Canada, 0.34 in Japan, 0.45 in Australia, and 0.53 in France.

Within the U.S., states with primary enforcement consistently report approximately 9.2% fewer shares of unrestrained occupant fatalities than the 17 states with secondary enforcement laws. States with lower unrestrained occupant fatalities, including California, New York and North Carolina, all employ primary enforcement and experience substantially lower fatality rates than the national average. New Hampshire—the only state without an adult seat belt law—continues to report a high proportion of unrestrained occupant motor vehicle fatalities (46.6% of all motor vehicle fatalities in 2024).



2. Implement nationwide rear seat occupant restraint laws

Rear-occupant restraint requirements are associated with higher seat belt use and may contribute to reductions in unrestrained occupant fatalities. The U.S. stands apart from these six peer nations (Australia, Canada, France, Germany, Japan, and South Korea), as each country nationally mandates rear-occupant restraint use and reports lower per capita unrestrained occupant fatalities. The U.S. experienced substantially higher unrestrained occupant fatalities per capita between 2016 and 2024, averaging 4.12 fatalities per capita, which is over 6.5 times as high as the average rate among peer nations during this period. The significant disparity in unrestrained occupant fatalities between the U.S. and peer nations warrants further examination of rear-occupant seat belt requirements as a potential strategy for reducing preventable fatalities.

8 U.S. states
Do not enforce rear
seat belt use

Within the U.S., evidence for the efficacy of rear seat occupant restraint laws is mixed. As of 2026, 42 states enforce rear seatbelt use, however, gauging the long-term impact of state rear-occupant restraint laws is challenging as state adoption and enforcement tends to be dynamic.

3. Implement stricter penalties for lack of restraint use

When seat belt law violation penalties and fines are low, they may provide less deterrence and may contribute to perceptions that noncompliance with restraint laws poses a significant safety risk. Restraint violations carry substantially lower fines for the U.S. and South Korea, ranging from \$20 to \$35, whereas Canada and France impose the highest fines—averaging \$174.38 and \$156.95, respectively.

\$32
The average base
fine for adult seat
belt violations in
the U.S.

Penalties tend to vary a great deal across states within the U.S., with some states imposing penalties as high as \$200. States with lower unrestrained occupant fatality rates, such as California, New York, and North Carolina, tend to impose stronger penalties for child restraint violations, including license points and higher fines.

4. Utilize public awareness & high visibility enforcement campaigns

High visibility enforcement (HVE) campaigns can help educate drivers and motor vehicle occupants about the importance of restraint use to reduce serious injuries and fatalities, sending a clear message that restraint laws are a priority.

Although U.S. occupant restraint laws broadly align with those of peer nations, they deliver markedly worse outcomes. For example, the U.S. employs occupant restraint awareness campaigns nationwide, while some states complement these efforts with high visibility enforcement. Some peer nations implement restraint-specific public awareness or high visibility enforcement, such as Canada, Germany, and France. Other peer nations, such as Australia, Japan, and South Korea, implement more general safe driving campaigns that address restraint use alongside other factors.

State public awareness campaigns focused on occupant restraint (or occupant protection) have historically followed the national *Click It or Ticket* campaign that originated in North Carolina in 1993. For that reason, North Carolina is recognized by NHTSA as a leading state, while New York was the first state to pass state seat belt laws. Both states, along with California, were some of the earliest to deploy accompanying public awareness campaigns. Many states, including those with lower and higher fatality rates, have implemented the national *Click It* campaigns and many have implemented state-branded restraint campaigns. Many states combine awareness with public messaging and high visibility enforcement (HVE), often implemented by state highway patrol and partnerships among law enforcement agencies.

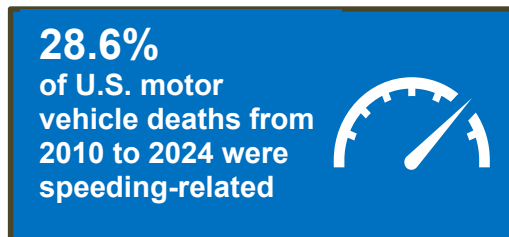
The persistent disparity in unrestrained occupant fatalities demonstrated in the U.S., despite similar legal frameworks, highlights the critical role of enforcement consistency, policy design, and implementation.

Conclusion

Within the U.S., states with primary seat belt enforcement, rear seat belt requirements, and stronger child restraint penalties consistently report lower shares of unrestrained occupant fatalities. While all states participate in the national *Click It or Ticket* campaign, leading states distinguish themselves through longer-established seat belt laws, greater use of high-visibility enforcement, and messaging that emphasizes seat belt use in all seating positions. Although seat belt compliance may receive less attention than impaired driving, speeding, or even distracted driving, the data show that primary enforcement and targeted outreach are associated with lower fatality rates, suggesting that implementing these countermeasures may help reduce deaths.

Eliminating Speeding-Related Motor Vehicle Fatalities: Current Approaches and Potential Opportunities

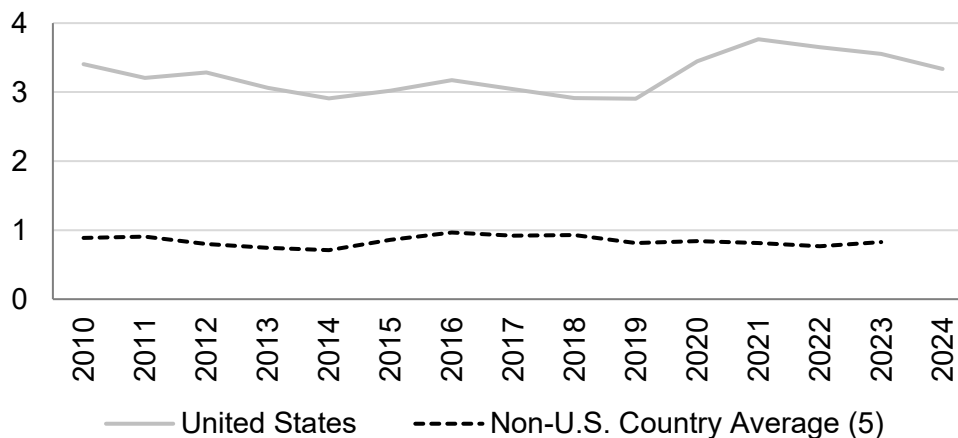
Speeding has long been recognized as a dangerous driving behavior yet continues to be one of the leading contributing factors to deaths in motor vehicle crashes in the United States and other countries. In 2024, 11,288 individuals in the U.S. were killed in motor vehicle crashes involving speeding.



