America's Rural Roads: Beautiful and Deadly

GHSA
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The States' Voice on Highway Safety

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This publication is primarily directed to Governors Highway Safety Association (GHSA) members, who consist of the State and Territorial Highway Safety Offices (SHSOs) that are tasked with addressing the behavioral safety issues that plague the nation's roadways and contribute to many traffic crashes. It is not intended to be inclusive of all programs, nor does inclusion of a program imply endorsement by GHSA, State Farm® or the expert panel. Rather it is intended to foster discussion and action that advances the safety of all roadway users. While SHSOs are the primary audience, advocates, educators, elected officials, law enforcement, and planning and transportation professionals will also find it instructive.

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Executive Summary

Almost half of all fatal crashes in the United States occur on rural roads — though only 19% of the U.S. population lives in rural areas.

Every state has rural roads, and every state has citizens who die in crashes on those roads. During the five-year period 2016-2020, **85,002 people lost their lives** in rural road crashes. In fact, **the risk of dying in a crash was 62% higher on a rural road than an urban road for the same trip length.**

This report takes a deep dive into rural road fatal crashes using Fatality Analysis Reporting System (FARS) data. The analysis examines where people crash on rural roads, who crashes and what risky behaviors they are engaged in when they crash.

The high rate of crashes on rural roads are caused by a combination of factors, including lack of safety resources, simpler roadway infrastructure, poor emergency medical service and, to a significant extent, risky driver behaviors. Many fatal crashes happen on straight sections of road. **Lack of seat belt use is the leading culprit; more than half (58%) of motor vehicle occupants killed in rural road crashes were unrestrained.**

Other leading factors include the use of alcohol and other drugs, speeding and distraction. Fatal crashes that involve very high speeds tend to occur on rural roads rather than their urban counterparts — particularly speeds above 100 miles per hour. The report also found that states with high maximum speed limits tend to have higher per capita rates of fatalities on rural roads than states with lower maximum speed limits.

Everyone is at risk on rural roads. Every age group, sex, race and ethnicity is represented in fatalities on these roadways. However, men are involved more than women (more than two to one), mirroring their overinvolvement in crashes of all types. **Young people are at particular risk on rural roads, and that risk does not dissipate when they turn 18 years old.** Instead, they continue to crash and die on rural roads well into their twenties — and at exceptionally high rates, the highest of any age group.

At the other end of the spectrum, adults 65 and older make up 19% of the rural population but account for 21% of rural road deaths. The overrepresentation may seem small, but the graying of the U.S. rural population is reason for concern.

Rural roads come with unique challenges — long distances, limited resources, culture. This report does not downplay the complexity of the barriers faced by rural communities. Instead, it offers concrete strategies to help the State Highway Safety Offices (SHSOs) that address behavioral highway safety issues work collaboratively with rural communities, local agencies, law enforcement and nontraditional safety partners to address rural road safety.

This report discusses proven countermeasures that have applicability to rural road safety. It also presents promising practices that may spur novel ideas by innovative thinkers. Tactics for sharing resources and specialized training can help spread limited resources — funding, equipment and personnel — where they are most needed. Improvements to post-crash care can boost survival rates. And a broad menu of behavioral safety strategies can reduce risky behaviors.

Everyone is at risk on rural roads. Fortunately, every state can reduce that risk.

Introduction

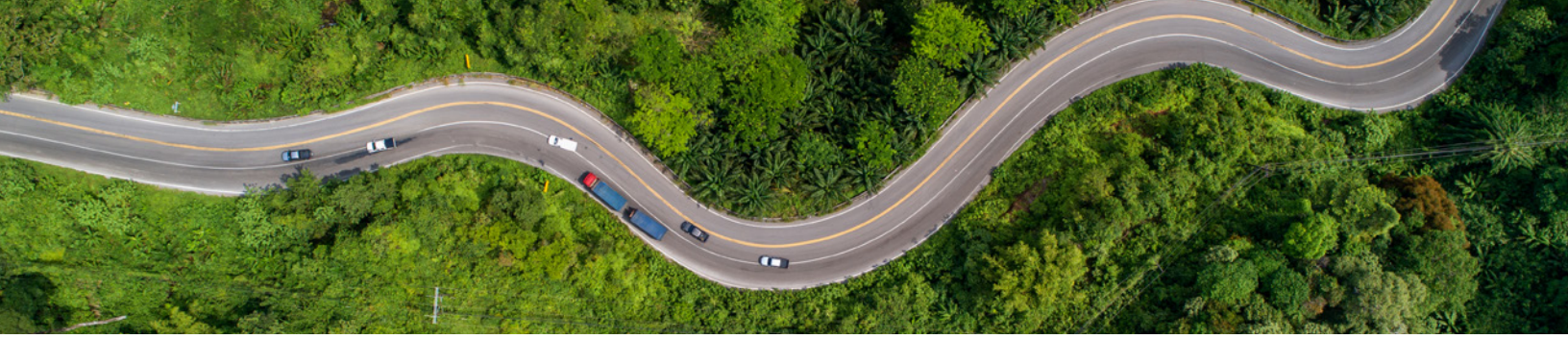
This report examines the extent of the safety problem on our nation's rural roads. It discusses rural roads' unique challenges and offers strategies to help SHSOs and their partners address behavioral highway safety issues.

- This report weaves together findings from sources that include five years (2016-2020) of FARS data; input from an expert panel composed of representatives from a cross-section of government, academic and nonprofit organizations working on rural road safety; findings of a survey of SHSOs; and peer-reviewed and other relevant literature. All this information is offered in summaries with linked resources for more detail.
- While some strategies specifically apply to rural roads, others are applicable to all road types, as the risky driving behaviors discussed in this report do not happen only on rural roads. The National Highway Traffic Safety Administration's (NHTSA) Countermeasures That Work and the Federal Highway Administration's (FHWA) Proven Countermeasures are useful resources that provide proven solutions for many roadway safety challenges. Countermeasures from these publications are discussed in this report only when they provide specific utility to rural roads or rural populations.

What is a rural road? For this report, rural roads are identified by the classifications in the U.S. Department of Transportation's FARS database. Based on U.S. Census Bureau boundaries of urban and urbanized areas, rural roads are those outside urban/urbanized areas.

What is a rural population? For this report, rural populations are those identified by the U.S. Census Bureau's 2018 American Community Survey (ACS). Data and descriptive statistics from the 2018 ACS were used to describe rural population demographics.

Aren't some rural roads close to urban areas? Yes, and the dangers of rural roads apply to all travelers.

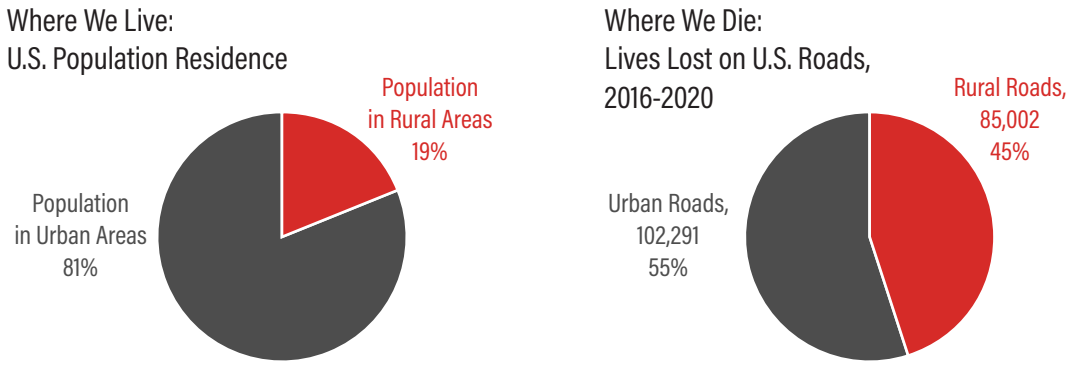


Rural Roads: Beautiful and Deadly

Gravel roads stretch into the distance, reaching for the horizon. Narrow ribbons of asphalt loop and twist through ancient mountains. Strips of packed dirt grind and bump up to mesa country. Narrow lanes link small towns and suburban clusters. In a nation with vast geography, rural roads serve to connect people with their destinations and can be found in every state.

Rural roads are both beautiful and utilitarian, but they hide a deadly secret. **Almost half of all U.S. fatal crashes occur on rural roads — though only 19% of the U.S. population lives in rural areas**.

Figure 1: Rural and Urban Proportions of U.S. Population and Proportions of Crash Fatalities



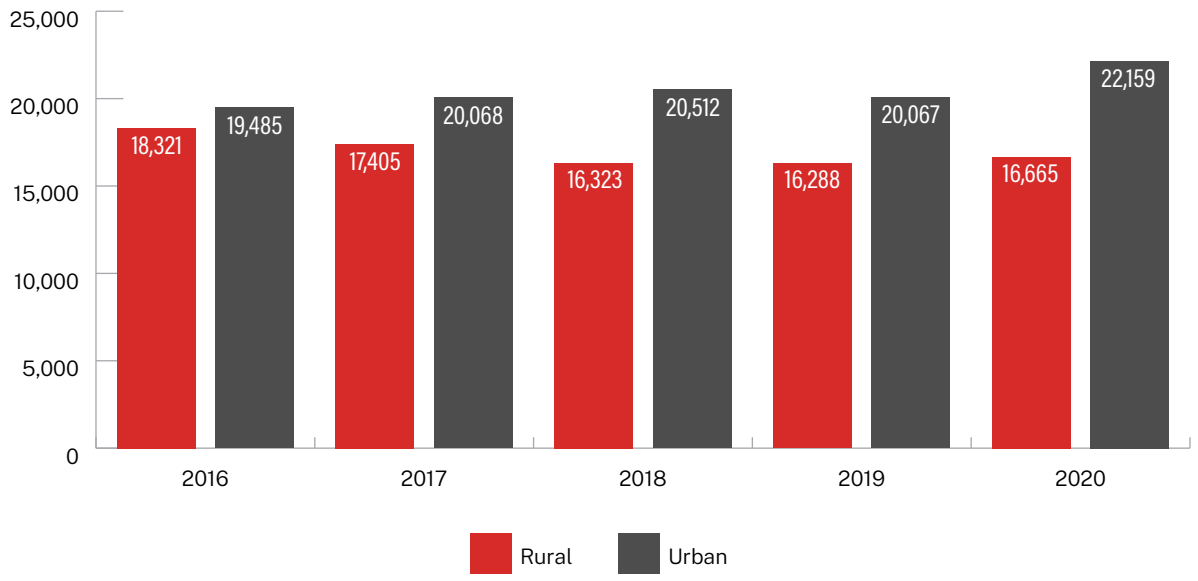
Source: FARS 2016-2020, U.S. Census Bureau American Community Survey 2018

Between 2016 and 2020,[1] 85,002 people lost their lives in crashes on rural roads in the U.S. That's more than the entire population of Scranton, Pennsylvania.[2]

1 Data source: FARS 2016-2020
2 U.S. Census Bureau, American Community Survey 2018

Fatalities on rural roads dropped for several years, as shown in Figure 2. But the decrease was not sustained; fatalities once again started to climb, with 16,665 lives lost in 2020. This increase mirrors what has happened on all U.S. roads since the start of the COVID-19 pandemic, making rural roads even more deadly.

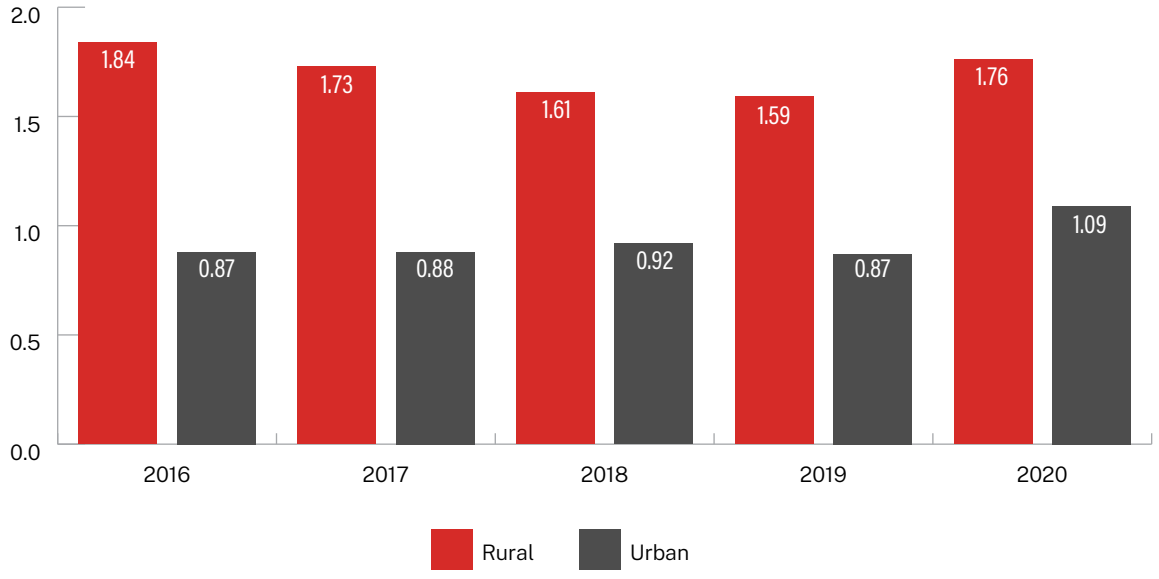
Figure 2: U.S. Rural and Urban Road Fatalities by Year, 2016-2020



Source: FARS

The extent of the problem is not explained by miles traveled. In 2020, **the risk of dying in a crash was 62% higher on a rural road than the same trip length on an urban road**. The FHWA maintains estimates of vehicle miles traveled (VMT) by road type and land use (urban/rural).[3] Calculating a fatality rate by VMT reveals the wildly disproportionate risk of death on rural roads compared to urban roads. This pattern holds true for the entire five-year period examined for this report and the individual years 2016-2020.

Figure 3: Rural and Urban Crash Fatalities per 100 Million Vehicle Miles Traveled, 2016-2020



Source: FARS

Rural roads are deadly. There is no doubt.

A careful examination of the data can help to identify solutions. No one should die in a crash, but when a subgroup of people are involved more than others, the data can lead to useful solutions. Similarly, when a behavior is associated with higher fatal crash involvement, that information can offer a lever to reduce crash fatalities.

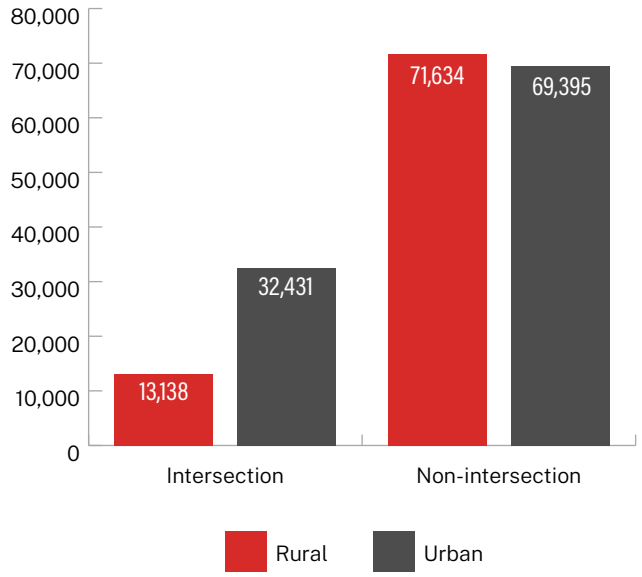
The following sections examine the locations, people and behaviors involved in fatal crashes on rural roads.

3 Table VM-2- Highway Statistics 2020. Federal Highway Administration. https://www.fhwa.dot.gov/policyinformation/statistics/2020/vm2.cfm

Where do rural road crashes happen?

Rural road crash locations differ from their urban counterparts. On urban roads, fatalities tend to happen at intersections. Although intersection crashes do occur on rural roads, they are much less common. The most common crashes on rural roads occur on non-intersection segments.

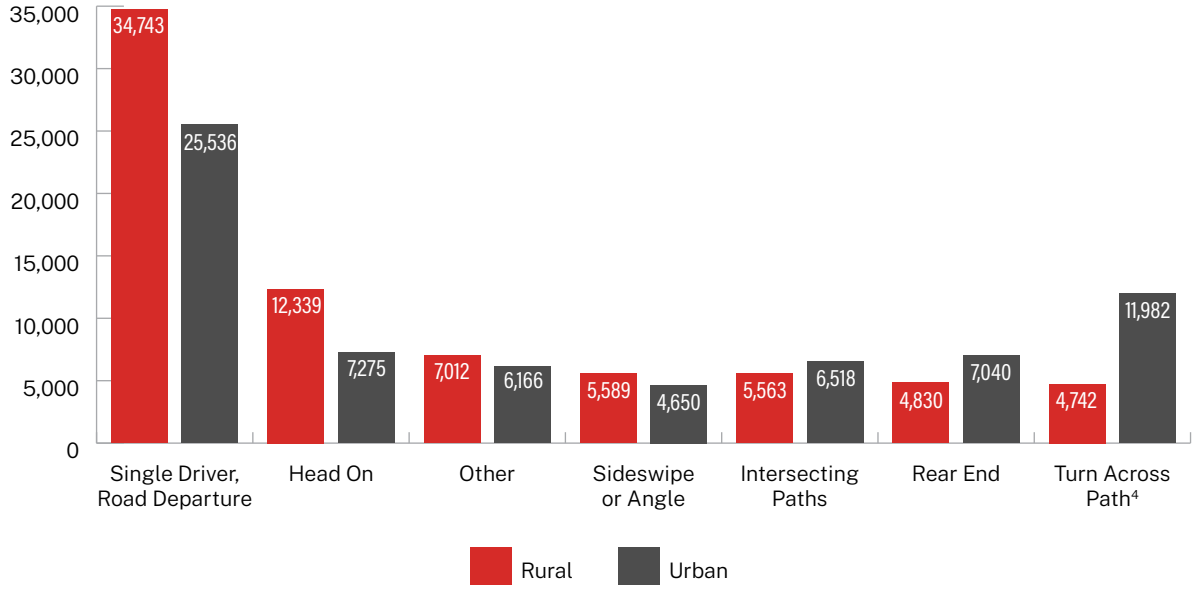
Figure 4: Rural and Urban Crash Fatalities at Intersections and Non-intersections, 2016-2020



Source: FARS

The two most common fatal crash types on rural roads are roadway departure and head-on collisions (Figure 5). These two crash types occur more often on rural roads (roadway departure, 57.6%; head-on collision, 62.9%) than on urban roads.

Figure 5: Rural and Urban Road Fatalities by Crash Type, 2016-2020



Source: FARS

Rural road crashes do not always occur on challenging terrain, nor can they always be explained by the demands they place on a driver's skill. Sixty-one percent of rural road fatalities happened on straight sections of roadway, which can be found on two-lane, narrow country roads as well as multi-lane interstate highways.

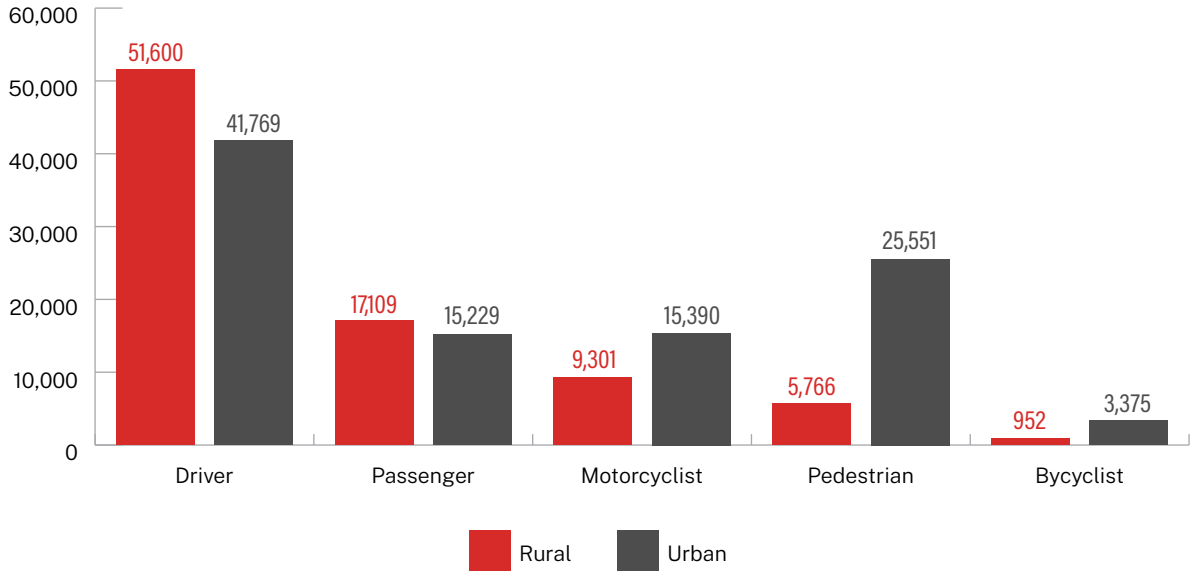
Rural road crashes also cannot be explained by road quality. Less than 1% of deaths on rural roads (2016-2020) involved poor road conditions (puddle, pothole, ice, etc.). It is important to note that many rural roadway facilities likely present opportunities for additional safety infrastructure. Many other resources describe common infrastructure shortcomings on rural roads as well as helpful countermeasures and improvements. A full discussion of infrastructure safety is beyond the scope of this report; rather, this resource will focus largely on the application of behavioral highway safety approaches that are within the SHSO mandate.

4 "Turn Across Path" refers to crashes in which one traveler turns across the projected path of another traveler (e.g., vehicle turns left in front of oncoming traffic without a sufficient gap).

Who is killed in fatal crashes on rural roads?

Most people killed in rural fatal crashes are motor vehicle occupants (drivers and passengers) and motorcyclists, with pedestrians and bicyclists making up a smaller percentage. Figure 6 illustrates, however, that more motor vehicle drivers (55%) and passengers (52.9%) were killed on rural roads, while more motorcyclists, pedestrians and bicyclists died on urban roads.

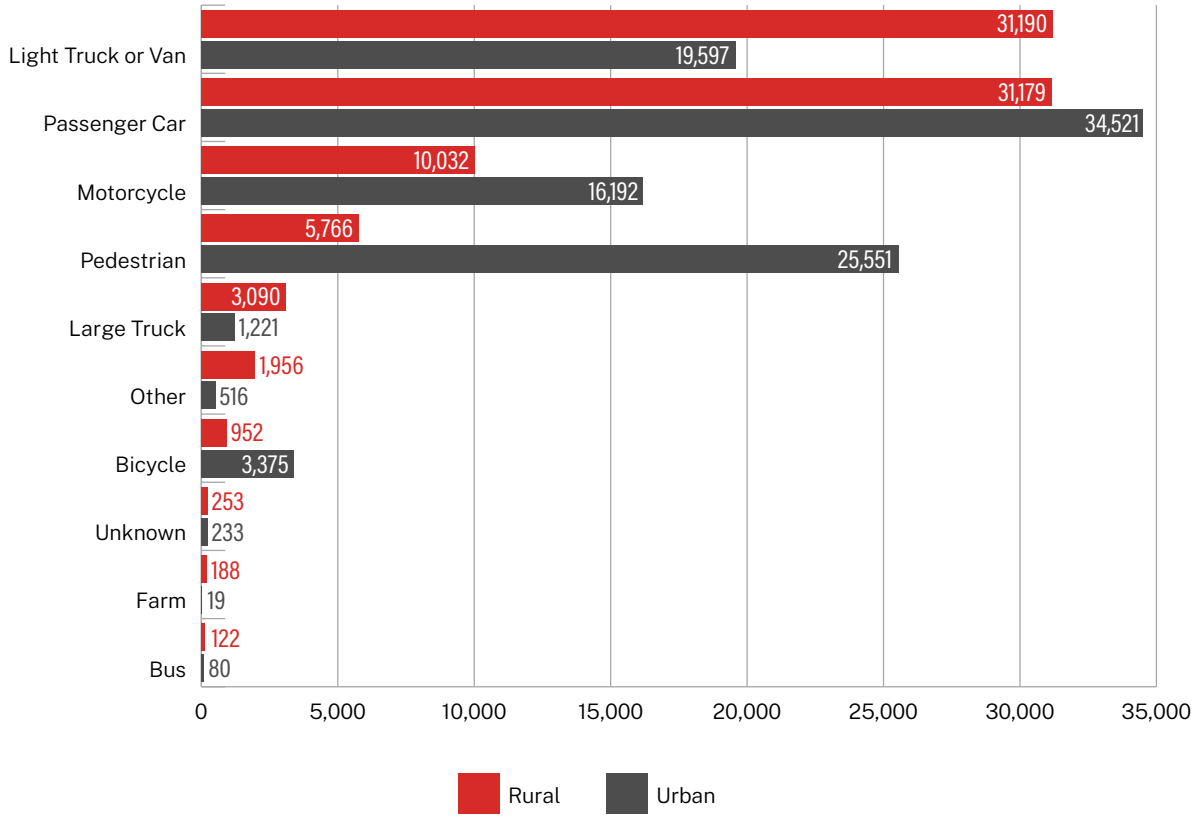
Figure 6: Rural and Urban Crash Fatalities by Person Type, 2016-2020



Source: FARS

Fatalities on rural roads usually involve pickups and passenger cars (Figure 7). The high number of fatalities involving pickup truck occupants traveling on rural roads outpaced urban crashes involving these same vehicles by 22% (61.4% versus 38.6%). In addition, slightly more rural road fatalities involved pickups than passenger cars. During this five-year period, passenger vehicle deaths were split evenly between rural and urban roadways, while motorcyclist fatalities accounted for slightly more than one third (38%) of rural road deaths. Notably, nearly three-quarters of fatalities involving large trucks occurred on rural roads, making these roads especially dangerous for some of the nation's most experienced drivers.

Figure 7: Rural and Urban Fatalities by Vehicle Type, 2016-2020

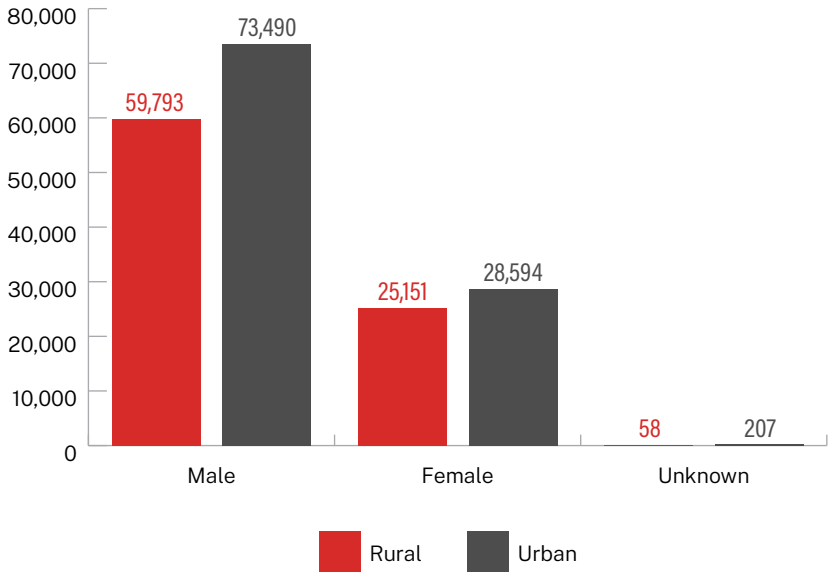


Source: FARS

Are men more likely to die on rural roads?

Like all crashes, men were killed more often than women in rural road crashes, as shown in Figure 8. Men outnumber women more than two to one in rural crash fatalities.

Figure 8: Rural and Urban Road Fatalities by Sex, 2016-2020

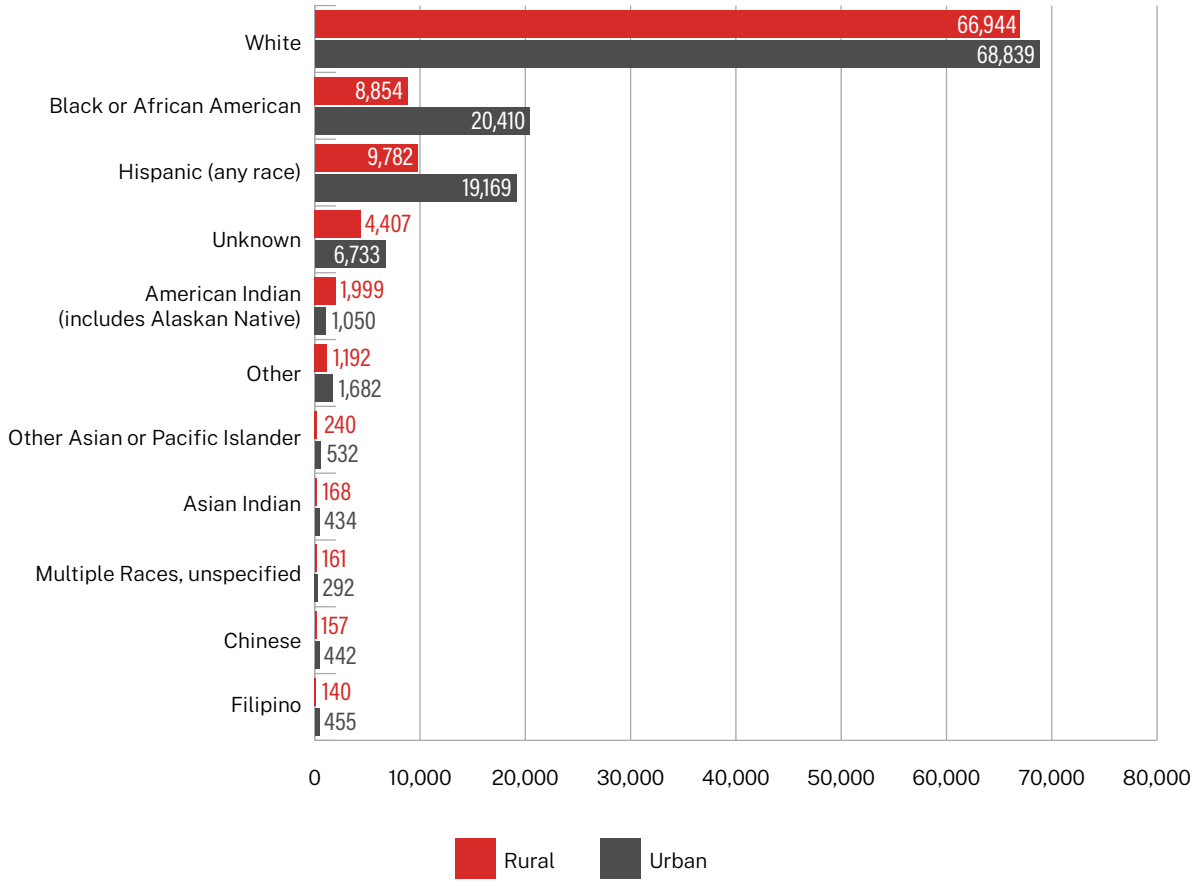


Source: FARS

Does race or ethnicity play a role in rural road fatalities?

The overwhelming majority of people (79%) who died in rural road crashes during the five-year period examined for this report were white. People of Hispanic ethnicity[5] accounted for 12% of rural road crash deaths (9,782), followed by Black or African American persons at 10% (8,854). Two percent of these deaths involved American Indian/Alaskan Native people (1,999), the only racial group more likely to die on rural roads than on urban roads, as shown in Figure 9.

Figure 9: Rural and Urban Road Fatalities by Race and Ethnicity, 2016-2020



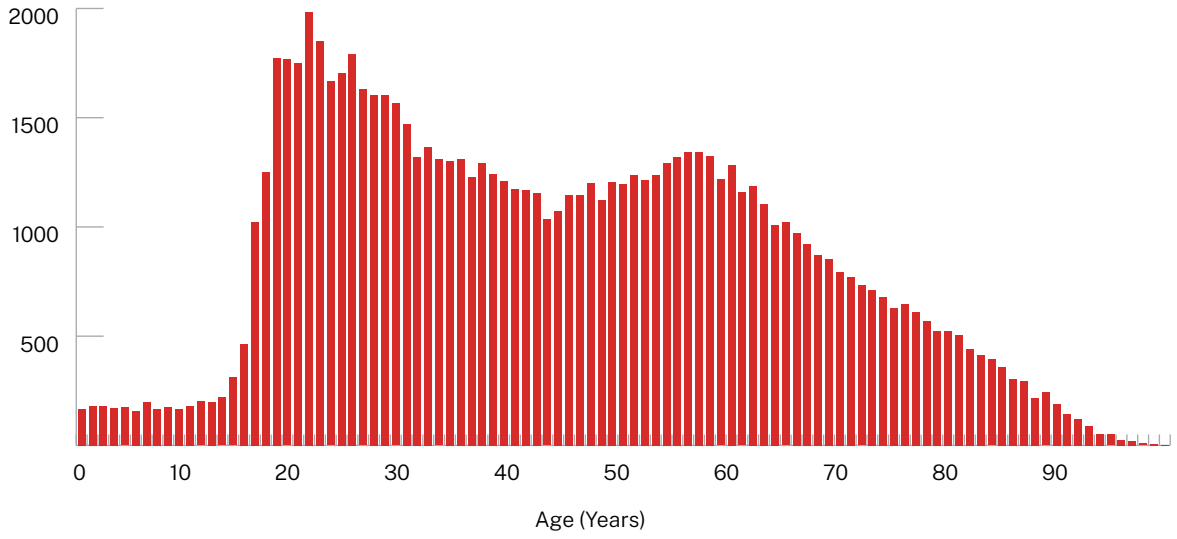
Source: FARS

5 People of Hispanic ethnicity can be any race, so totals will not sum to 100%.

Does age play a role in rural road fatalities?

When the number of people fatally injured in rural road crashes is tabulated by age, teens and young adults were overrepresented in these fatalities, as shown in Figure 10. Fatality rates declined with age until the mid-forties, when they once again began to climb. The mid to late fifties were characterized by higher fatality rates on rural roads, pointing to the need for states to closely examine their demographic data to identify age-related clusters.

Figure 10: Rural Crash Fatalities by Age, 2016-2020



Source: FARS

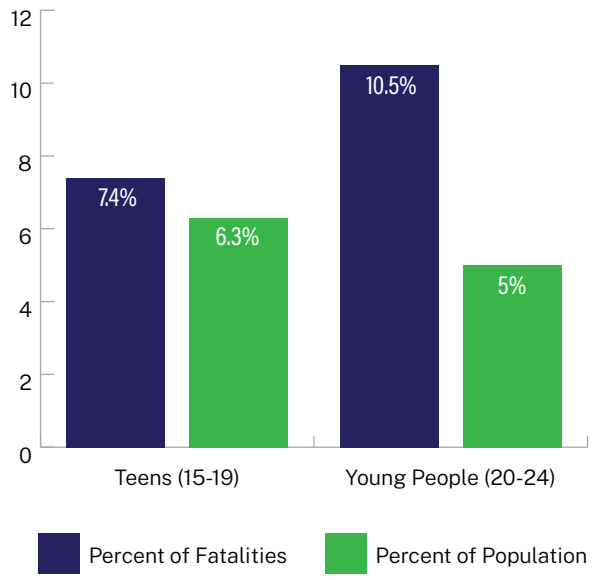
When examining age groups, states should seek to answer two critical questions. Are specific age groups disproportionately killed in rural road crashes? Are specific age groups of drivers disproportionately involved in rural road fatalities?

Young People Are at Significant Risk

People under age 25 are overrepresented in rural road fatalities. Based on their share of the rural population, they die in rural road crashes more often than any other age group.

Drivers under 25 are also more likely to be involved in rural road fatal crashes than their population would suggest. Teens 15-19 years of age make up only 7.4% of the rural population but were driving in 11.7% of rural road fatal crashes. The ratio for young people ages 20-24 is even worse; they represent 5% of the rural population but were behind the wheel in 10.5% of rural road fatal crashes (Figure 11).

Figure 11: Teen and Young Adult Driver Involved Fatal Crash Rates Compared to Rural Population Rates for These Age Groups, 2016-2020

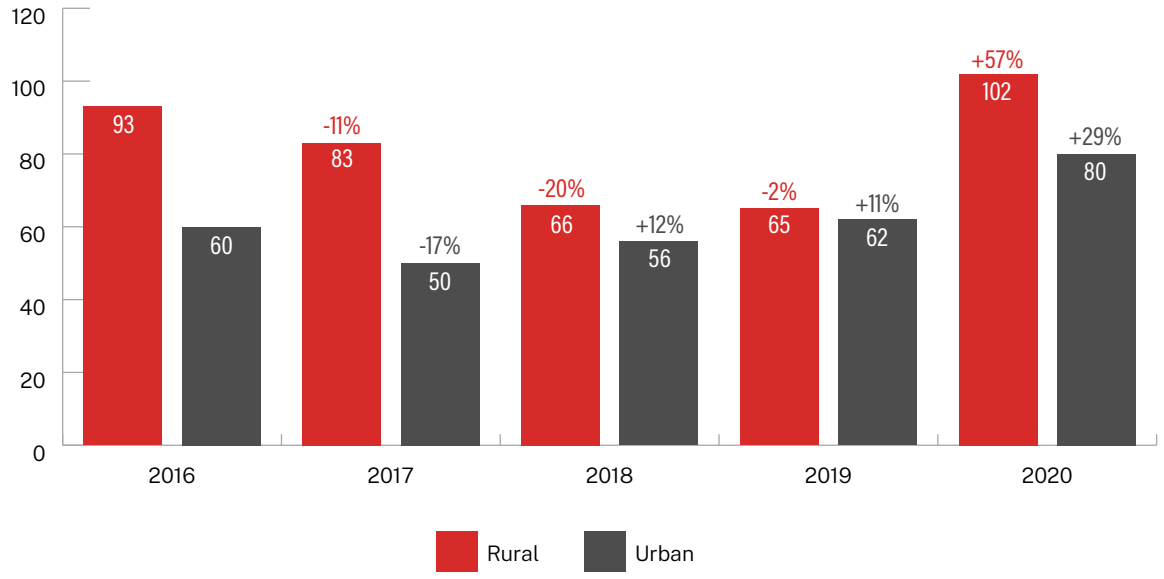


Source: FARS

The Danger to Very Young Teen Drivers

In some states, particularly those with more rural areas, teens can obtain driving privileges before they turn 16 years old. These licenses generally include restrictions but still allow teens to travel to and from school and work, exposing these very young and inexperienced drivers to crash risk. The average mileage driven by these young teens is unknown. However, the data show that when these drivers are involved in fatal crashes, most occurred on rural roads (Figure 12). Although fatalities on rural roads involving 14 and 15-year-old drivers had declined from 93 (2016) to 65 (2019), they spiked in 2020, with rural fatalities for these young teen drivers jumping by 57%. These increases mirror the national uptick in roadway deaths during the first year of the pandemic.