Between 2010 and 2024, speeding-related deaths accounted for an average of 28.6% of U.S. motor vehicle fatalities, reflecting a 10% greater share than six peer nations, including Australia, Canada, France, Germany, Japan, and South Korea. In fact, the U.S. reports over three times the number of speeding-related deaths per capita as peer nations. Considering that the U.S. experiences high levels of speeding-related crash

fatalities compared to other countries, it is critical to identify the most effective countermeasures to reduce speeding-related crashes.

Domestic Speeding-Related Fatality Rates Remain Higher than Peer Nations



Key Takeaways

- **The U.S. consistently reports a higher shares of speeding-related motor vehicle fatalities** than peer nations, exceeding the average share of peer nations by 10%.
- Even when accounting for distance travelled, **the U.S. has a higher speeding-related fatality rate**, averaging 0.31 fatalities per 100M VMT between 2016 to 2024. Germany, however, follows close behind the U.S., averaging 0.25 speeding-related fatalities per 100M VMT during this period.
- **Per capita, the U.S. reports speeding-related fatalities that are nearly three times higher than the average of peer nations** between 2016 to 2024.
- **Automated Speed Enforcement (ASE)** is associated with reduced speeding-related fatalities in peer nations, while its implementation in the U.S. remains fragmented due to varying state-level legal frameworks.

- **Lower speed limits** are associated with lower speeding-related fatality rates in the U.S. and abroad.
- **Administrative License Suspension (ALS)** is a countermeasure utilized in cases of severe speeding outside of the U.S. that may be associated with lower speeding-related fatality rates, despite not being widely implemented in the United States.



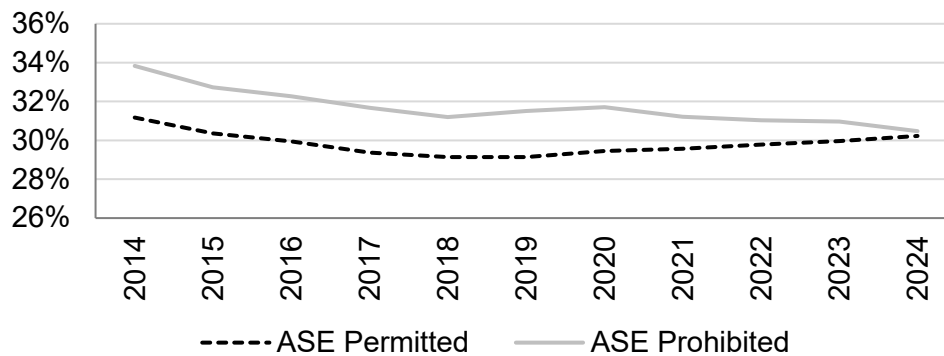
1. Encourage national use of automated speeding enforcement

Data suggests that automated speed enforcement (ASE) is associated with lower speeding-related fatality rates. Expanding ASE, in states where it is currently prohibited, as well as broadening the circumstances under which it is permitted, could provide an additional opportunity to reduce speeding-related fatalities the United States.

The U.S. and Canada stand out as two countries that do not utilize ASE nationwide. Apart from Germany, countries that permit ASE report notably lower speeding-related fatality rates.

Within the U.S., eight states prohibit the use of ASE. States that use speeding-specific ASE report modestly lower speeding-related fatality rates than states that prohibit them (28.8% vs. 30.3% in 2024). However, speed camera laws do not clearly distinguish states with higher and lower speeding-related fatalities. While many U.S. states permit cameras, deployment is often limited to school or work zones, limiting their potential impact.

Speeding-Related Fatality Share by ASE Legality - 5 Year Rolling Average

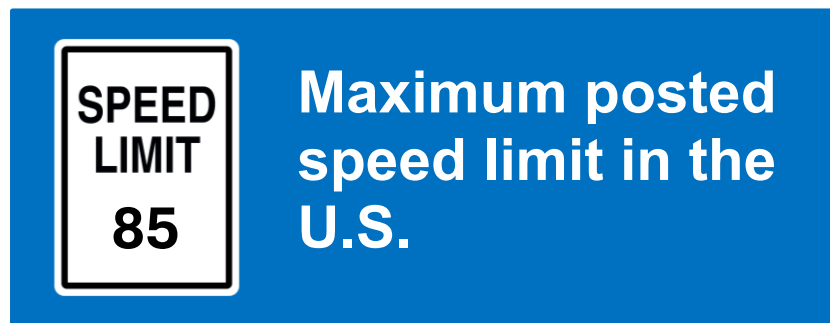


2. Set lower nationwide speed limits

Setting appropriate speed limits that consider road design, traffic patterns, and typical environmental conditions can help to deter driving at excessive speeds. Across the U.S. and peer nations, higher maximum speed limits are generally associated with higher rates of speeding-related fatalities. These data suggest that lowering speed limits may be an opportunity to reduce speeding-related fatalities.

The U.S. utilizes the highest maximum speed limits of the nations examined with the notable exception of Germany, which maintains unrestricted Autobahn sections. Notably, the maximum speed limits do not vary too widely between the U.S. and these six peer nations.

Historical trends in the United States reveal an association between increasing speed limits and fatality rates. Within the U.S., the average maximum posted speed limit reached its highest at 71 miles per hour in 2014, after which speeding-related fatalities per capita increased by 14.7%. States with lower speeding-related fatality rates tend to have relatively consistent speed limits, while states with higher fatalities exhibit wider variation.



To enforce speed limits for drivers who habitually speed or have a history of extreme speeding, some states have recently adopted Intelligent Speed Assist (ISA) legislation. This legislation allows judges to require the installation of an ISA system for motorists in various circumstances involving speeding. Washington D.C., Virginia, and Washington state have adopted this legislation, while six additional states considered but did not enact ISA legislation. Although this countermeasure has promise, the recency with which it has been enacted in the U.S. does not yet allow for an examination of its efficacy.

3. Implement speeding-exclusive administrative license suspension

Although many countries employ nationwide administrative license suspension (ALS) penalties for speeding, the U.S., along with Canada, do not implement ALS nationwide. Given the widespread use of speeding-exclusive ALS for excessive speeding in peer nations, combined with the higher domestic rates of speeding-related fatality rates, supports consideration of broader adoption of this penalty in the U.S. to strengthen deterrence for speeding.

While some U.S. states utilize ALS for “super speeding”, this penalty is not automatic in cases of “super speeding”. Many states require an additional unsafe driving violation in order to utilize ALS, and few states permit the use of ALS in cases where extreme speed was the only violation committed. Additionally, the threshold at which suspension occurs varies significantly among states. There is considerable variability in how this penalty is enacted across the U.S., potentially leading to reduced efficacy when implemented.

Within the U.S., speeding-exclusive ALS may be associated with lower speeding-related fatality rates. States that utilize speeding-exclusive ALS reported that speeding-related fatalities accounted for an average of 27.7% of their traffic fatalities from 2010 to 2024, while states without speeding-exclusive ALS reported an average of 30.6% of speeding-related fatalities. Both Florida and North Carolina have adopted speeding-specific ALS since 2025, so it will be important to evaluate the effectiveness of these approaches.

4. Utilize high visibility enforcement campaigns

The U.S. stands out as one of the few countries that utilize public awareness and high visibility enforcement campaigns targeted toward speeding. South Korea also implements more speeding enforcement, as their fatalities have increased over the past few years. Overall, most peer nations address speeding through general safe-driving campaigns rather than targeted speeding-specific awareness and HVE.

State public awareness campaigns for speeding incorporate public messaging in combination with statewide or targeted high visibility enforcement (HVE) efforts. Many of these efforts are led by state highway patrol and partnerships among law enforcement agencies. Notable campaigns include *Operation Southern Slowdown*, *Slow Down, Tennessee*, and *Drive with Aloha*.

Some states, such as Tennessee and Hawaii, have observed declines in the share of speeding-related fatalities following the introduction of their statewide public awareness campaigns (decreases of 4.3% and 15.9% respectively). Considering that several other states continue to experience increased speeding related fatalities while implementing public awareness campaigns, it is critical that states utilize a combination of countermeasures to prevent speeding-related crashes.

Conclusion

The U.S. experiences higher per-capita rates of speeding-related deaths than six peer nations, which may reflect the more fragmented implementation of speeding countermeasures and speeding-related laws across states.

Within the U.S., national speeding-related fatalities per capita have remained stable from 2010 to 2024, but speeding-related fatality rates vary widely at the state level. This variation among states may be linked to differential implementation of countermeasures. While automated speeding enforcement is a proven countermeasure, it is not widely implemented. Although lower speed limits are a proven countermeasure, maximum speed limits across the U.S. have steadily risen since the repeal of the National Maximum Speed Limit in 1995. As states continue to implement ALS for speeding and harsher penalties for excessive speeding, it will be important to observe their impact on speeding-related crash outcomes.

Eliminating Alcohol-Impaired Motor Vehicle Fatalities: Current Approaches and Potential Opportunities

Alcohol-impaired driving continues to be a troubling road-safety challenge, contributing to preventable deaths each year. In fact, alcohol-impairment is one of the leading contributors to U.S. motor vehicle deaths, only second to unrestrained occupants.

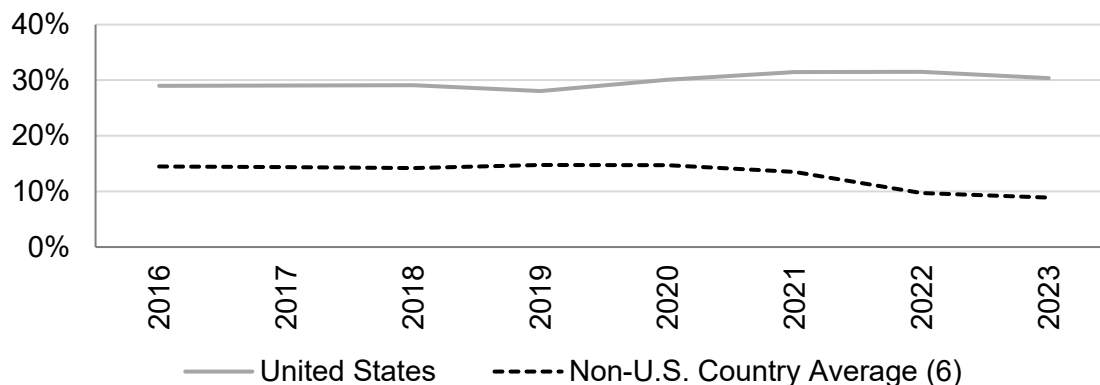
30% of U.S. motor vehicle fatalities between 2016 and 2024 involved alcohol-impairment



Between 2016 and 2024, alcohol-impaired motor vehicle fatalities accounted for 30% of all U.S. motor vehicle fatalities on average, over 2.25 times the average rate among peer nations. During this same period, alcohol-impaired fatalities accounted for a similar

share of motor vehicle fatalities in Canada and France, while representing a substantially smaller share in Australia, Japan, Germany, and South Korea. Considering that the U.S. continues to experience high levels of alcohol-impaired motor vehicle fatalities by comparison, it is critical to examine the different countermeasures and approaches utilized by the U.S. and peer nations.

Annual Share of Motor Vehicle Fatalities Involving Alcohol-Impairment



Key Takeaways

- **Alcohol-impairment accounts for a disproportionately larger share of U.S. motor vehicle fatalities**, at more than 2.25 times the average share among peer nations.
- Compared to peer nations, **the United States is the only country to have experienced an increase in fatal crashes involving an alcohol-impaired driver between 2016 and 2023 (13.33%)**, increasing 38.7% between 2019 and 2021 during the pandemic.
- **Even after accounting for vehicle miles traveled, the U.S. has substantially higher alcohol-involved fatality rate**, averaging 0.37 deaths per 100 million miles traveled from 2016 to 2023, nearly three times the average among peer nations.
- Taking population into account, **the U.S. demonstrated substantially higher alcohol-involved fatality rates per capita between 2016 and 2023**, averaging 3.57 deaths per capita, which is over six times as high as the average rate among the comparison countries.