Figure 12: Annual Rural and Urban Road Fatalities Involving Drivers Ages 14-15, 2016-2020

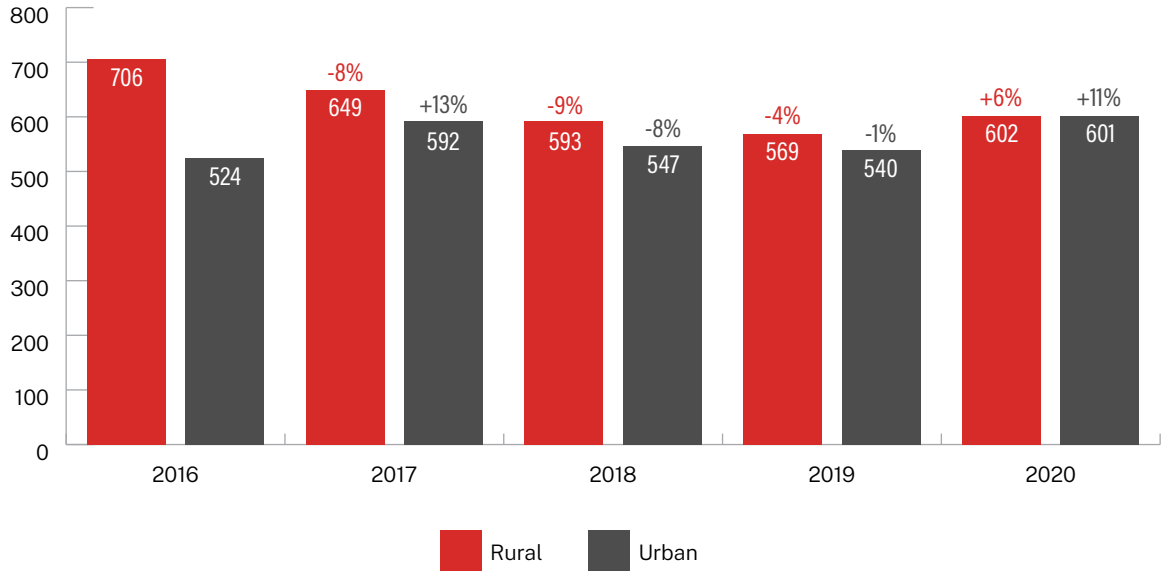


Source: FARS

Teens Ages 16-17

Sixteen- and 17-year-old drivers are inexperienced and immature.[6] From 2016 through 2020, fatalities that involved these novice drivers were more likely to occur on rural roads. Though the rural and urban rates have converged in the past few years, it is important to remember that rural roads represent a fraction of the miles traveled in the U.S..

Figure 13: Annual Rural and Urban Road Fatalities Involving Drivers Ages 16-17, 2016-2020



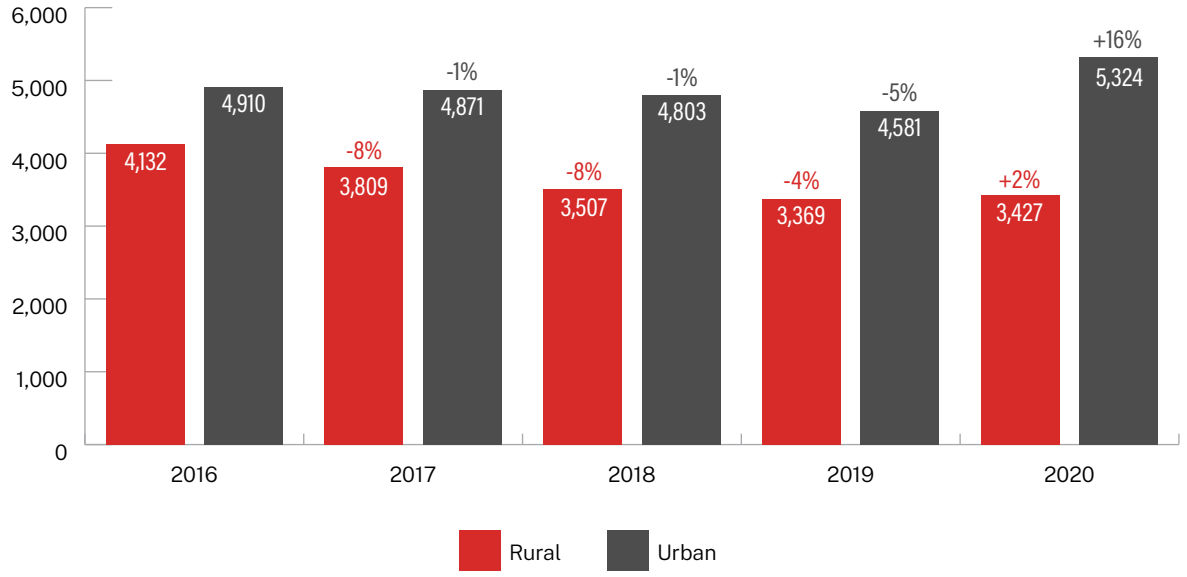
Source: FARS

6 Retting, R. (2021). Teens and speeding: Breaking the deadly cycle. Governors Highway Safety Association. http://www.ghsa.org/sites/default/files/2021-02/GHSA_TeenSpeeding_Feb16.pdf

The Risk Doesn't End at Age 18

The overrepresentation of young people in rural fatal crashes does not end at age 18. Though nearly all states put licensing restrictions in place to address the risk for drivers under age 18, the danger to those over 18 is even more disproportionate, according to FARS data. Rural communities lose their young people to outmigration,[7] but the data also show they lose young people in motor vehicle crashes — many of which are preventable — on rural roads. While the number of fatal crashes involving this age group had been declining on both rural and urban roads starting in 2017, the trend reversed in 2020, increasing 2% and 16%, respectively (Figure 14).

Figure 14: Annual Rural and Urban Road Fatalities Involving Drivers Ages 18-24, 2016-2020



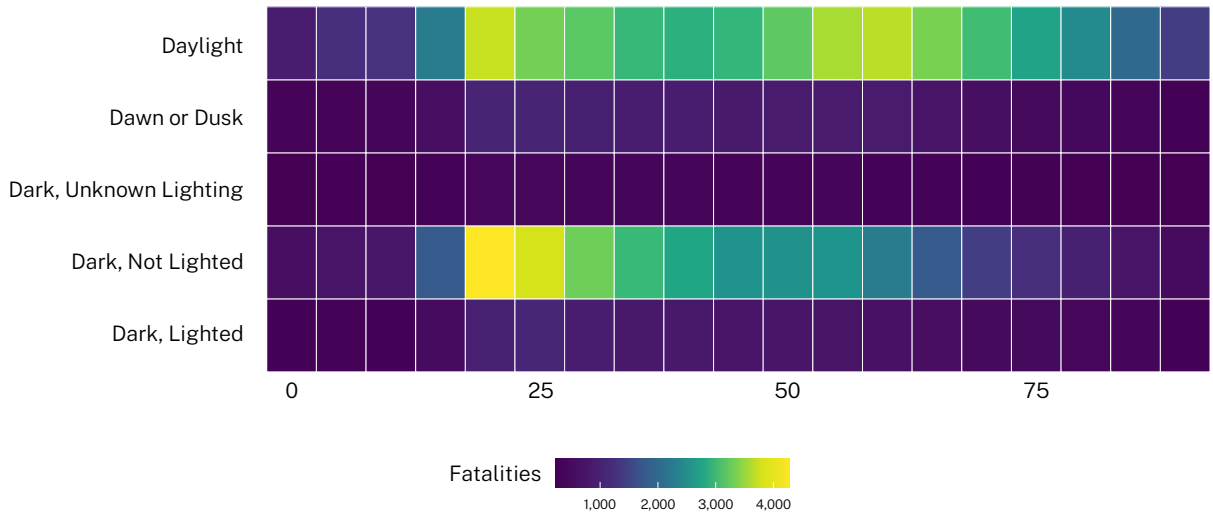
Source: FARS

7 Rural America at a Glance, 2018 Edition. U.S. Department of Agriculture. https://www.ers.usda.gov/webdocs/publications/90556/eib-200.pdf

What About Older Drivers?

Age-related visual decrements typically begin in the early forties but issues with night vision, vulnerability to glare, difficulty refocusing, and other visual challenges that impact safe driving are well pronounced in the fifties.[8] However, crashes that occur in the dark do not explain the surge in crashes for drivers 50-64 years of age. Crashes for these drivers occur mostly in the daylight (Figure 15), confirming that older drivers face risk at all times of the day.

Figure 15: Rural Road Fatalities by Lighting and Age, 2016-2020



Source: FARS

8 Staplin, L., Ball, K. K., Park, D., Decina, L. E., Lococo, K. H., Gish, K. W., & Kotwal, B. (1999). *Synthesis of human factors research on older drivers and highway safety, Volume I: Older driver research synthesis.* (FHWA-RD-97-094). Federal Highway Administration. https://rosap.ntl.bts.gov/view/dot/35362

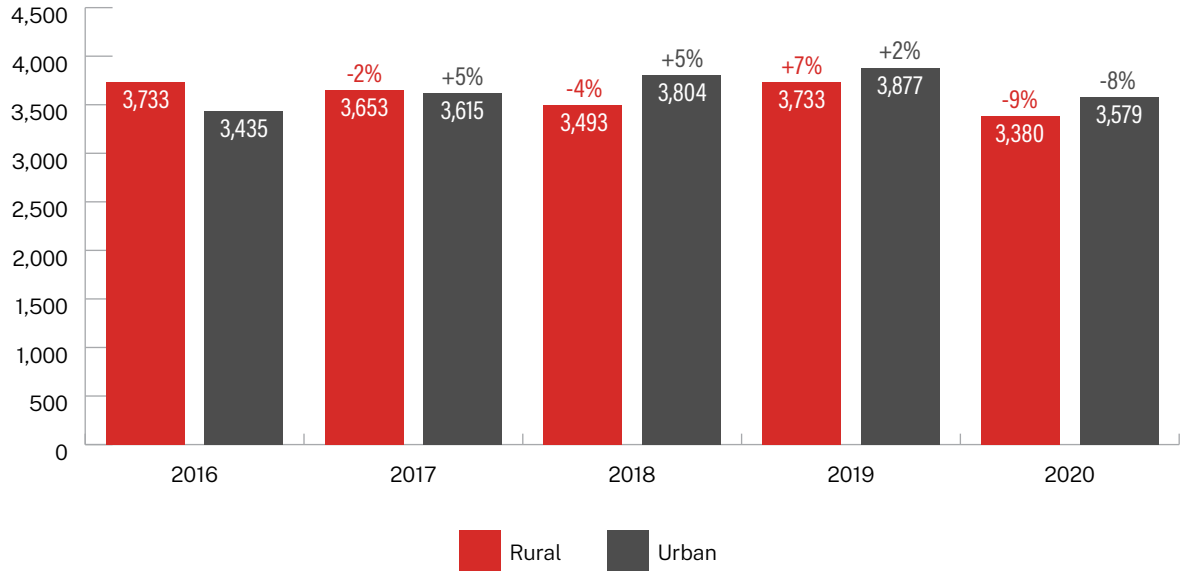
Crash Risk for Drivers 65+

Adults 65 and older make up 19% of the rural population but were 21% of those killed in crashes on rural roads between 2016 and 2020. Although the overrepresentation seems small, the graying of the U.S. rural population is reason for concern.

Those 65 and older are the fastest-growing segment of the rural population for multiple reasons.[9] Some rural areas are attractive as retirement destinations, prompting more retirees to move in. Other areas experience the outmigration of young residents, resulting in older adults becoming the proportionately larger population group. These two trends have been in place for decades. More recently, death rates of rural middle-aged adults have risen, again leaving those over 65 as proportionately larger segments of the population.

The graying of rural America is not expected to stop or reverse course, which should raise an alarm for the highway safety community. Unlike the youngest drivers, fatalities involving older drivers on both rural and urban roads have, for the most part, been slowly increasing since 2016 (Figure 16). However, they declined 9% and 8%, respectively, in 2020, unlike the fatalities involving other age groups. This decrease in fatalities may be the result of this "high-risk" age group limiting travel outside their homes to minimize exposure to COVID-19. This is likely to change as the nation transitions from a pandemic to endemic environment.

Figure 16: Rural and Urban Fatalities Involving Drivers 65 and Older, 2016-2020



Source: FARS

9 Rural America at a Glance, 2018 Edition. U.S. Department of Agriculture. https://www.ers.usda.gov/webdocs/publications/90556/eib-200.pdf

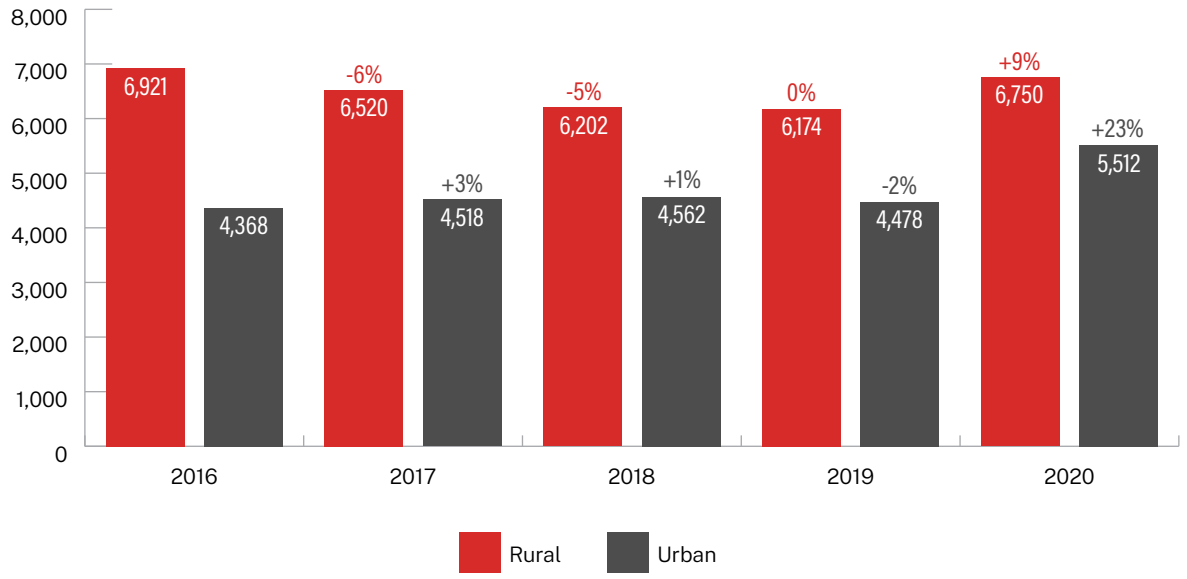
What risky behaviors are factors in rural crashes?

In addition to identifying who is involved in rural fatal crashes, identifying the behavioral risk factors is essential. Unfortunately, several risky behaviors are associated with fatalities on rural roads.

Rural Road Users Don't Always Buckle Up

A lack of seat belt use is a hallmark of fatalities on rural roads, as shown in Figure 17.[10] More than half (58%) of U.S. motor vehicle occupants killed in rural road crashes between 2016 and 2020 were unrestrained. During the five-year period, 32,567 motor vehicle occupants chose not to buckle their seat belts and then died in rural road crashes. In 2016 and 2017, unrestrained fatalities on rural roads dropped slightly and then rose beginning in 2018. However, these gains were mostly erased by the 9% increase between 2019 and 2020.

Figure 17: Rural and Urban Unrestrained Motor Vehicle Occupant Fatalities, 2016-2020



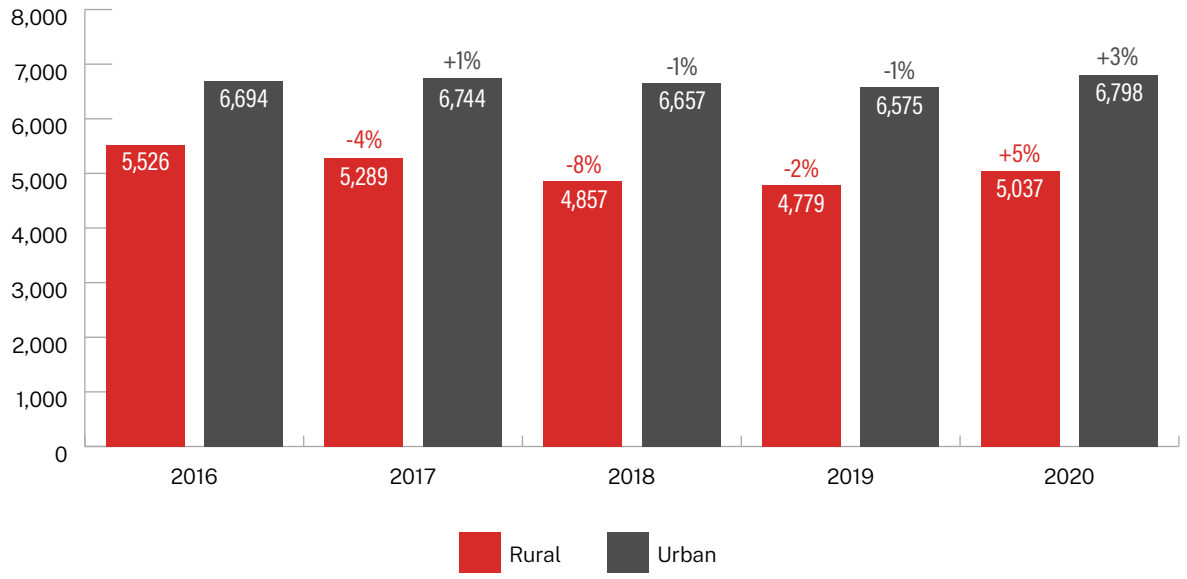
Source: FARS

10 When examining restraint use, only vehicle occupants are included. Motorcyclists, pedestrians and others who are not vehicle occupants are excluded. Also excluded are cases where restraint use is not known. The remaining cases are those vehicle drivers and passengers who were killed in motor vehicle crashes and whose use of seat belts and child safety seats is known.