- **The prevalence of alcohol-related disorders is higher in the U.S.** than four of the six peer nations in this comparison, suggesting that there may be a higher rate of alcohol-abuse that contributes to higher base rates of risky drinking and driving behaviors.
- Countries that implement **administrative license suspension (ALS)** or revocation for all offenders report lower alcohol-impaired fatalities per capita relative to the United States.
- **Reductions in blood alcohol concentration (BAC) limits** were followed by temporary declines in U.S. alcohol-involved motor vehicle fatalities, both after the nationwide reduction in 2000 and following Utah's reduction in 2018.
- Unlike the U.S., where **sobriety checkpoints are legally permitted in 38 states**, **all six peer countries with comparatively lower alcohol-impaired driving fatality rates authorize sobriety checkpoints through national legislation.**
- **States that permit and utilize sobriety checkpoints showed lower alcohol-impaired fatality rates** than those prohibiting them between 2010 and 2024.



1. Introduce nationwide legislation for alcohol-impaired driving, including administrative license suspension (ALS)

Alcohol-impaired driving penalties tend to be weaker and less consistent in the U.S. compared to comparison countries. Among non-U.S. comparison countries, alcohol-impaired fatalities have steadily declined as the number of laws and penalties for alcohol-impaired driving have increased. For example, non-U.S. comparison countries have a stronger inverse relationship between the number of alcohol-impairment laws and fatality rates per capita than in the U.S.

Countries that implement administrative license suspension (ALS) for all alcohol-impaired driving offenders have lower fatality rates per capita than those with less universal ALS penalties, including the United States. A comparison of leading and lagging states by alcohol-impaired driving fatality rates shows that lower-fatality states tend to impose stronger penalties for repeat offenses and longer administrative license suspension periods.

1. Introduce nationwide legislation for alcohol-impaired driving, including administrative license suspension (ALS)

Alcohol-impaired driving penalties tend to be weaker and less consistent in the U.S. compared to comparison countries. Among non-U.S. comparison countries, alcohol-impaired fatalities have steadily declined as the number of laws and penalties for alcohol-impaired driving have increased. For example, non-U.S. comparison countries have a stronger inverse relationship between the number of alcohol-impairment laws and fatality rates per capita than in the U.S.

Countries that implement administrative license suspension (ALS) for all alcohol-impaired driving offenders have lower fatality rates per capita than those with less universal ALS penalties, including the United States. A comparison of leading and lagging states by alcohol-impaired driving fatality rates shows that lower-fatality states tend to impose stronger penalties for repeat offenses and longer administrative license suspension periods.

2. Utilize lower BAC limits nationwide

One of the most apparent drops in alcohol-involved motor vehicle fatalities in the U.S. corresponded to the national blood-alcohol content (BAC) limit of 0.08 g/dL enacted in 2000. By 2005, all 50 states had adopted the lower limit, and by 2010, the U.S. rate of alcohol-involved motor vehicle fatalities per capita had declined 42%.

The only state with lower BAC limits is Utah, which was reduced to 0.05 g/dL in 2018. The year after this legislation was enacted, Utah's shares of alcohol-impaired fatalities dropped by 8.5%. Countries with lower BAC limits, including Japan and South Korea at 0.03 g/dL, and Australia, France, and Germany at 0.05 g/dL, report lower shares of alcohol-impaired fatalities and lower fatality rates per capita relative to the U.S. Non-U.S. countries tend to penalize drivers with lower BAC levels that are below the legal limit more so than the United States. Penalties for driving above legal BAC limits are enforced in non-U.S. countries in contrast to harsher penalties for alcohol-impaired drivers that have BAC limits well above the legal limit.

3. Implement high visibility enforcement campaigns with sobriety checkpoints

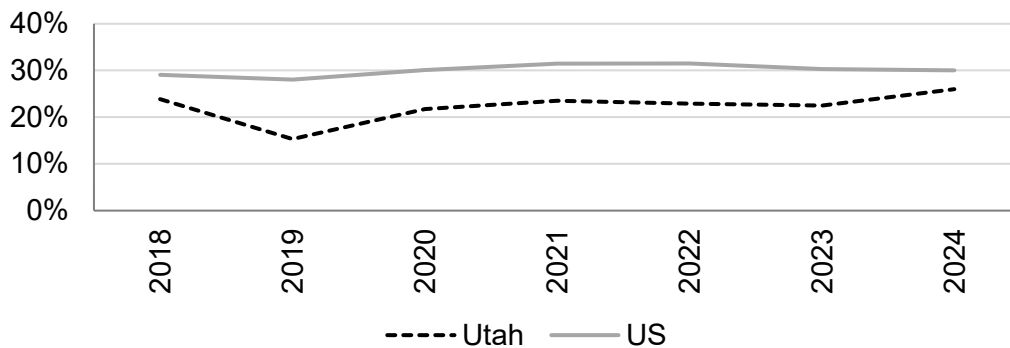
In contrast to the U.S., sobriety checkpoints are universally permitted in the six comparison countries that all have lower alcohol-impaired fatality rates. Sobriety checkpoints are only legal in 38 U.S. states and the District of Columbia and are prohibited in 10 states. States that permit and utilize sobriety checkpoints show lower alcohol-impaired fatality rates (29.4%) than those prohibiting them (32.1%) between 2010 and 2024. Enforcement is key, as states that permit but do not utilize sobriety checkpoints have shown the highest alcohol impaired fatality rates during that time.



4. Maintain ongoing public awareness and enforcement efforts to mitigate alcohol-impairment risks

Considering that domestic alcohol-impaired driving fatalities have declined following enactment of legislation at the national and state level suggests that the public is adjusting their behavior, albeit only temporarily. For example, Utah's reduction in BAC limits resulted in an 8.5% decline in alcohol-involved fatalities in the year following the state legislation. Unfortunately, however, rates of alcohol-impaired fatalities rose again beginning in 2020. Continuing to keep public awareness and compliance for road safety remains a critical challenge.

Shares of Alcohol-Related Fatalities following Utah's 2018 BAC Limit Reduction



The gap remains in maintaining public attention on the issue of alcohol-impaired driving. While the public is largely aware of the risks of driving under the influence of alcohol, they are unlikely to be aware that fatality rates continue to be an ongoing public safety problem. Often public safety messaging and enforcement campaigns include statements about driving under the influence and the effectiveness of their individual campaigns. They don't often include the concerning statistics that highlight this ongoing crisis. This requires public education efforts to focus on the numbers and reminding the public that simply knowing the risks is not sufficient.

Future public awareness campaigns should provide quantitative metrics of alcohol-impaired driving fatalities and injuries and point out that these rates are not declining. Bringing awareness to the severity of the issue can be made salient to the public and more memorable than simply reminding them about impaired driving.

Combining memorable statistics with public awareness messaging during public enforcement campaigns will bring attention and provide memorable information for this issue. In fact, NHTSA's evaluation of their public service announcement (PSA) "Friends Don't Let Friends Drive Drunk" campaign reported high public awareness, with 84% of American's surveyed remembering the PSA and 80% taking action to prevent friends or family from driving impaired.

Considering that people are more likely to remember negative information than positive information (e.g., the negativity bias), emphasizing the significance of alcohol-impaired driving will provide the public with accessible messaging that is coupled with effective high visibility enforcement campaigns.

Conclusion

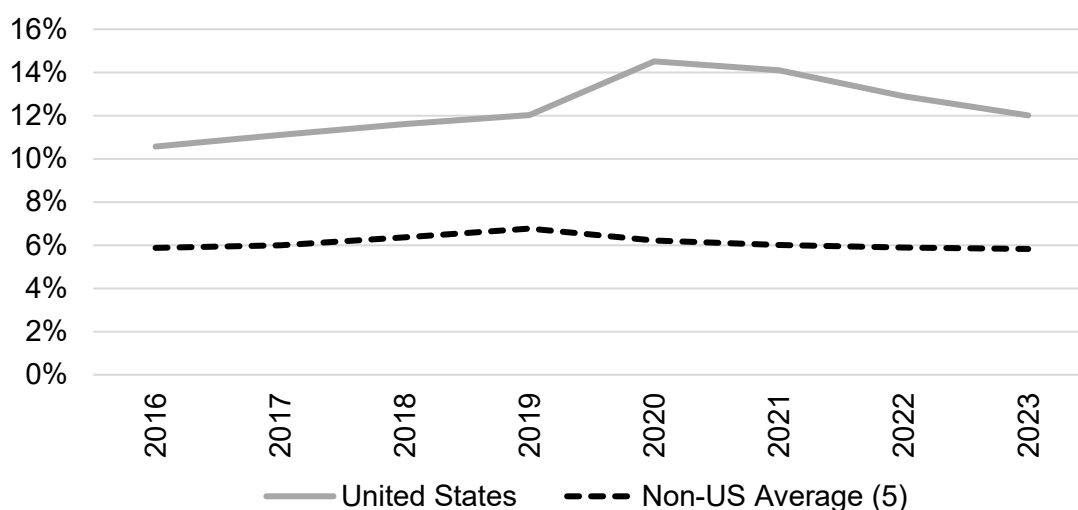
Within the U.S., states with alcohol-impaired driving legislation that include administrative license suspension, repeat offender laws, blood alcohol concentration limits, and sobriety checkpoints consistently report lower shares of alcohol-involved fatalities. Leading states with lower shares of alcohol-involved fatalities are distinguished by longer administrative license suspension periods and utilization of sobriety checkpoints. While it is challenging to see any evidence of a long-term decline in alcohol-involved fatalities associated with BAC limit reductions, there does appear to be a temporary decline following the enactment of these limits. Considering that these laws are not consistent across all states, it introduces confusion and mixed signals about the priority of eliminating an ongoing issue with alcohol-impaired driving. Future public awareness and enforcement initiatives could be more impactful if they incorporate messaging that emphasizes statistics about alcohol-involved fatalities with memorable information that communicates how alcohol-impaired driving remains a serious and persistent traffic safety issue.

Eliminating Drug-Impaired Motor Vehicle Fatalities: Current Approaches and Potential Opportunities

Drug-impaired driving contributed to 4,577 deaths in 2024 in the U.S., reflecting a persistent and increasingly complex road safety challenge. Relative to other types of risky and impaired driving, drug-impaired driving appears to account for fewer fatalities among U.S. motor vehicle crashes. The expanding range of substances involved in drug-impaired driving, coupled with inconsistent detection and reporting practices, limits the ability to accurately quantify its impact nationwide. These data limitations suggest that reported drug-impaired fatalities represent only a portion of the true burden.

Between 2016 and 2023, drug-impaired motor vehicle fatalities accounted for 12% of all U.S. motor vehicle fatalities on average, over twice the average rate among comparison countries. During this same period, drug-impaired fatalities accounted for a higher share of motor vehicle fatalities in France, while representing a substantially smaller share in Australia, Canada, Japan, and Germany. Considering that the U.S. continues to experience high levels of drug-impaired motor vehicle fatalities by comparison, it is critical to examine the different countermeasures and approaches utilized by the U.S. and peer countries.

Annual Share of Motor Vehicle Fatalities Involving Drug-Impairment



Key Takeaways

- **Drug-impairment accounts for a disproportionately larger share of U.S. motor vehicle fatalities**, at more than 2.25 times the average share among peer countries.
- **The United States experienced an increase in fatal crashes involving a drug-impaired driver between 2016 and 2023** (22.9%), along with Australia (32.5%) and Germany (54.8%). The U.S. stands out as the only country among these peer nations to have experienced an increase in drug-impaired fatalities between 2019 and 2020 during the pandemic (29.6%).

- **Accounting for vehicle miles traveled, the U.S. has a substantially high drug-involved fatality rate**, averaging 0.15 deaths per 100 million miles traveled from 2016 to 2023, over three times the average among comparison countries. Nevertheless, France has a higher fatality rate per capita than the U.S., with an average of 0.18 deaths per 100M VMT.
- Taking population into account, **the U.S. demonstrated substantially higher drug-involved fatality rates per capita between 2016 and 2023**, averaging 1.47 deaths per capita, over five times as high as the average rate among comparison countries.
- **Drug-impaired driving legislation has steadily expanded across the U.S. and peer nations since 2010**, alongside growing awareness of this issue. Countries with more centralized legislation and stricter penalties show lower fatality rates.
- In contrast to **different types of drug-impairment legislation utilized across the U.S.**, countries that utilize impairment based laws show lower drug-impaired fatality rates.
- **Drug-impaired fatality trends have diverged as cannabis legalization has expanded, increasing in the U.S.**, remaining stable in Germany, and declining in France.
- **Although the U.S. has a higher prevalence of drug-abuse disorders than five of six peer nations**, the broader range of licit and illicit substances capable of impairing drivers underscores a growing challenge beyond road safety.