Alcohol and Other Drugs as a Factor

Forty-three percent of alcohol-related motor vehicle deaths occurred on a rural road. According to 2016-2020 FARS data, 25,488 people died in alcohol-related crashes on rural roads (Figure 18). While these deaths had dropped slightly on rural roads and were holding steady on urban roads starting in 2017, they increased 5% and 3%, respectively in 2020. Considering that only 19% of the U.S. population lives in rural areas, clearly alcohol involvement is a problem on rural roads.

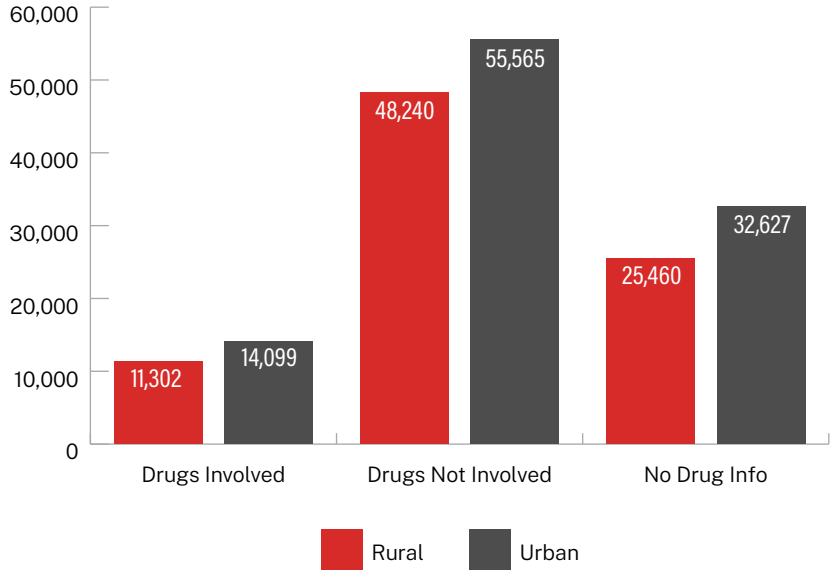
Figure 18: Rural and Urban Road Fatalities Involving Alcohol, 2016-2020



Source: FARS

The involvement of alcohol in traffic crashes is well-documented, as approximately **5,000 lives are lost in alcohol-involved crashes on rural roads each year (5,037 in 2020)**. Drug involvement, however, is under-investigated. According to FARS, 2,644 lives were lost in 2020 in drug-involved crashes on rural roads, but this is likely an undercount. Almost twice as many rural road crash deaths (5,335) have no information about potential drug involvement, leaving a gaping hole where information should be. As shown in Figure 19, rural road crashes mirror urban crashes in the lack of information about drug involvement. As jurisdictions seek to improve this gap, rural communities face unique challenges that will be covered later in this report. Determining the contributing factors, particularly when it comes to impairment, is critical for reducing recidivism and saving lives.

Figure 19: Rural and Urban Road Fatalities and Testing for Drug Involvement, 2016-2020

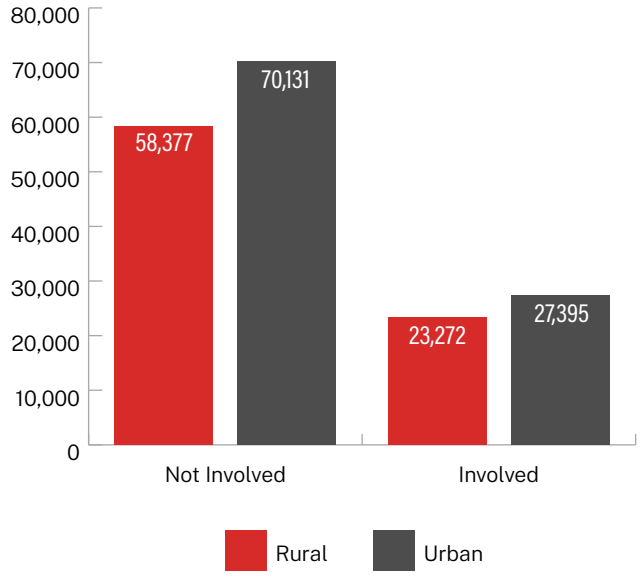


Source: FARS

Speed Kills on Rural Roads

Speed is a known factor in 27% of rural road fatalities, as shown in Figure 20. However, when examining only fatalities in crashes that involved speeding, 46% of those fatalities occurred on rural roads.

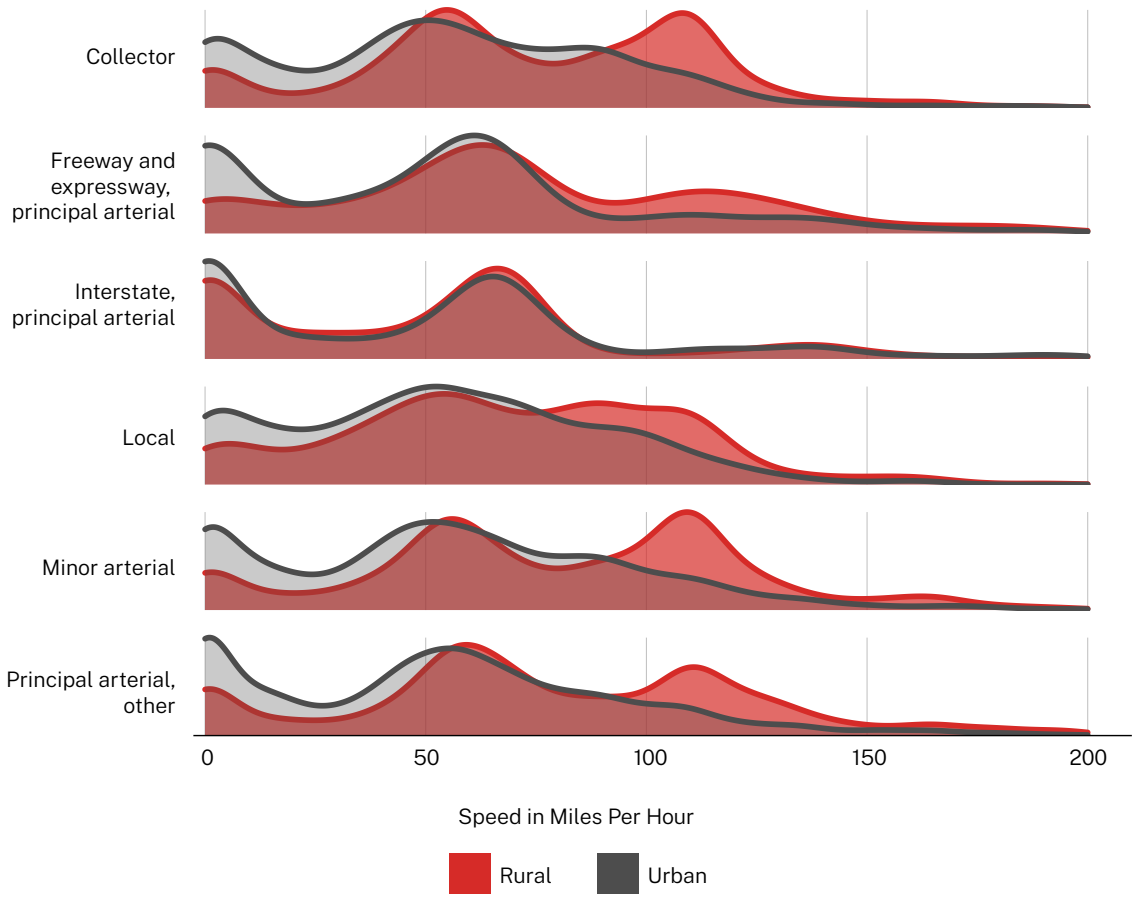
Figure 20: Rural and Urban Fatalities in Crashes with Speeding as a Factor, 2016-2020



Source: FARS

Just how extreme is the speeding problem on rural roads? Figure 21 illustrates the findings of an examination of the estimated crash impact of speeds by road type on rural (red) and urban (gray) roads. For each road type (e.g., collector, freeway, interstate, local), the height of the line (y-axis) indicates the number of crashes at each speed: the higher the line, the more crashes occurred at that impact speed. The highest impact speeds in fatal crashes occurred on rural roads far more than urban roads — particularly when it came to impact speeds above 100 miles per hour. Except for interstate/principal arterial where rural and urban fatalities appear almost equal, these extreme impact speeds occurred far more often on rural than on urban roads.

Figure 21: Fatal Crash Impact Speed (MPH) Distributions on Rural and Urban Roads, 2016-2020

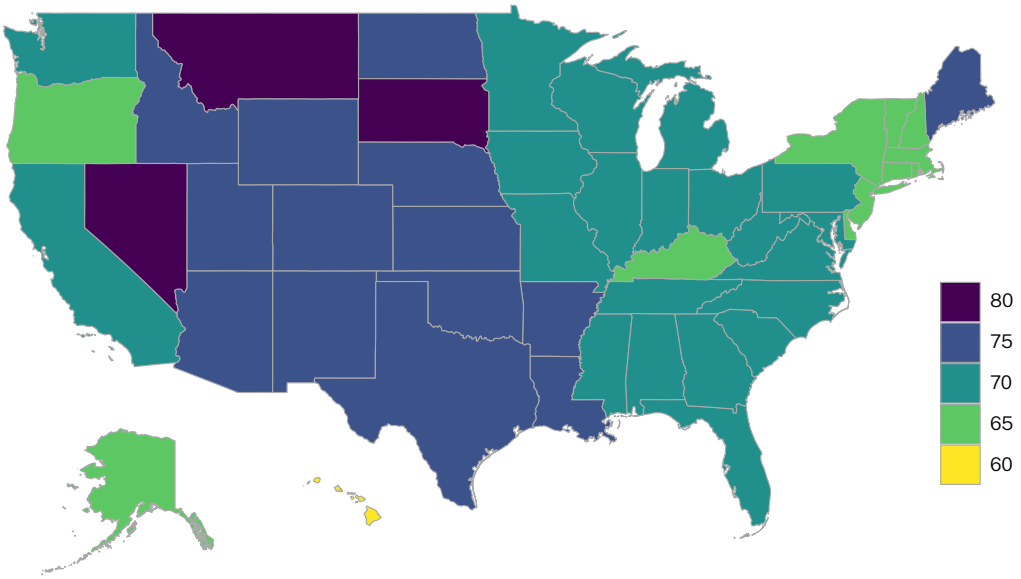


Source: FARS

There are many reasons why speeding occurs on rural roads — even local rural roads. Behavioral reasons will be covered in later sections. However, the extremely high impact speeds beg for an examination of high-speed travel.

States set their own maximum speed limits. These top speed limits cover a wide range, with three states allowing speed limits as high as 80 miles per hour, as illustrated below in Figure 22. This broad range of maximum speed limits calls for an analysis of the relationship between maximum travel speeds and fatal crashes. There is precedent for this hypothesis, with previous analyses establishing that rising speed limits over time have contributed to increased crash deaths, including a rise over time in deaths on non-interstate roads.[11]

Figure 22: Maximum Speed Limits on Rural Interstates by State



Source: IIHS[12]

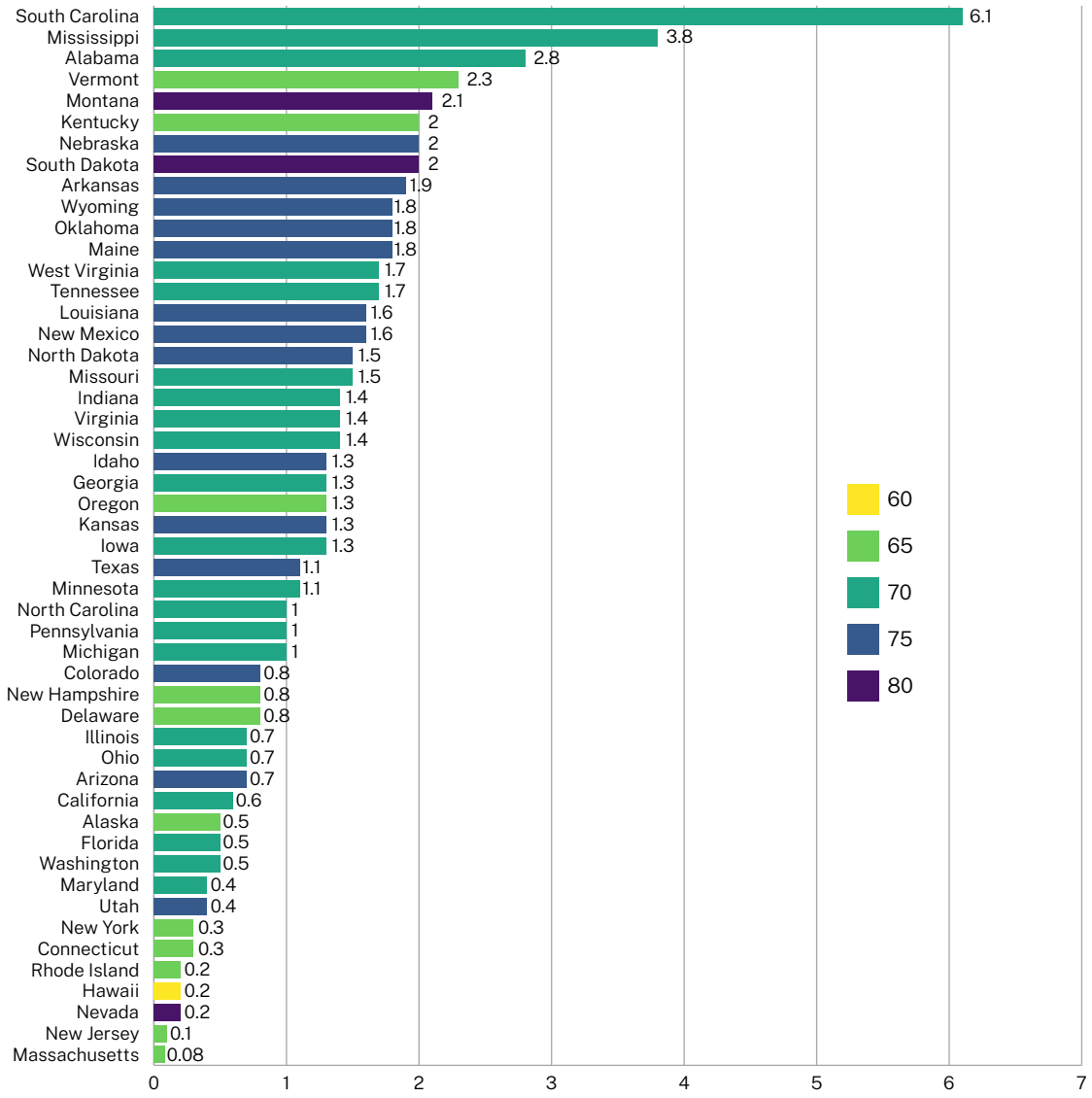
Higher maximum speed limits appear to be associated with higher rates of rural road fatalities per 100,000 state population. The relationship varies, but the overall trend, as shown in Figure 23, is obvious and confirms that speeding unnecessarily claims lives. Of the states with the top 12 fatality rates per capita, 10 have maximum speed limits of at least 70 miles per hour. Two of those ten have the highest maximum speed limits of 80 miles per hour.

11 Farmer, C. (2019, April). The effects of higher speed limits on traffic fatalities in the United States, 1993-2017. Insurance Institute for Highway Safety. https://www.iihs.org/topics/bibliography/ref/2188

12 Maximum posted speed limits by state (iihs.org). Speed limits used for analysis are those that apply to rural interstate highways state-wide, not exceptions in limited areas.

The 12 states with the lowest per capita rural road fatality rates look quite different. Seven states have maximum speed limits of 65 miles per hour or less. Only two states have maximum speed limits of 75 miles per hour or more.

Figure 23: Rural Road Fatalities per 100,000 Population by State Maximum Speed Limit, 2016-2020

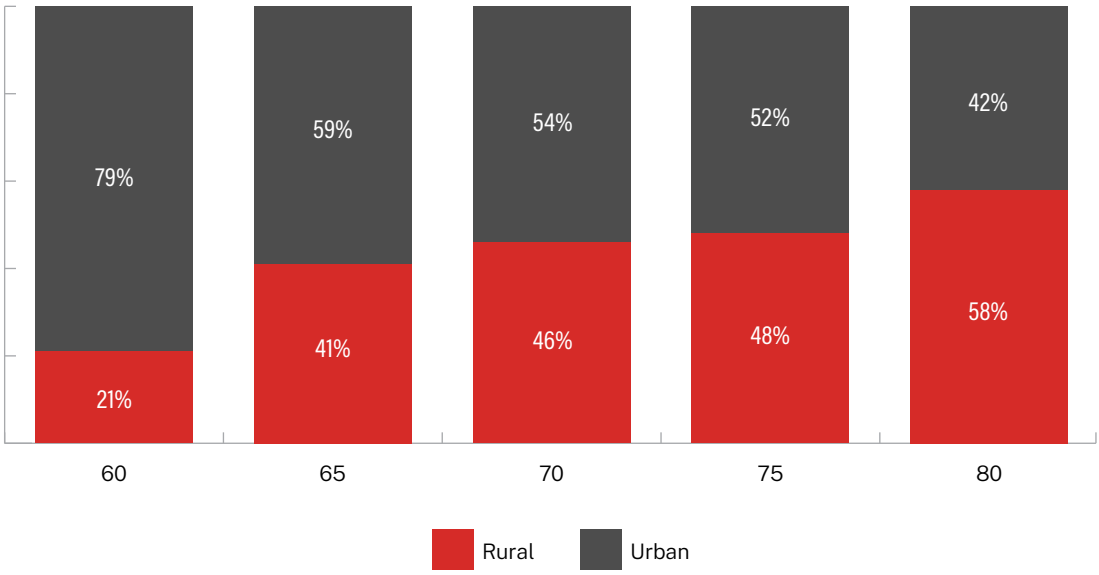


Source: FARS, IIHS

Urban roads have frequent traffic control devices, vehicular traffic and a built environment that discourages or prevents extremely high speeds. Rural roads — even local rural roads — are more likely to be open and uncongested. If high maximum speed limits lead to dangerous behaviors on local roads, will the resulting crashes appear disproportionately on rural roads?

Higher maximum speed limits appear to be associated with a greater proportion of fatalities occurring on rural roads (Figure 24). Not only are higher maximum speed limits related to higher per-capita rural road fatality rates, that burden falls disproportionately on rural roads as the maximum speed limit rises.

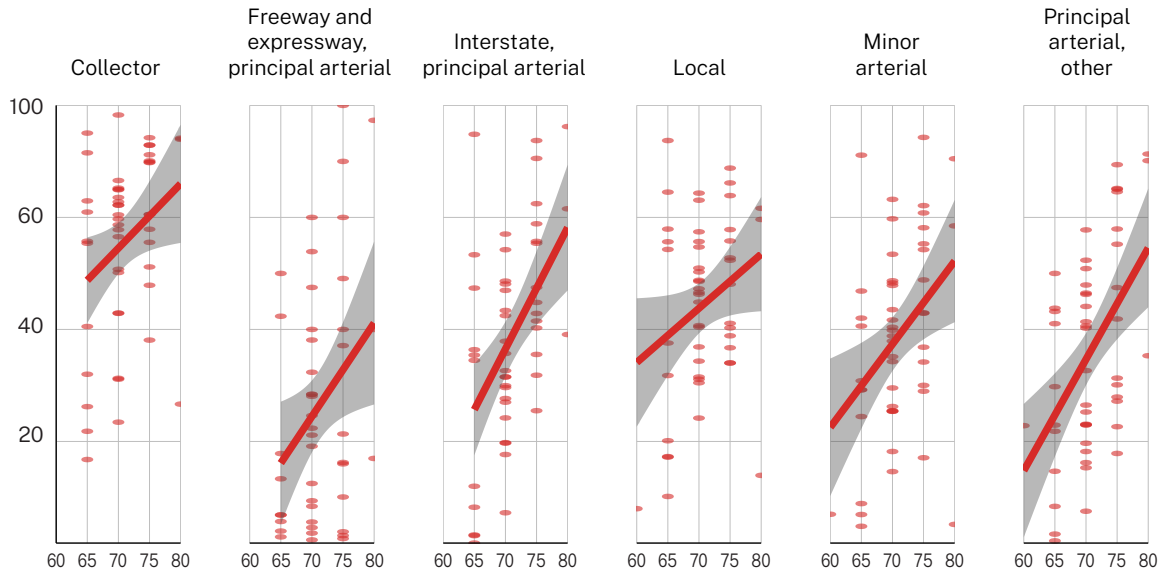
Figure 24: Proportion of Fatalities on Rural and Urban Roads by State Maximum Speed Limit, 2016-2020



Source: FARS, IIHS

It's tempting to assume this relationship holds true only on roads with the highest speed limits, which are typically interstates. However, the association between maximum speed limits and fatalities is evident for all road types as depicted in Figure 25. The upward slope of the line shows that higher maximum speed limits are associated with higher proportions of rural road fatalities compared to urban road fatalities. Even local roads show a higher proportion of rural road fatalities when maximum interstate speed limits are high.

Figure 25: Relationships Between State Rural Fatality Proportions and Maximum Speed Limits for Each Road Type, 2016-2020

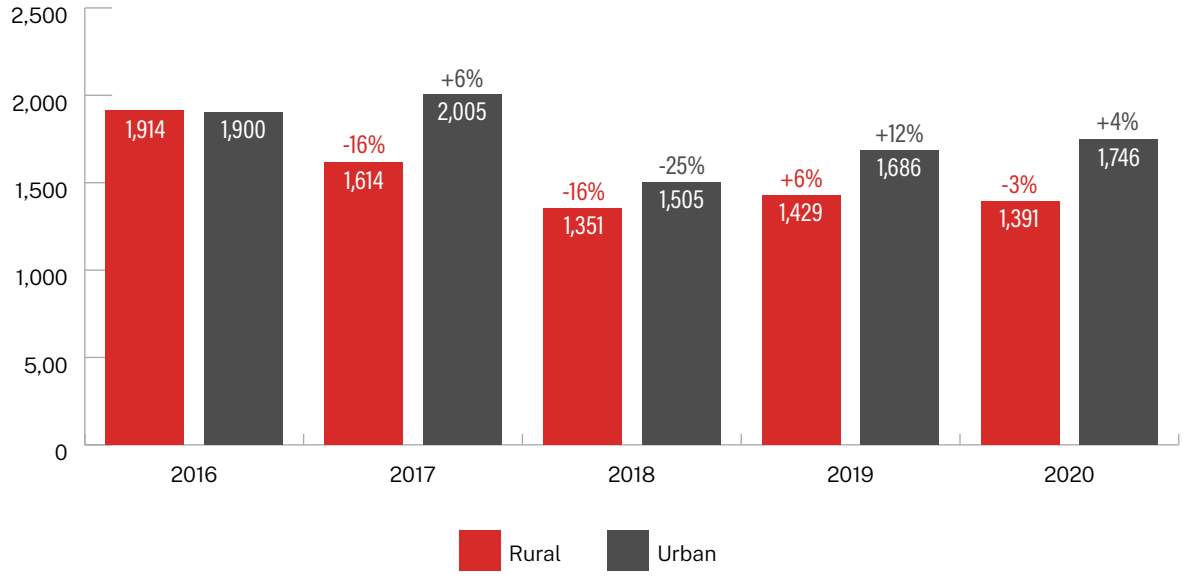


Source: FARS

Distraction is a Problem on Rural Roads

From 2016 through 2020, at least 7,699 people died in crashes on rural roads that involved driver distraction (Figure 26). Of all fatalities that involved distraction, 46% occurred on rural roads — far more than the rural population would predict. FARS data on distracted driving is limited, in part because driver distraction is difficult for law enforcement or crash investigators to determine. First responders arriving on the scene of a crash will not know if a driver had been using a cell phone, adjusting the radio or looking away from the road. Distraction is believed to be a factor in roadway departure crashes, one of the two most prevalent fatal rural road crash types. Despite the difficulty documenting its involvement, the problem must be addressed.

Figure 26: Rural and Urban Fatalities Involving Driver Distraction, 2016-2020



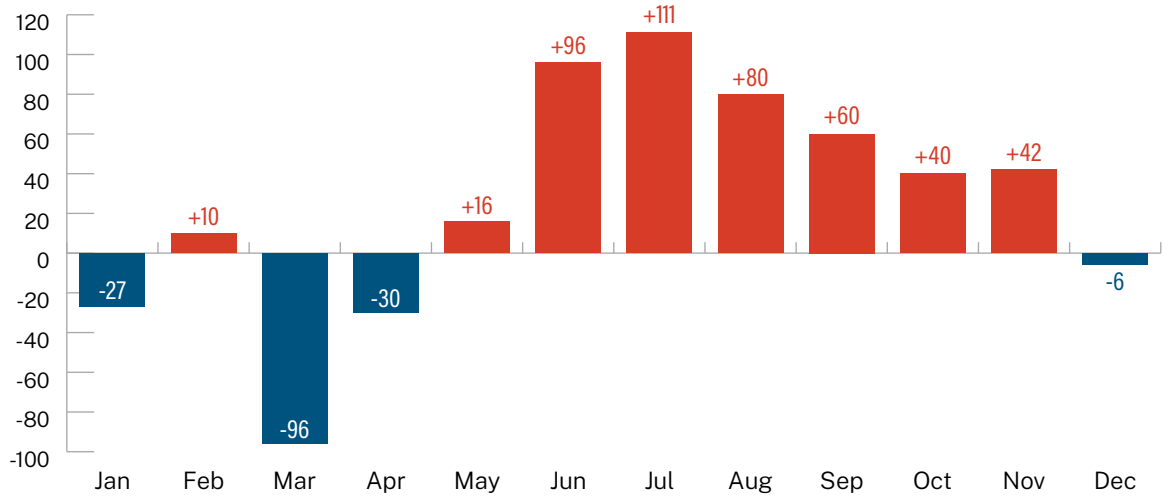
Source: FARS

Less Driving, But More Fatalities in 2020

Among the trends in fatal crashes, 2020 data can be difficult to interpret but cannot be ignored. The public health crisis caused by COVID-19 affected roadway travel, particularly during the lockdowns that began in March 2020. Despite the historic drop in VMT nationwide, motor vehicle fatalities increased. This unexpected uptick was the result of some drivers predominantly engaging in three risky behaviors – speeding, impaired driving and lack of seat belt use.[13] Figures 27-29 illustrate restraint nonuse, alcohol involvement and speeding in rural road fatalities for 2020 by month. Percentage changes show how each month in 2020 differs from the mean of that month for years 2016-2019.

In 2020, there was a marked decrease in rural road fatalities in March and April, followed by a dramatic increase in the summer months that coincided with the three risky behaviors. The incidence of these behaviors generally dropped by the end of the year. However, preliminary 2021 NHTSA fatality data indicate that some drivers continued to engage in these risky behaviors, making it likely the uptick in rural road fatalities persisted through 2021.

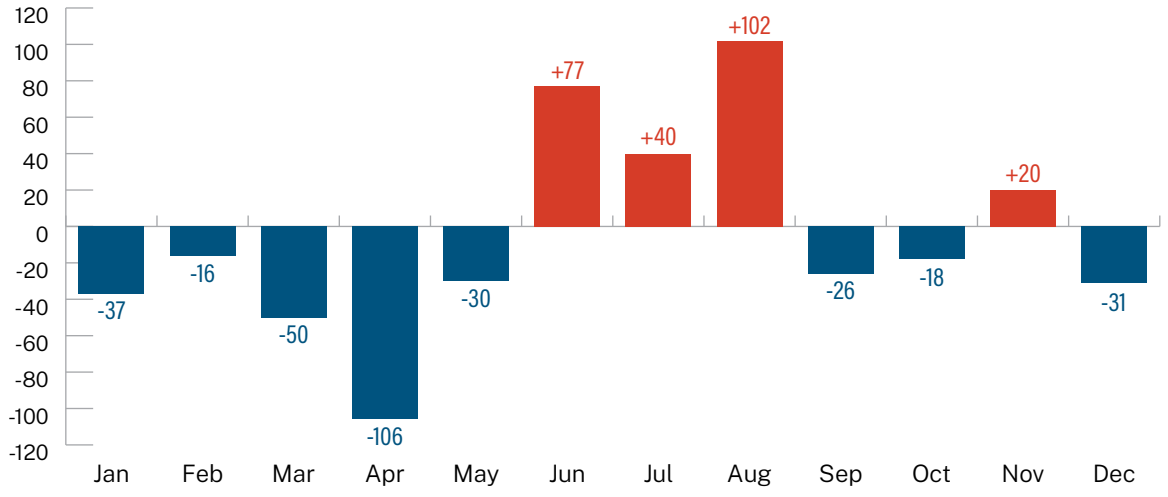
Figure 27: Percentage Increase in 2020 Unrestrained Rural Road Fatalities by Month Compared to 2016-2019



Source: FARS

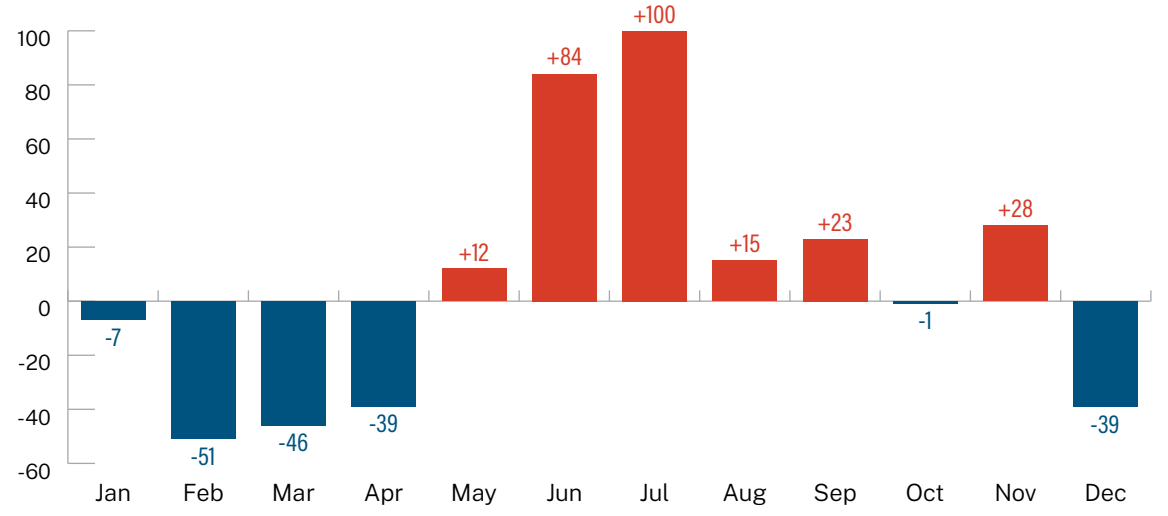
13 Wagner, E., Atkins, R., Berning, A., Robbins, A., Watson, C., & Anderle, J. (2020, October). *Examination of the traffic safety environment during the second quarter of 2020: Special report* (Report No. DOT HS 813 011). National Highway Traffic Safety Administration. https://rosap.ntl.bts.gov/view/dot/50940

Figure 28: Percentage Increase in 2020 Rural Road Fatalities Involving Alcohol by Month Compared to 2016-2019



Source: FARS

Figure 29: Percentage Increase in 2020 Rural Road Fatalities Involving Speeding by Month Compared to 2016-2019



Source: FARS

Key Fatality Facts

Rural roads present a serious safety problem in the U.S. Crash deaths on rural roads are disproportionate to the rural population and vehicle miles traveled.

Young people are at particular risk on rural roads, and their risk remains high well into their 20s. However, as the U.S. population continues to live longer, concerns about older driver safety cannot be overlooked, especially on rural roads.

Risky behaviors contribute heavily to fatalities on rural roads. Restraint non-use, involvement of alcohol and other drugs, speeding and distraction are key factors in fatal crashes on rural roads. Fatal crashes that involve very high speeds tend to occur on rural roads rather than their urban counterparts, and states with high maximum speed limits tend to have higher per capita rates of fatalities on rural roads than states with lower maximum speed limits.

The rural road safety problem is both severe and complex. To prevent these crashes and save lives, states, tribes and their partners must understand the unique challenges associated with rural roads and implement countermeasures to address them. That is the focus of the next section of this report.

Examining the Rural Landscape: Barriers and Challenges

Mountain switchbacks and ruler-straight landscapes seem very different, but they share the large distances and sparse population patterns of the rural U.S. These characteristics create challenges for traffic safety that are different from those found in dense urban cores.

Long Trips: The Effects of Distance

Households in rural areas drive longer distances than city dwellers. According to the 2017 National Household Transportation Survey, rural residents traveled almost 50% more vehicle miles than urban residents.[14] Routine errands expose rural residents to more miles of crash risk than their urban counterparts. These long trips raise risks in other ways as well.

Long trips can feel routine or boring. Drivers who experience a drop in arousal levels (e.g., drowsiness or boredom), tend to use unsuccessful strategies such as opening windows[15] or playing music.[16] They may have a conversation with another passenger, make a cell phone call or engage in another secondary task that distracts from the driving task.

Long drives also make high speeds seem especially desirable. Behavior that is rewarded will be repeated,[17] and the feedback for speeding is usually a trip that is perceived to be shorter. While the perceived benefits seem obvious, the increased crash risk and greater crash severity may not be apparent until a crash occurs.

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14 McGuckin, N., and Fucci, A. (2018). *Summary of travel trends: 2017 national household travel survey.* (FHWA-PL-18-019). Federal Highway Administration. https://nhts.ornl.gov/assets/2017_nhts_summary_travel_ trends.pdf

15 Walker, R. B., Hicks, M., Smith, T., & Devlin, K. (2001). *Drowsy driving in West Virginia (Report No. TRP 99-14).* https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.465.4548&rep=rep1&type=pdf

16 Hirano, T., Lee, J., & Itoh, M. (2018). Effects of auditory stimuli and verbal communications on drivers' situation awareness in partially automated driving. 2018 57th Annual Conference of the Society of Instrument and Control Engineers of Japan, SICE 2018, 690–696. https://doi.org/10.23919/SICE.2018.8492552

17 Skinner, B. F. (1957). The experimental analysis of behavior. *American Scientist*, 45(4), 343-371.

Long drives also cause poorer performance. Regardless of time of day, driving performance on tasks such as lane keeping degrades with the time spent driving and these decrements begin in as few as 35 minutes[18] reaching a medium to large effect size within 80 minutes of driving.[19] Given that travel by rural residents is estimated at more than 30 miles per day on average,[20] performance decrements are likely a factor in rural road crashes.

A False Sense of Safety

Amid these dangers, drivers on rural roads must also contend with a false sense of safety. Drivers perceive rural roads as less risky than urban roads, even when the features are the same.[21] However, rural roads look safer than they are as indicated by the data analysis conducted for this report.

Limited Resources

Rural and tribal areas often grapple with limited resources at all levels. Cash-strapped governments must cover broad geographic areas that often have few alternative transportation options. Rural and tribal roads tend to lack safety features — especially expensive features such as lighting.[22] Small communities may not have access to technical expertise — in fact, they may have a single person tasked with all aspects of public safety, from well water to road safety to disaster response.

Rural institutional and health resources have dwindled due to the closure of rural hospitals across the nation.[23] These closures cause long transport times for people who are injured in crashes, increasing the potential risk for complications or death. The lack of health professionals also reduces safety messaging, outreach, training and other resources they could provide.

Individuals in rural areas, too, may have fewer resources. These limitations create barriers for rural road safety. For example, lack of public transportation and long distances mean that travelers may be forced to drive, even if they would prefer another method. A rural vehicle owner — like their urban/suburban counterpart — can check for recalls and have the repair made for free. However, if the nearest dealer is a half a day's drive or more, the problem may go unrepaired. When it comes to purchasing a new or used vehicle, rural drivers can compare vehicle safety features, but the latest innovations may be financially out of reach. And people who walk or bicycle rather than drive, out of necessity or choice, face a roadway environment that is typically designed for cars and trucks, not non-motorized traffic.

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18 Anund, A., Kecklund, G., Peters, B., Forsman, Å., Lowden, A., & Åkerstedt, T. (2008). Driver impairment at night and its relation to physiological sleepiness. *Scandinavian Journal of Work, Environment and Health*, 34(2), 142–150. https://doi.org/10.5271/sjweh.1193

19 Ting, P. H., Hwang, J. R., Doong, J. L., & Jeng, M. C. (2008). Driver fatigue and highway driving: A simulator study. *Physiology and Behavior*, 94(3), 448–453. https://doi.org/10.1016/j.physbeh.2008.02.015

20 McGuckin, N., and Fucci, A. (2018). *Summary of travel trends: 2017 national household travel survey.* (FHWA-PL-18-019). Federal Highway Administration. https://nhts.ornl.gov/assets/2017_nhts_summary_travel_ trends.pdf

21 Cox, J. A., Beanland, V., & Filtness, A. J. (2017). Risk and safety perception on urban and rural roads: Effects of environmental features, driver age and risk sensitivity. *Traffic Injury Prevention*, 18(7), 703-710.

22 Raymond, P., Anderson, R., & Sykes, K. (2020). *Practical safety solutions for local and tribal roads: A human factors approach* (FHWA-SA-20-071). Federal Highway Administration.

23 Kaufman, B. G., Thomas, S. R., Randolph, R. K., Perry, J. R., Thompson, K. W., Holmes, G. M., & Pink, G. H. (2016). The rising rate of rural hospital closures. *The Journal of Rural Health*, 32(1), 35-43.