1. Assess drug-impairment legislation

Within the U.S., drug-impairment legislation varies widely. Among these types of legislation impairment-based approaches are associated with lower fatality rates and are similar to practices used in peer nations. Between 2010 and 2024, states that implemented per se laws that make it illegal to drive with a specified concentration of a drug in the driver's body, showed higher fatalities on average (12.4%). States that implement impairment-based laws tend to have the lowest fatality rates in the U.S. (10.5%), along with peer nations including Germany, Japan, and South Korea that place greater emphasis on detecting impaired driving by law enforcement.

Given that the U.S. countermeasure for drug-impaired driving has only been assessed by NHTSA for per se laws, it is critical to evaluate the effectiveness of different drug-impairment legislation. Despite the variability of measurement and reporting for drug- impairment, more

standard and specific legislation will provide the public with clearer limits and strengthen enforcement efforts.

Share of Drug-Involved Fatalities by Drug-Impairment Law 5-year Rolling Average



2. Enhance drug-impaired driving measurement

One of the most striking trends in U.S. drug-impaired driving is the substantial increase in drug-related fatalities, rising from 3.1% in 2000 to 11.17% in 2024. Developing effective countermeasures for drug-impaired driving hinges on accurate data for these fatalities and crash outcomes. Several gaps exist about the impact of drug-impairment with different substances, along with a wide range of methods for detecting, reporting, and tracking drug-impaired driving outcomes. Another challenge for this issue relates to understanding the prevalence of drug use and substance use disorders as a larger public health issue that creates more risk for impaired driving.

As NHTSA is increasing funding toward improving drug-impaired driving data collection and reporting, it is critical to consider two key issues. First, it is important to establish a standardized, ongoing surveillance system capable of producing comparable drug-use trends across jurisdictions, including internationally comparable reporting standards. Second, new surveillance systems may be improved by connecting or leveraging data from existing public health sentinel systems that already track drug abuse through emergency response and health care systems.

3. Identify best practices in drug-impairment detection

A key challenge in eliminating drug-impaired driving is to identify the scale of the problem. Variability in drug-impairment detection methods within and outside the United States pose challenges for reporting and accurate quantification of drug-impaired driving outcomes.

Impairment detection training is more widespread among law enforcement officers in peer nations with lower drug-impaired fatality rates, including Germany, South Korea, and Japan.

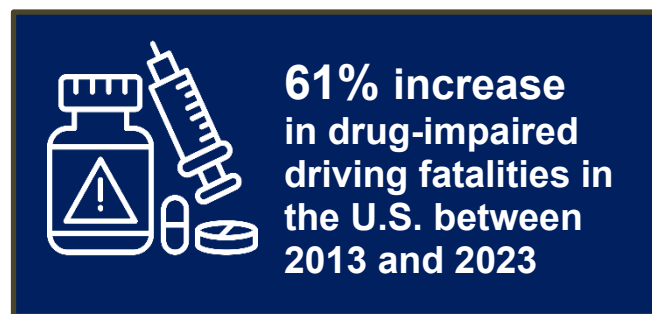
These countries utilize law enforcement training for impairment or medical personnel to determine drug-impairment. Within the U.S., drug recognition experts (DREs) receive special training for detecting drug-impairment along with officers that receive Advanced Roadside Impaired Driving Enforcement training (ARIDE). The deployment of trained officers to detect different types of drug impairment is an essential step to better detection of drug impairment at the scene of a crash.

A key opportunity lies in better understanding the effectiveness and prevalence of law enforcement with DRE and ARIDE training across states to identify best practices and strengthen roadside detection. As federal funding is allocated to support states within Section 402 and 405(d), there is an opportunity to further validate specialized training as a countermeasure for drug-impaired driving enforcement.

4. Integrate public awareness with drug-impaired driving legislation

An important factor in addressing drug-impaired driving is to determine how both legal and illegal drugs may be involved in motor vehicle crashes. For instance, legalized cannabis use appears to distinguish the U.S. from other peer nations given that legalization is more recent than many countries. In contrast to some peer nations that have legalized cannabis for recreational use, fatality rates involving drug-impairment in the U.S. have increased substantially since legalization has expanded. What is striking about drug-impaired fatality rates following cannabis legalization in the U.S. is that states that legalize cannabis also tend to utilize public awareness campaigns about the risks associated with drug-impaired driving.

Drug-impaired driving fatalities followed divergent trends across countries following legalization of cannabis, increasing by 61.2% in the U.S. and 53.1% in Germany, where recreational cannabis is legal, but declining by 20.9% in France, where cannabis is limited to medical use. .



Within the U.S., there are 24 states that have legalized cannabis for recreational use and 46 states have legalized cannabis for medicinal use. Notably, the highest drug-related fatality rates are not necessarily concentrated in states with legalized cannabis. In fact, states without legalization have reported fatality rates as high as 20.8% in 2022, highlighting the complexity of the relationship between cannabis policy and

drug-impaired driving outcomes.

The variation in drug-impaired driving fatalities across U.S. states points to the importance of looking beyond drug legislation alone. States with lower drug-impaired fatality rates, including Virginia, New Mexico, and New York, tend to stand out due to their approach combining dedicated public awareness campaigns with enforcement and evaluation.

Taken together, these findings suggests that drug legalization has the potential to be associated with higher rates of drug-impaired fatalities but may be improved if accompanied by comprehensive drug-specific enforcement, public awareness, and evaluation. The combination of these countermeasures communicate that while some drug use may be legal, it is critical to be aware of the risks and consequences of drug-impaired driving.

Conclusion

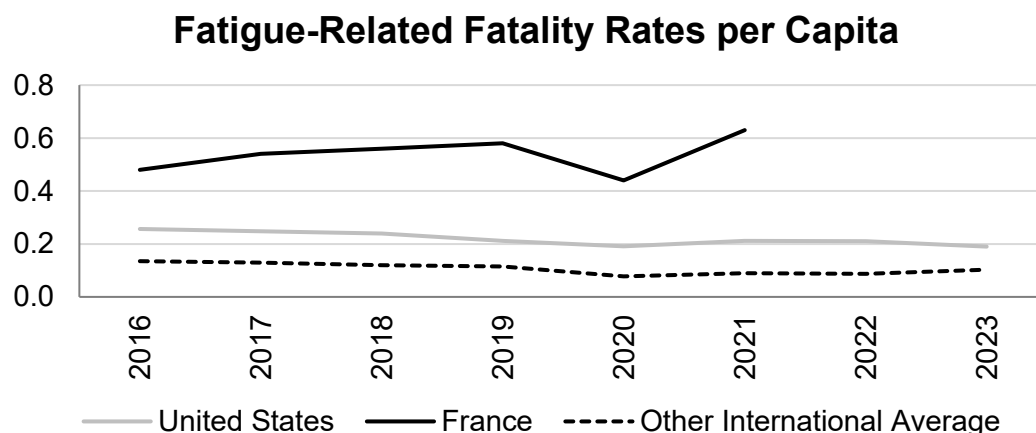
Addressing drug-impaired driving is a considerable challenge for road safety that is not isolated to the United States. A growing number of substances, legal and illegal, have the potential to cause impairment among drivers. Detecting, testing, and tracking drug-impaired driving and related fatalities becomes a bigger challenge when it is addressed in different ways within the U.S. and internationally. Drug-impaired driving legislation is increasing but still varies based on the judgment of law enforcement, demonstrating impairment, and measuring the presence of drugs following a crash or violation. Data suggest that impairment-based legislation is related to lower fatality rates in the U.S. and among several peer nations. This type of legislation is closely related to the ability for law enforcement to detect impairment. While impairment detection training is widespread among peer nations, the U.S. has advanced specialized training for key programs, including DRE and ARIDE that increase detection skills for law enforcement. This type of training, however, requires additional time and resources, which may not be widely available across the U.S. There is also limited data to determine how effective this training is for detection, so there is an opportunity for further evaluation of these programs.

Developing additional countermeasures for drug-impaired driving is also crucial as the need for more standardized recording and tracking of drug-impairment is increasing. As the U.S. expands drug-impaired driving data tracking systems, it is essential that these data are comparable to international reporting standards. As with many initiatives that expand tracking at a national level, transportation agencies may be able to leverage data and sentinel systems already in place in the public health sector. Finally, it is important to consider that drug-impaired driving legislation and enforcement are being developed amid shifting legislation that authorizes use of a growing number of substances that may impair drivers, including cannabis. Cannabis is an example of a legalized substance that has potentially led to increased drug-impaired driving fatalities in the U.S. in contrast to other countries, but legalization alone is not likely to be the only factor that contributes to these trends. The prevalence of substance use disorders in the U.S., not including alcohol-use disorders, is higher than many other countries, highlighting a broader public health issue. Addressing drug-use disorders is a critical imperative that could have significant impact on reducing drug-impaired driving. Given the combined approaches for reducing drug-impaired driving utilized by U.S. state law enforcement include public awareness, it is key to include this as a method of educating people about the risks of substance use, in and outside of a vehicle.

Eliminating Fatigue-Related Motor Vehicle Fatalities: Current Approaches and Potential Opportunities

The dangers of fatigued driving have only recently received increased attention in road safety research and data collection in the U.S. and abroad. Despite research that likens sleep deprivation over 24 hours to an impaired blood alcohol content (BAC) level of 0.10%, tracking of fatigued driving deaths and fatigue-specific driving legislation is limited. For example, only two U.S. states have fatigue-impaired driving laws, while Japan and South Korea are among the few nations to have national fatigue-specific driving laws. Additionally, fatigue is only identified by U.S. law enforcement during post-crash investigations which relies heavily on circumstantial evidence. Fatigued driving and related fatalities are likely under-reported both in the U.S. and abroad.

In the U.S., fatigued driving fatalities accounted for an average of 2.0% of traffic deaths from 2010 to 2024, averaging 0.2 fatalities per capita during this time. Despite the scarcity of fatigue-specific driving laws, several peer nations track fatigue-related driving fatalities. France reports the highest per capita fatigue-related fatality rates, followed by the United States. Both Canada and Australia report similar rates to the U.S., while Germany and Japan report lower rates of fatigue-related fatalities. France's fatigue-related fatality rate per capita is likely to be an outlier given that agencies use known fatigue-related fatality numbers to estimate the number of total fatigue-related fatalities. Within the U.S., there is considerable variation in fatigued driving fatality rates among states.



Key Takeaways

- Reported **fatigued driving fatalities accounted for only 2.0% of U.S. traffic fatalities** from 2010 to 2024.
- **Only two U.S. states and two peer nations have enacted fatigue-impaired driving laws.**
- **U.S. states with fatigue-specific driving laws report, on average, half the share of fatigued driving fatalities as states without fatigue-specific driving laws.**
- Japan has a national fatigue-impaired driving law and reports an average of 0.02 fatigue-related driving fatalities per capita from 2010 to 2024, compared to 0.23 fatigue-related driving fatalities per capita in the U.S. during this time.
- Fatigue-specific laws define fatigued driving, but **reporting is limited to post-crash investigations that rely on circumstantial evidence.**
- **Fatigued driving fatalities are likely under-reported**, both in the U.S. and abroad.