Rural Culture

Rural culture can pose challenges to safety as well.[24] Scarce resources and long distances create a culture where residents rely on themselves and their local communities rather than outside organizations. In urban areas, a single vehicle nose-down in a ditch warrants a quick tow-truck call. In a rural area, a neighbor with a winch is likely to be a more expedient solution. When a crash occurs, Emergency Medical Service (EMS) may be so far away that self-transport to the hospital is the default. Downed trees might require carrying a chainsaw to clear the roads. In a multitude of ways, distance and a lack of resources make self-reliance necessary.

> *"No one wants to hear from [State Capitol] what to do."*
>
> SHSO Director

The result of this self-reliance can be strong resistance to top-down initiatives. Messages developed for urban audiences do not always transfer well to rural areas and customizing materials for rural populations can be challenging and resource intense. Education and messaging programs can be expensive to develop and deploy, making funding these activities for small populations a tough sell. Rural areas also have more diffuse media markets that limit the reach of any mass media efforts, further complicating the task.

Law Enforcement & Emergency Response

Rural and tribal law enforcement agencies tend to be small. Agencies that serve communities with fewer than 25,000 residents employ an average of only two officers.[25] These tiny agencies must often handle sparse populations that are spread over large geographic areas and many miles of road.

Just like their suburban and urban counterparts, small agencies must handle complex traffic safety problems that require training. The lack of educational opportunities coupled with an inability for rural officers to take advantage of them due to budget and manpower issues make professional development challenging. For instance, classes that are offered in the state capitol can be convenient for an urban agency but might require a long drive and a week of hotel bills for a rural or tribal officer. The remaining officer(s) who picks up the absent officer's work may be disproportionately burdened. Small agencies in remote areas have demonstrable training needs but less opportunity to access them.

Rural and tribal agencies may lack appropriate equipment as well. Budget, storage, transportation, and training needs can put equipment out of reach for rural agencies. Even when equipment is available, long distances can impact its use.

Long distances also mean long response times in remote areas, which have a direct effect on safety and outcomes. The damage caused by delays is far broader than equipment access. Response times can determine opportunities for documentation, evidence collection, medical treatment, prevention of

24 Rakauskas, M. E., Ward, N. J., & Gerberich, S. G. (2009). Identification of differences between rural and urban safety cultures. *Accident Analysis & Prevention*, 41(5), 931-937.

25 Hyland, S. S., & Davis, E. (2021, Revised). Local police departments, 2016: Personnel. U.S. Department of Justices, *Bureau of Justice Statistics,* www.bjs.ojp.gov/content/pub/pdf/lpd16p.pdf.

further injuries or damage and more. Rural and tribal residents are acutely aware that law enforcement response may not be timely. Rather than "sit around waiting" for help, self-reliance and independence are highly valued.

Small communities present social opportunities and barriers all their own when it comes to law enforcement. Social ties can promote community policing[26] but may also create complications. Issuing a citation to a stranger, for example, may seem easy, almost routine for a small-town officer, but citing your child's teacher can be awkward.

Clearly, law enforcement and EMS face unique challenges in rural areas. Enforcement-based behavioral safety solutions must accommodate rural realities to improve safety.

> *"When they design the [emergency rescue] equipment, they're not thinking about rural roads. You might have to wait an hour for someone to get the Jaws of Life to a crash site, then wait another hour for someone to bring a generator so you can plug it in. And it's not just the Jaws of Life. It's all kinds of equipment, and there are long delays."*
>
> NASEMO Executive Director

26 International Association of Chiefs of Police. (2018). *Policing in small, rural, and tribal communities. Practices in modern policing*. International Association of Chiefs of Police. Policing in Small, Rural, and Tribal Communities (theiacp.org)

Applying the Safe System Approach in Rural Areas

The Safe System approach is a fundamental part of the U.S. Department of Transportation's (DOT) National Roadway Safety Strategy that was released in January 2022. **It is an integrated approach designed to provide layers of protection that consider**:

- Death/serious injury is unacceptable.
- Humans make mistakes.
- Humans are vulnerable.
- Responsibility is shared.
- Safety is proactive.
- Redundancy is crucial.

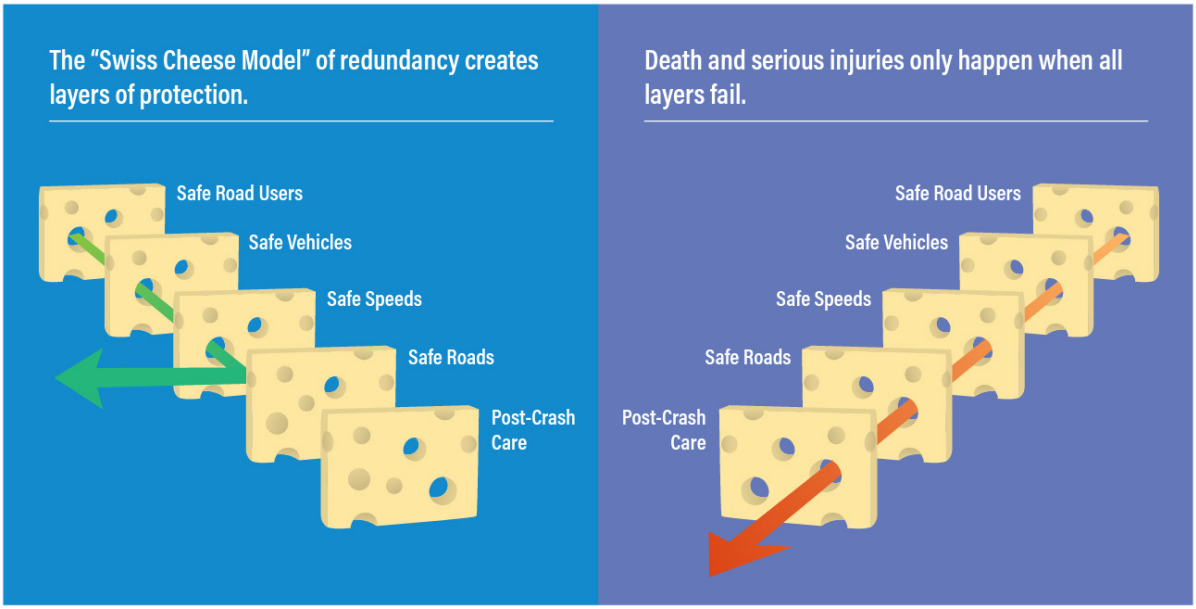
These underlying principles drive the Safe System philosophy of an interlocking system that works to eliminate death and serious injury by acknowledging human limitations and working to protect road users with overlapping, mutually reinforcing strategies.

The five elements of the Safe System approach (Figure 30), represent five ways to prevent death or serious injury. **Strengthening all elements ensures that if one fails, road users are still protected** (Figure 31). The elements must be managed as a system, so the layers complement and reinforce one another, providing redundant protection. The Swiss Cheese illustration shows the importance of redundant layers of protection as well as how to identify significant gaps that lessen this protection. When known risk factors coincide, crash risk increases. Ideally, all risk factors should be eliminated as much as possible.

Figure 30: Five Elements of the Safe System Approach

Source: FHWA

Figure 31: Multiple Layers of Protection Under the Safe System Approach

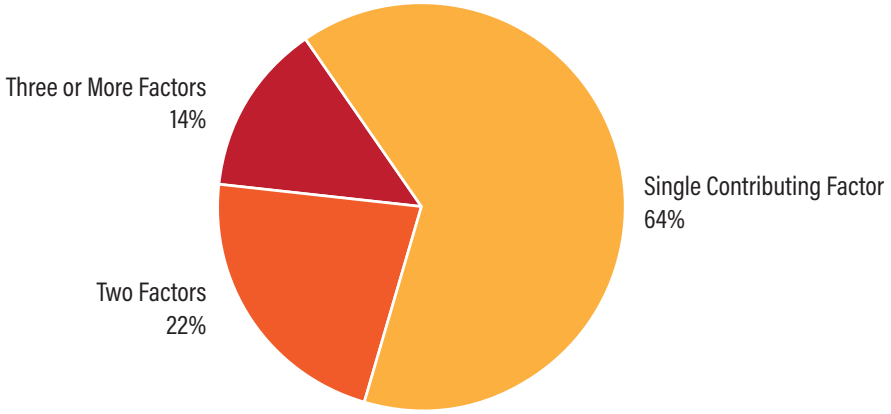


Source: Washington Traffic Safety Commission, 2021

Rural roads present opportunities to use the Safe System approach to improve safety by mitigating the various risk factors. The data examined earlier bear this out. From 2016 through 2020, 18,927 lives were lost in rural road fatal crashes that involved two of the risk factors investigated in this report, such as a driver under age 25 who was traveling at an excessive rate of speed or an unbelted vehicle occupant who was impaired by alcohol. Another 11,499 motor vehicle occupants died in rural road crashes that involved three or more risk factors. All told, multiple risk factors were documented to be involved in the deaths of more than one-third (36%) of the people who died on rural roads during this five-year period.[27]

27 This analysis only included the risk factors included in this report: age (young and older drivers), speeding, alcohol and other drugs, and distraction. FARS contains a host of other risk factors that are not included in this report. This percentage is clearly an underestimate of the involvement of multiple risk factors.

Figure 32: Number of Factors Involved in Rural Road Crash Deaths, 2016-2020



Some have questioned the role of behavioral safety in the Safe System approach, suggesting that infrastructure improvements alone can end road deaths. However, the data analysis conducted for this report found that less than 1% of deaths on rural roads involved poor road conditions (puddle, pothole, ice, etc.). Clearly, a holistic approach is needed to address the rural road safety problem — one that includes both behavioral and infrastructure safety. SHSOs, in partnership with engineers, planners, advocates, law enforcement agencies, educators and many others can and must play a role in advancing the Safe System approach in rural areas.

SHSOs are encouraged to leverage the Behavioral Safety Safe System Framework provided in the GHSA report, *Putting the Pieces Together: Addressing the Role of Behavioral Safety in the Safe System Approach*. The Framework shows how behavioral safety and the Safe System approach can be effectively integrated programmatically. It can also help an SHSO identify where it may already be supporting the Safe System principles and elements. The framework clearly illustrates why it would be insufficient to focus only on one approach; all need to be a part of the solution.

Rural Post-Crash Care

When it comes to implementing the Safe System approach, SHSOs predominantly focus on the elements of Safe Road Users and Safe Speeds, providing "secondary support" for the other three elements. All five elements are important; however, Post-Crash Care is essential for rural road safety. Crash outcomes on rural roads are worse than in urban or suburban areas.[28] Limited resources often leave rural EMS

28 Alanazy, A. R. M., Wark, S., Fraser, J., & Nagle, A. (2019). Factors impacting patient outcomes associated with use of emergency medical services operating in urban versus rural areas: A systematic review. *International Journal of Environmental Research and Public Health*, 16(10), 1728.

with less training and equipment, despite long transport times making training and equipment even more crucial. There are opportunities for SHSOs to learn more about post-crash care needs and target resources to maximize investments that will improve the system.

Improve Post-Crash Data Resources

A great deal of information is collected on crashes and their aftermath. However, the information is often housed in separate databases with no method to link them. The National Emergency Medical Services Information System (NEMSIS) database includes 92% of all 911 activations in the nation. Because this data source includes location and some crash information, states can examine characteristics of crashes that result in a 911 call and specifically investigate crashes on rural roads. States can promote the use of NEMSIS v.3.5.0 and add a Universally Unique Identifier (UUID) that links EMS reports and trauma registry data. States can pursue data linkage between crash and injury surveillance data by integrating a field for UUID on crash and EMS reports, hospital records and trauma registry databases. This will allow states to learn about all phases of post-crash care and pinpoint where best to invest resources to make critical improvements.

States will need to ensure these data resources are usable. If the state's contract with an outside storage firm does not provide a mechanism to pull data for study, valuable information is lost.

Improve Rural Crash Outcomes

The National Association of State EMS Officials (NASEMSO) has developed a slate of recommendations to improve rural road safety and crash survivability. They include:

- Extend 911 coverage throughout rural areas.
- Provide Emergency Medical Dispatch training so that dispatchers can elicit the most useful information and coach callers through lifesaving techniques.
- Train first responders to use the new field trauma triage guidelines, the NHTSA Office of Emergency Medical Services (OEMS) trauma-specific resuscitation guidelines and mass casualty guidance.
- Provide advanced training (now available online) and the supporting equipment. Advanced EMT skills such as airway control can improve survival rates, especially during long transport times. Paramedic training goes beyond EMT and Advanced EMT training, and Prehospital Trauma Life Support (PHTLS) training can further improve survival rates.

SHSOs are well positioned to provide information to policymakers about the rural crash problem and help fund training to improve rural post-crash care. Currently, scarce resources often mean that EMS in rural and tribal areas have minimal staff, equipment and training. Many policymakers and constituents may not be familiar with the higher levels of skill that come from advanced training (e.g., medication administration, airway control) or recognize that long transport times make prehospital care essential for survival.

Recommendations for SHSOs

- Work with your state Traffic Records Coordinating Committee to promote the use of NEMSIS v.3.5.0 and the addition of a Universally Unique Identifier (UUID) that links EMS reports and trauma registry data. Integrate a field for UUID on crash and EMS reports, hospital records and trauma registry databases.
- Join with EMS and others in the health care industry to provide information about the advantages of extending cell phone coverage, broadband and 911 service throughout rural and tribal areas.
- Work with EMS to identify and help fund critical training and equipment for rural agencies.

Engaging Rural and Tribal Jurisdictions

When it comes to SHSOs engaging rural jurisdictions to address behavioral safety in their communities and counties, helpful strategies include working with local partners, finding local champions, tracking countermeasures and outcomes, communicating results and committing to extended engagement.

Communication is critical. SHSOs are encouraged to establish relationships with local stakeholders, listen to their concerns and provide data that is specific to their area.

While each of these is important, local data is especially useful, as stakeholders will be more interested in local statistics rather than statewide or national data. For example, if a particular county or town has a seat belt use problem, sharing that jurisdiction's proportion of unrestrained fatalities is critical for obtaining buy-in to implement proven and promising countermeasures. Identifying who is most at-risk by age, sex and race, along with any other contributing factors, paints a detailed picture that is more likely to resonate with local stakeholders and community members.

It is important that SHSOs focus on equitable solutions, which requires broad-based community engagement. States looking to make in-roads in local communities may wish to work with a local grantee or public agency to establish a task force composed of diverse local stakeholders. Look for potential champions across social, economic, age, disability, racial and ethnic groups. Find the centers of social influence keeping in mind they may be non-traditional partners. Look at faith-based organizations and their leaders, social clubs, parent-teacher organizations, school boards, coaches and sports organizations, trade schools, local businesses and their owners, medical care providers and other respected people who have frequent contact with community members. Casting a wide net beyond the usual partners can improve engagement and create a more equitable approach to addressing a traffic safety problem(s).

Let local champions lead the way. When states have identified local champions (individuals or organizations), enlist them as teammates to solve a shared problem. A top-down approach may inspire resistance, but a cooperative approach sets the tone for the local initiative. Local ownership of decisions and countermeasures are critical for buy-in. States can supply information and data but should then step back to ensure local input is heard as well.

States can still enlist local government agencies, such as law enforcement, public health departments, EMS, local emergency management agencies (EMA), schools and other public entities. Where appropriate, offer these valuable allies training to increase their expertise, acquaint them with opportunities and resources for safety improvements, and promote local initiative and buy-in.

> *"Everyone would rather hear from actual [local] people. We sent reminders that came from us, not a big national organization, and we got great responses."*
>
> North Carolina
> Injury Prevention Specialist

To ensure that countermeasures don't create unintentional disadvantages for a subset of the population, track implementation and outcomes. If traffic enforcement is a component of the initiative, require tracking of racial and ethnic data as well as the reason for each stop and the disposition of the encounter (i.e., warning, citation).[29] GHSA provides a guide to advancing equity in traffic safety and enforcement, *Equity in Highway Safety Enforcement and Engagement Programs*, which SHSOs and their local partners are encouraged to utilize.

Measuring success is important, particularly tracking outcomes to determine whether the desired behavior change is occurring. Follow up on countermeasures by choosing outcome measures that are keyed to the desired results. If a countermeasure is intended to reduce travel speeds, then measure speeds. If increased occupant restraint is the focus, monitor seat belt and child safety seat use. Whatever is tracked should be transparent and the results shared with the community.

In addition to communicating results to the public, credit should be given when improvements have been made. This includes acknowledging not only the local communities, but also the contributions of stakeholders and champions. This is important for sustaining a traffic safety initiative over the long term.

Road safety is not achieved through a single short-term effort. Human behavior is complex and responds to many forms of input. Especially when external pressures incentivize risky driver behaviors, safety requires layers of protection across elements and significant effort over time.

Recommendations for SHSOs

- Provide local data that succinctly details the safety problem.
- Work with a local grantee or agency to establish a task force of diverse local champions and stakeholders that includes non-traditional individuals and organizations.
- Establish local ownership of decisions and countermeasures.
- Measure outcomes, share successes and acknowledge community and individual efforts.
- Commit to extended involvement through the provision of funding and/or staff support.

29 Sprattler, K., & Statz, L. (2021). Equity in highway safety enforcement and engagement programs. Governors Highway Safety Association.

Data for Rural Road Safety

Rural practitioners need data to fully understand the traffic safety issues in their communities and share that information with residents. Effective local engagement requires knowledge of where to access data, how to calculate rates relevant to rural areas and how to bring this information to life through visualizations and other tools.

Making Data Meaningful to Rural and Tribal Communities

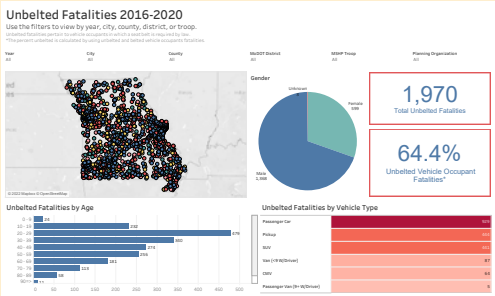
Rural and tribal communities are aware their traffic safety challenges may be different than in major population centers. For this reason, statewide data may not be compelling. However, information that is specific to the state's rural areas is more likely to claim local attention. County data is accessible via NHTSA's State Traffic Safety Information (STSI) portal.

SHSOs may wish to translate the numbers, so they are meaningful to a local audience. Small communities and sparse populations pose challenges for data interpretation. If a rural county experiences five fatal crashes and a densely populated suburban county has ten fatalities in the same time frame, what does that mean? Calculating rates per capita can make interpretation easier. Using Census data to determine the number of residents in a geographic area and offering crash data as a rate rather than a raw number are also helpful.

Provide visualizations. If a picture is worth a thousand words, a good data visualization is worth a million. Some states now provide crash data in an interactive, map-based format. Users can examine crash incidence and find crash clusters. Reporters can easily access and share these trends with their viewers and readers. Some local practitioners may dive into the data, but others may be overwhelmed.

PROMISING PRACTICE

The Missouri Coalition for Roadway Safety website features traffic crash and highway safety dashboards. Crashes can be viewed statewide or by region and maps show crash locations and contributing factors. This resource can help a rural safety practitioner or policymaker see where crashes are happening in their community and why.



Providing basic visualizations to regions or counties that show their most significant contributing factors will help communities better understand and address rural road fatalities.

When it's appropriate, map the information. Maps are easy to understand and can be a clear way to present complex information. States have a wealth of data that is coded by location. The availability of geographic information system (GIS) data and visualization tools have made user-friendly, interactive mapping a realistic resource for states. Wisconsin goes beyond that, providing some Department of Transportation users with additional data in their interactive mapping tool. A layered interactive mapping tool lets a user pick a region and variables to view. Rural practitioners do not need specialized training to select rural areas and examine factors that contribute to crashes.

PROMISING PRACTICE

North Carolina mapped the locations of certified Child Passenger Safety Technicians (CPSTs) across the state. The SHSO identified training and resource gaps and successfully certified CPSTs in every county in the state.

Recommendations for SHSOs

- Provide easy to understand local data that calculates per capita rates to clearly show the extent of the local problem.
- Provide visualizations and maps when appropriate to help bring the data to life.

Behavioral Safety Issues in Rural Communities

Rural areas experience the same behavioral traffic safety challenges as their urban and suburban counterparts, but as discussed previously the rural experience often imposes unique challenges that require localized solutions. The remainder of this report discusses the five major factors, as detailed in the FARS data analysis for the years 2016-2020, in order of their contribution to fatal crashes on rural roads. The factors are:

- Seat belts and child restraints
- Alcohol and other drugs
- Driver age: young drivers and older drivers
- Speeding
- Distraction

Potential solutions include links to information where available. Recommendations are provided for SHSOs following each factor.

Seat Belts and Child Restraints

Nationwide, the largest contributing factor to motor vehicle fatalities is a failure to use seat belts. **Every year, most of the people killed on rural roads are those who were unrestrained — 32,567 from 2016 through 2020.** The single behavior that has the most potential to save lives is buckling up.

Improving Rural Road Safety

Current behavioral safety strategies predominantly focus on seat belt enforcement and child passenger safety technician (CPST) engagement, rather than seat belt educational efforts. In the survey of SHSOs conducted for this report, states without primary seat belt laws reported that enacting one would be beneficial, and those with primary laws said that stronger enforcement is more effective than weak enforcement or low sanctions.

Law enforcement officers, however, may not realize the important role they play in increasing seat belt use. Individual officers may view traffic enforcement as an unrewarding assignment. Even in states with primary enforcement and seasonal campaigns, law enforcement experts indicate that seat belt enforcement can generate a lack of enthusiasm.

Officers also may underestimate the importance of wearing their own seat belts. Especially in rural areas, law enforcement officers may be the traffic safety experts who are most visible to the public. Most jurisdictions require seat belt use by law enforcement, but law enforcement experts admit the practice of wearing one varies greatly. **When an officer drives unrestrained, members of the public see an expert driving unrestrained.** In rural areas where local law enforcement may be personally acquainted with most residents, this effect may be magnified.

Enlisting officers as true partners in enforcing seat belt use can require both traditional channels and creativity. Engagement by the highest levels of law enforcement can be a powerful force on the rank-and-file when the mandate flows down the chain of command. On the softer side, emphasizing and acknowledging efforts by law enforcement to improve seat belt use (others' use and their own) may help reinforce those goals as a fundamental part of their mission.

Enforcement improves restraint use for both seat belts and child safety seats. Short-term High Visibility Enforcement (HVE) programs, nighttime enforcement and sustained enforcement are all effective, especially when communications programs support the enforcement effort. Recent research has confirmed that higher levels of occupant protection enforcement activity are associated with better safety outcomes.[30] That is, more enforcement of seat belt requirements translates to greater compliance and overall safety gains.

HVE efforts require a combination of enforcement, public education and outreach, all of which can be more challenging in rural areas. Public education materials must be culturally appropriate for their audiences and relevant for rural populations. For example, traffic safety communication that discusses urban driving and shows images of busy urban streets and suburban arterials is unlikely to resonate with rural drivers. Rural public education materials should be reflective of the local population and include ethnic, racial and linguistic minorities. People want to see themselves in outreach materials.

30 Office of Behavioral Safety Research. (2022, June). Synthesis of studies that relate amount of enforcement to magnitude of safety outcomes (Traffic Tech Technology Transfer Series. Report No. DOT HS 813 268). National Highway Traffic Safety Administration.

Child restraint improves with engagement by CPSTs. Car seat installation and use can be difficult to perform correctly.[31] For example, almost half of child safety seats with top tethers are used without the top tether attached to the vehicle tether anchor.[32] Clearly, caregivers need access to CPSTs.

During COVID-19, CPST interactions and training quickly moved online, and these virtual resources are anticipated to remain active. Rural and tribal communities have had difficulty accessing CPST resources and events because of distance, so online training and car seat inspections will continue to be valuable to far-flung communities. That is why providing training to certify CPSTs in rural areas is critical. North Carolina prioritized training CPSTs in every county in the state (see the box), dramatically improving rural in-person access to their expertise.

Tribal communities experience additional barriers to seat belt and car seat use. Sovereign nations may not require their use on tribal lands. For American Indian and Alaskan Native communities, resistance to government mandates is strong and resources are often scarce. Improving car seat use (and restraint use overall) will require local engagement, culturally appropriate programs and resources to provide car seats.[33] Focus on seat belts for everyone in the vehicle. With all populations, it is a best practice to treat families as a unit when attempting to improve restraint use. Driver restraint and child restraint are strongly related, as unrestrained children are often transported by unrestrained drivers.[34] **Encourage families to correctly restrain ALL vehicle occupants.**

Encourage seat belt use in all situations. Consistent messaging, in fact, may help to raise restraint rates in rural areas. Law enforcement officers can be powerful role models for promoting seat belt use, but consistent messaging may also come in the form of seat belts on school buses. School districts have been adding seat belts to school buses in hopes of improving safety and creating good habits, and the National Transportation Safety Board now recommends that new school buses be equipped with lap and shoulder belts.[35] Beyond the safety benefits, these jurisdictions observe

PROMISING PRACTICE

Recognizing the barriers for rural citizens, North Carolina brought CPST training to underserved areas and covered the course fee. Local residents were able to get certified without the expenses and loss of work time associated with travel. The state also retained its full slate of certified CPSTs through the pandemic by offering online training courses that enabled them to fulfill National Child Passenger Safety CEU requirements.

PROMISING PRACTICE

The San Carlos Apache Tribal Motor Vehicle Injury Prevention Program used U.S. Centers for Disease Control and Prevention (CDC) funding to tailor and deliver culturally-appropriate messaging designed to reduce alcohol-involved driving, increase seat belt use, and increase child restraint use.

31 Raymond, P., Searcy, S., & Findley, D. (2018, July). Additional analysis of national child restraint use special study: Child restraint misuse (Traffic Safety Facts Research Note. Report No. DOT HS 812 527). Washington, DC: National Highway Traffic Safety Administration.

32 Eichelberger, A. H., Decina, L. E., Jermakian, J. S., & McCartt, A. T. (2014). Use of top tethers with forward-facing child restraints: Observations and driver interviews. *Journal of Safety Research*, 48, 71-76.

33 West, B. A., Naumann, R. B., & Centers for Disease Control and Prevention. (2014). Tribal motor vehicle injury prevention programs for reducing disparities in motor vehicle-related injuries. *MMWR Suppl*, 63(1), 28-33.

34 Raymond, P., Searcy, S., Miller, S., & Redden, C. (2018). Additional analysis of national child restraint use special study: Characteristics of those not restrained (No. DOT HS 812 477). National Highway Traffic Safety Administration.

35 Selective issues in school bus transportation study: Crashes in Baltimore, Maryland, and Chattanooga, Tennessee (ntsb.gov)

improved student behavior.[36, 37] The additional benefit may be the consistent message that wearing a seat belt is important.

Efforts have leaned heavily on seat belt laws, enforcement and public education. To reach the remaining unrestrained people, other tactics may be needed. For example, one of the promising approaches, Missouri's "Buckle Up Phone Down" program uses a social media challenge to change behavior. These programs are new and have not been formally evaluated, but the tactics are worth noting.

Iowa's "High Five" initiative and several other similar programs target low-use rural counties for local engagement, communication and enforcement.[38] Efforts are concentrated in a few high-risk locations for an intensive intervention. NHTSA is currently evaluating "High Five" and other jurisdictions are watching carefully.

PROMISING PRACTICE

In Missouri, the "Buckle Up Phone Down" (BUPD) program seeks to increase belt use and decrease cell phone use. BUPD includes a social media challenge, encourages employers to adopt employee seat belt use policies and urges drivers and their passengers to take a pledge to not drive distracted or unrestrained. The goal is to raise awareness and change the social norm. NHTSA has launched a formal evaluation as the effort spreads to other jurisdictions.

"Buckle Up in Your Truck" targets men who drive pickup trucks. This subgroup of rural road users are less likely to wear seat belts and are disproportionately killed in motor vehicle crashes on rural roads.[39] In 2020, 2,845 unrestrained males in pickup trucks died on rural roads alone, according to FARS data. "Buckle Up in Your Truck" has taken various forms, but generally incorporates messaging and HVE. Because pickup-driving men are at high risk of being involved in unrestrained fatal crashes, this targeted approach has been implemented as a component of local, state and regional programs. When paired with enforcement, these programs are effective, but that effect tends to be smaller than the effect of "Click It or Ticket."[40] Given the resistance of this population to other strategies, even a small effect is noteworthy.

PROMISING PRACTICE

North Carolina's "Most of Us Buckle Up" pilot program, conducted in rural Person County, used social norms and objective feedback to encourage seat belt use. Rather than telling people what to do, they simply reminded residents that "Most of Us Buckle Up in Person County," and reinforced this locally by creating outreach messaging with publicly posted use rates. Initial results were promising, and the program is expanding to other counties.

36 Kissner, E., Katz, B. J., & Davis, J. (2021). Indirect effects of school bus seat belt installation.

37 Katz, B., Graham, D., Davis, J., Kissner, E., Wright, W., Rigdon, H., & Jackson, S. (2021). Education on proper use of seat belts on school buses (No. DOT HS 812 999). National Highway Traffic Safety Administration.

38 Tinker, J., (2022). *High five rural traffic safety project*. Conference presentation, Lifesavers 2022. OP-05-Tinker.pdf (lifesaversconference.org)

39 Schattenberg, T. (2015). Pickup truck drivers who don't wear seat belts [Web article]. Texas A&M Today. Texas A&M University. https://today.tamu.edu/2015/06/09/pickup-drivers-who-don't-wear-seat-belts/

40 Nichols, J. L., Tison, J., Solomon, M. G., Ledingham, K. A., Preusser, D. F., & Siegler, J. N. (2009, June). Evaluation of the "Buckle Up in Your Truck" programs (Report No. DOT HS 811 131). National Highway Traffic Safety Administration. https://rosap.ntl.bts.gov/view/dot/1879

Recommendations for SHSOs

- Educate rural law enforcement about the critical role they play in promoting belt use through role modeling, education and HVE.
- Identify counties and tribes with few or no Child Passenger Safety Technicians and partner with local leaders/champions to make CPST training available in those locations. Once trained, provide "seed" funding to help jump-start local events.
- Identify a small number of rural counties and/or tribes with low belt use and high crash rates. Engage those counties by providing data that show the human losses and offer technical assistance to help them address the problem.
- Pilot non-enforcement campaigns such as, "Most of Us Buckle Up in Person County" or "Buckle Up Phone Down," to invoke social norms and raise seat belt use.

Alcohol and Other Drugs

The involvement of alcohol in traffic crashes is well-documented, as approximately **5,000 lives are lost in alcohol-involved crashes on rural roads each year (5,150 in 2020)**. Drug involvement, however, is under-investigated, as described earlier in this report.

Many jurisdictions do not routinely test for drugs. When testing is ordered, many labs test only for specific substances rather than running a full-panel screen. Testing processes are sometimes backlogged so extensively that results are not obtained by the deadline for states to submit final data to FARS and thus may not be reflected in national data. (NHTSA is engaging in efforts to improve drug data reporting in FARS.)

Some jurisdictions test first for alcohol, then abandon drug testing if alcohol is detected. Law enforcement and prosecutors may regard non-alcohol drug impairment evidence as unnecessary once alcohol impairment is established. They can prosecute for impairment based on the detection of alcohol and do not see the utility of further testing, according to toxicologists. From 2016 to 2020, 26,181 people were killed in alcohol-involved crashes on rural roads. For 12,428 of those fatalities — nearly half — there is no information on whether other drugs in addition to alcohol were involved.

The lack of toxicology data about drug impaired driving undermines efforts to fully understand the extent of the problem. The International Association of Chiefs of Police (IACP) has called for testing of all impaired driver blood samples for drug involvement, regardless of Blood Alcohol Concentration (BAC) levels. A full-panel screen of alcohol and other drugs for all fatal crashes would begin to fill in the gaps, and timely reporting to FARS would ensure the data are included. NHTSA has launched multiple efforts to help states improve their toxicology programs, provide information and resources and build consistency among states and jurisdictions. The Society of Forensic Toxicologists (SOFT) maintains a short list of resources on drugs and driving impairment and oral fluid testing. NHTSA's Drugs and Human Performance Fact Sheets are being updated and will soon include synthetic opioids and cannabinoids.

Improving Rural Road Safety

Most countermeasures solely target alcohol use. Alcohol, however, is not the only impairing substance. Alcohol is not even the only *legal* impairing substance — particularly with the widespread use of impairing prescription drugs and the increase in the number of states that have decriminalized consumption of recreational cannabis.

Anecdotal evidence suggests that **many drivers fail to understand the impairing effects of drugs**. A few educational efforts publicize the impairment caused by prescription medications, including information noting that "operating heavy equipment" includes driving a car. As cannabis decriminalization increases, state toxicologists and prosecutors anecdotally report that many drivers believe that cannabis does not impair driving. Education is needed in states that decriminalize cannabis use — and in states that do not. SHSOs are encouraged to carefully review the recently released GHSA report, *Cannabis Consumers and Safe Driving: Responsible Use Messaging*, which provides guidance to help states develop messaging that resonates with this audience (see Promising Practices on the right for one rural state's approach).

Some of the strategies presented here may be help prevent drug-involved driving. Intensive driver monitoring, for example, offers the potential to prevent impairment from drugs other than alcohol. However, most strategies are specific to alcohol.

The work to reduce alcohol-involved crashes has spanned decades and targeted every component of impaired driving. There are strategies to keep servers and hosts from providing excessive alcohol; get drinkers home without driving; help law enforcement detect, arrest and prosecute impaired drivers; handle alcohol involvement as an addiction issue and keep known offenders from driving after drinking or from drinking at all. The countermeasures presented here are those most likely to have a positive impact in rural areas.

PROMISING PRACTICE

The Wyoming Highway Safety Program surveyed cannabis users and found 96% of respondents already knew cannabis was illegal in the Cowboy State. This prompted a shift away from an earlier public education strategy that stressed the illegality of cannabis. Instead, messaging was directed to young men ages 21-34 to reinforce that driving while impaired by cannabis can result in an arrest for DUI since trained Drug Recognition Experts (DREs) are able to detect impairment. Sponsored by the Governor's Council on Impaired Driving, the general impaired driving campaign was expanded from "Don't go down that road," to "Driving high is not our style. Don't go down that road." Billboards were used to convey the message on roads connecting Wyoming and Colorado, where, in the latter, cannabis is legal.

Hold Servers and Hosts Responsible

Responsible beverage service programs take a variety of forms but generally seek to train servers to reduce alcohol-impaired driving. These programs train bartenders and waitstaff to track consumption and limit alcohol served to drinkers.

Social host liability laws make individuals liable for damage, injury and death when caused by those who were provided or allowed access to alcohol by the host. Social host ordinances make hosts subject to fines to recoup costs from the consequences of underage drinking such as emergency services and law enforcement. These laws do not require generous resources, proximity or population density and thus may be useful in rural jurisdictions.

Get Drinkers Home Without Driving

Some states seek to improve rural access to alternative transportation for impaired drivers. The North Dakota Department of Transportation partnered with AAA to pilot a Sober Ride program that offered ride-hailing coupons during the week of St. Patrick's Day. They hope to expand the program to small towns in the future. For transportation solutions that require cabs or ride-hailing services, gaining access in rural areas is a substantial barrier that may prevent expansion.

Since 1999, Wisconsin has included a surcharge with every DWI conviction and allocated the funds to provide transportation for those who consume alcohol. This source, combined with funding from the Tavern League of Wisconsin, allows SafeRide to provide customers with free rides home from participating establishments. Wisconsin and the Tavern League credit this program with reducing alcohol involved crashes and convictions. Rural areas have financial challenges to alternative transportation but spreading the cost may offset some of that burden.

Designated drivers are intended to informally provide a sober driver and may be especially useful in rural areas, but the evidence suggests that actual practice may vary in drivers' understanding of "sober." A designated driver who drinks less than usual or switches to coffee is not a sober driver. Because designated drivers may be the most realistic sober ride available to rural residents, it is critical that rural drinkers know that a designated driver is one who has not consumed alcohol or any other impairing drug.

PROMISING PRACTICE

Obtaining and maintaining access to taxicab services is an ongoing challenge in rural communities. Rural Isanti County, Minnesota pioneered the SafeCab program to provide sober cab rides to patrons of participating alcohol-serving establishments. Funding assistance is provided by participating bars and restaurants, several beer distributors and a community fund that includes donations from local businesses and grants.

Preventing Roadway Departure Crashes Involving Impairment

Roadway departure crashes frequently involve alcohol and/or other drugs, as well as other sources of driver impairment.[41] Roadway departure data can help identify locations where alcohol and drug involvement countermeasures may be helpful. Because alcohol-impaired drivers tend to focus their vision on the surface directly in front of the vehicle, Florida has experimented with low placement of delineation and signs to try to prevent wrong-way driving, which often involves an impaired driver. South Carolina engaged in a tree-removal program to improve recovery after roadway departure. Although the South Carolina program was not implemented expressly to address impaired driving, this and other recovery-related strategies may help impaired drivers avoid injuring themselves or others.

Law Enforcement and Testing for Involvement of Alcohol and Other Drugs

Rural and tribal law enforcement officers face challenges in detecting the involvement of alcohol and other drugs. Long distances, the need for specialized training and limited manpower can affect their ability to prevent and respond to the involvement of alcohol and other drugs.

States lean heavily on enforcement countermeasures to address impaired driving. All states require that, as a condition of licensure, drivers automatically provide implied consent for BAC and drug testing. Enforcement strategies include publicized sobriety checkpoints, HVE patrols, preliminary breath tests, passive alcohol sensors, and integrating alcohol- and drug-impaired driving enforcement into other traffic enforcement programs. Though checkpoints are viewed as labor-intensive, low-manpower sobriety checkpoints can be staffed by as few as three personnel. Cooperation among jurisdictions can help to supply the staff needed for the effort.