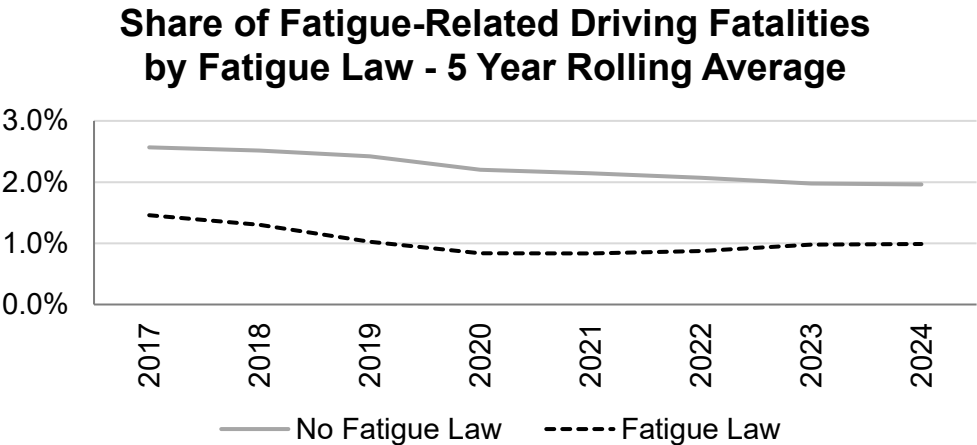
1. Enact fatigued driving laws

Fatigue-impaired driving laws, in the U.S. and abroad, are associated with fewer fatigue-related driving fatalities. These laws are one of the most straightforward countermeasures that can be used to address fatigued driving.

Japan and South Korea are peer nations with nationwide fatigue-impaired driving laws. While South Korea does not report fatigue-related driving fatalities, Japan records and reports fatalities with 0.02 fatigue-related driving fatalities per capita from 2010 to 2024, compared to 0.23 fatigue-related driving fatalities per capita in the U.S. during this time.

Within the U.S., New Jersey and Arkansas are the only two states with fatigue-impaired driving laws that criminalize fatigued driving that results in death. These states report that fatigue-related driving fatalities account for 1.13% of their traffic fatalities post law-enactment, in comparison to 2.26% of motor vehicle fatalities in the U.S. during this time.

Despite their sparse implementation, the evidence suggests that fatigue-specific driving laws are related to fewer fatigue-related crash fatalities.



2. Utilize public awareness campaigns & high visibility enforcement

While the U.S. has relatively few countermeasures for fatigued driving, increasing public awareness for fatigued driving is being implemented as part of dynamic messaging and some states are implementing specific fatigued driving public awareness campaigns. Despite its recognized safety risks, fatigued driving remains comparatively under-addressed, with less emphasis placed on public awareness, enforcement and legislative measures than other forms of risky and impaired driving. Considering that studies have reported that over 60% of U.S. drivers admit to driving while fatigued, awareness about the risks of fatigue as a form of impairment may not be legitimized to the same degree as other types of impairment.

Among peer nations, the U.S. is the only country to utilize public awareness campaigns specific to fatigued driving. State public awareness campaigns focused on fatigued driving are beginning to expand, particularly since the 2007 inception of National Drowsy Driving Prevention Week led by the National Sleep Foundation. Many U.S. states participate in National Drowsy Driving Prevention Week and some have their own fatigued driving campaigns, while other states group fatigued driving in with other safe driving campaigns. States with relatively lower fatigue related fatality rates including New Jersey, Arkansas, and California utilize fatigue-specific enforcement campaigns, and report that 1.3% of their traffic fatalities from 2010 to 2024 involved fatigued driving, compared to 2.1% of U.S. crash fatalities during that same time.

3. Standardize police reporting

Effectively addressing fatigue-related driving is challenging when its full scope is not well understood, particularly given variability in how fatigue is identified and reported by law enforcement in the U.S. and internationally.

Five peer nations, including Australia, Canada, France, Germany, and Japan, report on fatigued driving fatalities, however, the extent to which law enforcement officers in these countries are expected to consider the possibility of fatigue alongside other factors involved in a crash is unclear. In Germany and Japan, officers utilize a checklist that includes potential contributing factors such as fatigue. In Germany, the role of fatigue in crash fatalities is likely under-reported (personal correspondence, 2026). In Canada and Australia, it is unclear how often officers consider fatigue as a potential factor in crashes. France uses officer reports of known fatigued driving fatalities to estimate the unknown fatigued driving fatalities, which likely results in France's elevated rate of fatigued driving fatalities per capita. Standardized reporting about fatigued driving and related fatalities involving fatigue is essential in order to fully understand the problem and the effectiveness of potential countermeasures.

In the U.S., it is likely that the role fatigued driving plays in traffic fatalities is under-reported. Estimation of the involvement of fatigue in crashes relies on officer judgement and circumstantial evidence. While FARS data indicates that fatigued driving fatalities make up 2.0% of traffic fatalities from 2010 to 2024, NHTSA (2016) reported that up to 20% of annual traffic deaths may be related to fatigued driving.



4. Improve fatigue detection

Confounding the problem of under-reporting is the difficulty of detecting fatigued driving. In the U.S. and abroad, fatigued driving identification is limited to post-crash investigations which rely on circumstantial evidence and proxies for fatigued driving crashes (such as nighttime crashes and roadway departure crashes). There is not a currently validated and reliable way to measure driver fatigue following a crash, which adds an additional layer of complexity to accurately quantifying the extent of fatigued-related fatalities.

5. Expand fatigue countermeasures

There are relatively few countermeasures for fatigued driving compared to the other types of risky and impaired driving in the U.S. Without broader, validated countermeasures, it is even more challenging to make progress toward reducing these risks on the road. This limits the implementation of countermeasures and potentially limits reducing fatigued driving and fatalities. Considering the impact that fatigued-driving legislation and similar impaired driving legislation and public awareness have had on other forms of impairment, it is crucial to validate and expand these countermeasures.

Conclusion

Fatigued driving remains a significant but poorly understood traffic safety challenge. Although reported fatigue-related fatalities account for a relatively small share of traffic deaths in the U.S. and internationally, the limited availability of fatigue-specific laws, inconsistent reporting practices, and the absence of reliable methods for detecting driver fatigue indicate that the true scope of the problem is likely substantially larger than current data suggest.

Evidence from nations and U.S. states indicates that fatigue-specific legislation may be associated with lower rates of fatigue-related fatalities, while public awareness campaigns, high-visibility enforcement, and improved police reporting offer additional opportunities to reduce risk and better quantify outcomes.

However, meaningful progress will require addressing fundamental gaps in fatigue detection and measurement, expanding the range of available countermeasures, and improving the consistency of fatigue-related crash reporting. Taken together, these findings underscore the need for a more comprehensive approach to fatigued driving that combines legislation, education, enforcement, data collection, and research to prevent fatigue-related crashes and save lives.