Collect Evidence of Alcohol and Other Drug Involvement

Timeliness of toxicological sampling is important in rural areas, given the longer distances involved. Impairing substances are metabolized over time. Accuracy requires testing that reflects the driver's condition at the time, not after a long drive to a medical facility. The greater the delay in collecting physical evidence, the more evidence is lost, casting doubt on the driver's state at the time of the traffic stop or crash.

In rural areas, the ability to collect a urine or blood sample is crucial. Blood samples have broad acceptance as evidence, and officers can be trained to draw blood using established procedures. GHSA and Responsibility.org awarded a grant to Georgia to fund officer phlebotomy training in underserved areas across the state. The goal is to reduce the number of DUI cases that go to trial with no toxicology reports and allow blood draws in a safe and timely fashion. Many states are seeking to expand their law enforcement phlebotomy programs and there is funding available from NHTSA to help with this effort.

If a driver refuses testing, officers will need a search warrant to take a blood sample. An expedited search warrant program can reduce the time needed to secure the necessary approval, preserving the timeliness of the sample in rural areas. The time savings also allows an officer to return to their duties on the road or elsewhere quicker. For a small, rural police agency that can mean more opportunity to

41 Behnood, A., Roshandeh, A. M., & Mannering, F. L. (2014). Latent class analysis of the effects of age, gender, and alcohol consumption on driver-injury severities. *Analytic Methods in Accident Research*, 3, 56-91.

remove impaired drivers from the road or to address other traffic or public safety issues. For judges, especially those serving large rural area, it means less disruption such as being awakened in the middle of the night to obtain a search warrant.[42]

Not all states accept oral fluid testing as evidence of drug involvement, but the number that do is increasing. Oral fluid collection requires less training than phlebotomy, offering a potentially important advantage to rural law enforcement. Alabama was the first state to offer a comprehensive oral fluid testing program at the State Criminal Laboratory level. It has two components: screening at the roadside to identify cannabis, cocaine, methamphetamines, amphetamines, opioids and benzodiazepines and evidentiary confirmation at the laboratory. Collecting oral fluids is easy for officers and requires less specialized training than phlebotomy. As more states begin to accept oral fluids as evidence, this method is expected to become more widely used.

PROMISING PRACTICE

Indiana's oral fluid grant program makes the testing devices and supplies, along with training, available to officers in jurisdictions with low drug-involved case rates. Approximately 80% of the line officers that have completed the one-hour training do not hold Advanced Roadside Impaired Driving Enforcement or DRE certification, making this model viable for rural agencies with limited ability to send officers to a multi-day training.

Officers who are DRE certified can establish driver impairment, but the training takes more than 110 hours to complete. Small local agencies may struggle to find resources to cover the time that officers are absent for training. DREs responsible for covering a wider rural geographic area may take longer to arrive at the location where they will carry out an evaluation. Sharing DRE resources may help rural jurisdictions in their efforts to address impaired driving. NHTSA will soon release a report detailing practices in the sharing of DRE resources.

In 2021, GHSA and Responsibility.org provided a grant to Wisconsin to expand DRE training. The state currently has a DRE in 50 of 72 counties, but many are severely underserved. With drugged driving on the increase in Wisconsin, the training will enable the state to have a DRE in every county and reduce the number of cases that are dismissed or pled down.

Prosecuting Impaired Drivers

Toxicology expertise is required for prosecution. Rural jurisdictions may face barriers in accessing toxicologists' analysis and testimony. GHSA and Responsibility.org have partnered to pilot an on-call forensic toxicologist in Louisiana. This position will provide toxicology analysis and expert testimony in areas of the state that have previously faced challenges. Having access to a forensic toxicologist will allow rural areas to remove dangerous drivers from the road, so they receive the treatment and monitoring needed to reduce recidivism.

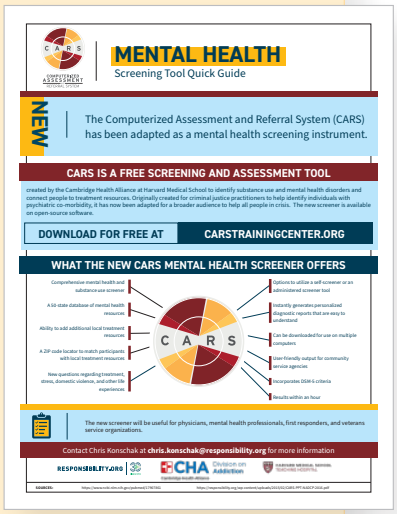
42 Symoun, J., Kehoe, N., Carlson, L., & Marose, D. (2021, April). Practices for implementing expedited search warrant programs for obtaining evidence from impaired drivers (Report No. DOT HS 812 949). National Highway Traffic Safety Administration.

Handle Alcohol Involvement as an Addiction Issue

Non-enforcement screening programs allow officials to ask individuals a simple series of questions intended to reveal substance abuse and/or mental health problems. They are commonly administered in medical treatment centers after a crash or arrest, when personnel hope the individual may be able to recognize how serious the potential outcome could be. The goal is to identify the driver's risk level, so they receive the appropriate level of supervision and treatment. For those offenders who show signs of substance or mental health issues, an assessment is recommended. This is more time-intensive than screening as it explores individual issues in-depth to evaluate the presence of an alcohol and/or drug problem, as well as its extent and severity. There are numerous tools available, but only four are validated for use with DUI offenders (see an example in the text box).

PROMISING PRACTICE

The Computerized Assessment and Referral System (CARS) is a comprehensive diagnostic tool that identifies substance abuse and major mental health disorders. CARS operates on free, open-source software that immediately generates a personalized, user-friendly report that includes information on an offender's substance use and mental health profile, risk of recidivism, sentencing and treatment needs and targeted referrals by zip code to appropriate treatment services within their community. CARS can be used by both clinicians and non-clinicians and is available in three formats: 15- to 20-minute screener, 15- to 40-minute self-administered screener and one to two-hour full assessment. It has been piloted in rural counties in Minnesota, Wyoming and Michigan and found, unlike other screeners, to better identify co-morbid mental health disorders. GHSA and Responsibility.org recently awarded a grant to the Nevada Office of Traffic Safety to train judges and case managers to use CARS. It is also being piloted in Louisiana.



Prevent Further Offenses

Rural jurisdictions face challenges in preventing recidivism. On the prosecution and adjudication side, states use DWI courts and diversion programs, limit diversions and pleas and promote court monitoring of offenders. NHTSA, through a cooperative agreement with the American Bar Association, funds Judicial Outreach Liaisons and Judicial Fellows to serve as free and accessible resources on impaired driving traffic safety issues, and rural populations may find these helpful.

Urban and suburban jurisdictions find ignition interlocks to be an effective method for preventing offenders from driving while using alcohol. In many rural areas, however, ignition interlocks have limitations. The devices require access to installation services, which are often not available in rural areas. Offender monitoring is an important component of impaired driving prevention, but rural areas may have difficulty implementing ignition interlocks.

Some jurisdictions have engaged instead in intensive offender monitoring with 24/7 programs. Offenders are not merely prevented from driving while impaired — the focus, instead, is on preventing consumption. This program allows rural jurisdictions to monitor offenders without requiring device installation. The 24/7 approach has been implemented by other states and evidence is encouraging.[43] [44] [45]

The 24/7 program also holds potential for monitoring drugs other than alcohol: At the time of this report, ignition interlocks detect alcohol but no other drugs. Given the increase in drug-impaired driving, the ability to use this technology to monitor other drugs is critical.

PROMISING PRACTICE

Michigan established regional DWI courts in 2013 in 16 counties where access to problem-solving courts was limited. This has allowed rural jurisdictions to pool their resources and provide DWI court proceedings on selected dates and made ignition interlocks available to eligible participants.

Pedestrians and Alcohol and Other Drug Involvement

Pedestrian crashes also co-occur with alcohol and drug involvement according to FARS data. Impaired drivers may strike pedestrians. Alcohol or drug consumption may also lead users to walk rather than drive. The lack of alternative transportation in rural and tribal areas can exacerbate this issue. States can provide pedestrian facilities that physically separate vulnerable road users from vehicular traffic whenever possible.[46] Though separation may be impossible system-wide, rural and tribal areas may be able to provide some facilities near establishments that serve or sell alcohol, particularly in areas with more pedestrian traffic.

Recommendations for SHSOs

- Include the involvement of drugs in addition to alcohol in your state's efforts to improve rural road safety.
- Promote law enforcement testing impaired drivers for drug involvement, regardless of BAC.
- Fund specialized training for rural and tribal law enforcement, so they can collect timely samples that will improve prosecution, adjudication and treatment of impaired drivers.
- Encourage rural jurisdictions to share resources such as equipment, personnel and expertise.

43 Kilmer, B., Nicosia, N., Heaton, P., & Midgette, G. (2013). Efficacy of frequent monitoring with swift, certain, and modest sanctions for violations: Insights from South Dakota's 24/7 Sobriety Project. *American Journal of Public Health*, 103(1), e37-e43.

44 Midgette, G., & Kilmer, B. (2021). Can novel 'swift-certain-fair' programs work outside of pioneering jurisdictions? An analysis of 24/7 Sobriety in Montana, USA. *Addiction*, 116(12), 3381-3387.

45 Midgette, G., Kilmer, B., Nicosia, N., & Heaton, P. (2021). A natural experiment to test the effect of sanction certainty and celerity on substance-impaired driving: North Dakota's 24/7 Sobriety Program. *Journal of quantitative criminology*, 37(3), 647-670.

46 Raymond, P., Anderson, R., & Sykes, K. (2020). Practical safety solutions for local and tribal roads: A human factors approach (No. HWA-SA-20-071). Federal Highway Administration.

Speeding

Safe speeds is one of the five Safe System elements and a centerpiece of any road safety effort. Safe speeds can allow drivers more time and distance to correct driving errors, reducing the likelihood of a crash. Safe speeds can also reduce crash severity, turning a would-be fatal crash into an injury or property-damage-only event.

The relationship between increased speed and increased risk is not something road users see demonstrated in their day-to-day lives. Speed multiplies the force applied upon impact and the speeds involved in any crash can be the difference between survival and death. Until recently, efforts to educate drivers on the danger of excessive speed have not been a national priority. That has changed due to the uptick in excessive speeding on U.S. roadways during the pandemic.

Improving Rural Road Safety

Safety practitioners have recognized the dangers of traveling at excessive speeds since the invention of the internal combustion engine. However, many drivers disregard speed limits, viewing them as a minimum rather than maximum. As discussed in the introduction, rural roads can be misleading: drivers underestimate their danger, long trips incentivize speed, and the risk and severity of a crash are not apparent until the event takes place.

Countermeasures for speeding lean toward enforcement, and for good reason. It's hard to extinguish a behavior that is self-rewarding. This section will discuss how states can leverage self-enforcing roads and telematics to encourage safer driving without direct enforcement.

Enforce Speed Limits

Enforcement of speed limits can be difficult. Support for enforcement is thin and has waned in recent years, while law enforcement officers correctly regard traffic stops as risky for them and their vehicles – especially on narrow rural roads. Equity concerns have put downward pressure on traffic stops of all kinds. Rural areas have few officers to cover many miles of road, making enforcement difficult. In 2020, on-road traffic enforcement declined,[47] lower traffic volumes gave drivers open roads and fatalities in speed-involved crashes increased compared to the previous two years.[48]

HVE campaigns and other programs can help curb speeding. In Maryland, a pilot program funded by GHSA, the Insurance Institute for Highway Safety (IIHS) and The National Road Safety Foundation investigated the potential of a multi-pronged speeding approach on a rural road that included low-cost infrastructure (lane narrowing, driver feedback signs), HVE and public outreach and education. While in place, the IIHS determined that this program was associated with a 9% speed reduction and the odds that a vehicle on the road was speeding dropped by three-quarters.[49]

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47 Wagner, E., Atkins, R. G., Berning, A., Robbins, A., Watson, C., & Anderle, J. (2020). Examination of the traffic safety environment during the second quarter of 2020: Special report (No. DOT HS 813 011). United States. National Highway Traffic Safety Administration. Office of Behavioral Safety Research.

48 Vanlaar, W. G. M., Woods-Fry, H., Barrett, H., Lyon, C., Brown, S., Wicklund, C., & Robertson, R. D. (2021). The impact of COVID-19 on road safety in Canada and the United States. *Accident Analysis & Prevention*, 160, 106324.

49 Governors Highway Safety Association. (2021, June). Multipronged anti-speeding effort succeeds in slowing traffic [News release]. https://www.ghsa.org/resources/news-releases/GHSA/speed-pilot-maryland22

Higher speeding penalties may provide deterrence. Provisions that allow violators to avoid penalties should be wielded carefully. In many states, traffic violators can attend secondary driver education to avoid sanctions, but implementation is uneven, and the benefits of these ticket-forgiveness programs are not always clear.

Automated enforcement to address speeding and red light running can improve compliance without endangering officers or raising equity concerns.[50] Education and outreach can clarify goals to the public, and follow-up information should confirm whether the program has had the desired effect. If a rural jurisdiction is considering the use of automated enforcement, local residents should be provided information and education about how the safety cameras work, why they are being installed and, once installed, updates on the cameras' effectiveness in changing driver behavior. Where cameras are placed within a community should be carefully considered. The goal should always be to improve safety, not generate revenue.

Use Self-Enforcing Roads to Help Drivers Choose Appropriate Speeds

Self-enforcing roads are a powerful tool to encourage drivers to select an operating speed that is consistent with the design speed. Also called "self-explaining roads," this countermeasure ensures that features of the road are chosen to guide drivers to the correct speed selection. Knowledge of driver perception and decision-making are leveraged to create roads that lead drivers to safe speeds.

In other words, **road characteristics tell drivers how to select travel speeds**. A road with wide lanes, full shoulders and broad medians tells drivers that a high travel speed is expected. A 35-mph posted speed limit is unlikely to counteract that impression. If 35-mph is the safe travel speed, the road should show drivers the characteristics of a road that speed, not the characteristics of a 55-mph road, for example.

FHWA provides *Self-Enforcing Roadways: A Guidance Report*, which focuses on two-lane rural roads. Local practitioners can use these data-driven strategies to ensure that rural roads convey accurate expectations to drivers. SHSOs are encouraged to provide resources and information to help rural jurisdictions consider whether and how these human-factors-driven countermeasures might bolster their efforts to help rural drivers select appropriate speeds.

50 Sprattler, K., & Statz, L. (2021). EEquity in highway safety enforcement and engagement programs. Equity in Highway Safety Enforcement and Engagement Programs FINAL with Date.pdf (ghsa.org)

Use Telematics to Encourage Safe Driving

If successful, telematics may provide a variety of methods to encourage safer driving. Driver impairment programs (see Alcohol and Other Drugs page 50) already use driver monitoring such as ignition interlock systems and 24/7 programs to ensure that high-risk drivers limit their dangerous behaviors. Drivers who chronically select unsafe travel speeds put all road users at risk. If the public demanded action, vehicle telematics could provide monitoring to help reduce speeding and save lives. SHSOs are encouraged to work with insurance providers and telematics companies to obtain de-identified driver data to help gauge where speeding is most problematic on local roads. Share these data with local and county road departments, law enforcement agencies and safety stakeholders to inform countermeasure selection and resource allocation.

PROMISING PRACTICE

Vehicle telematics may offer a potent mechanism to limit speeding. State Farm's Drive Safe and Save program uses a mobile phone app and a Bluetooth beacon to monitor driver behaviors. (There's also a similar program for drivers with specific connected cars.) By tracking quick acceleration, hard braking, speeding, fast cornering, and distracted driving, the system can provide feedback to drivers. Safer driving is rewarded with insurance discounts. Nationwide's SmartRide app provides a similar system and incentives.

Recommendations for SHSOs

- Educate drivers on the dangers of excessive speed.
- Work with rural jurisdictions to provide information on the strategies of self-enforcing roads as a countermeasure to help rural drivers choose appropriate speeds.
- Share the findings of the rural speed management pilot program in Maryland with local jurisdictions to encourage a comprehensive approach to the problem. Provide grant funding to pilot a program in a rural community with a clearly identified speeding problem.
- Partner with insurance providers and telematics companies to identify the extent of the speeding problem on rural roads.

Driver Age: Teens and Young Adult Drivers

Young drivers are not identified by SHSOs as a top priority when it comes to rural road safety. But nearly all states fund and/or implement programs that broadly address novice drivers. These countermeasures, however, typically focus on teens up to age 18. Most states do not have programs dedicated specifically to **drivers aged 18-24, but the data analyzed for this report indicate they are in grave danger on rural roads.**

Young drivers are at high risk due to immaturity and inexperience. Immaturity includes a host of risk factors, such as overestimation of their own skills,[51] sensation-seeking[52] and an underestimation of risk.[53] The developmental arc that drives these factors does not mature at age 18. Instead, many of these characteristics remain until the frontal cortex matures at about age 25[54] — the age when fatality rates begin to stabilize.

Rural and tribal roads may lead to a false sense of safety for young drivers and their parents. As noted earlier, rural roads are judged to be safer than urban roads with the same features. However, open roads and long drives can tempt drivers to engage in risky behaviors such as speeding and cell phone use. Parents, too, may mistakenly assume that rural and tribal roads are safer than highways due to their lower speeds and lighter traffic volumes.

Rural and tribal roads, however, are unforgiving. Narrow lanes, unmarked pavement, winding roads, dirt and gravel do not offer margin for error. Inexperienced drivers do not reflexively correct minor misjudgments, and excessive speeds can snatch away precious response time.

Improving Rural Road Safety

Strategies to protect young drivers typically focus on those who are under 18. Strategies aimed at preventing alcohol impairment in young drivers are the only common countermeasures to address drivers aged 18-21. Countermeasures to protect drivers aged 21-24 are far less common.

Prevent Alcohol Use

Though estimates vary with the method used, underage drinking is believed to be more prevalent in rural areas.[55] Several countermeasures target underage drinking to **prevent alcohol impairment among young drivers**. These include a minimum alcohol consumption age of 21 typically addressed through enforcement and vendor compliance checks.

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51 Deery, H. A. (1999). Hazard and risk perception among young novice drivers. *Journal of safety research*, 30(4), 225-236.

52 Whissell, R. W., & Bigelow, B. J. (2003). The speeding attitude scale and the role of sensation seeking in profiling young drivers at risk. *Risk Analysis: An International Journal*, 23(4), 811-820.

53 Tränkle, U., Gelau, C., & Metker, T. (1990). Risk perception and age-specific accidents of young drivers. *Accident Analysis & Prevention*, 22(2), 119-125.

54 Spear, L. P. (2000). The adolescent brain and age-related behavioral manifestations. *Neuroscience & Behavioral Reviews*, 24(4), 417-463.

55 Dixon, M. A., & Chartier, K. G. (2016). Alcohol use patterns among urban and rural residents: Demographic and social influences. *Alcohol Research: Current Reviews*, 38 (1), 69–77.

Separate Risk Factors with GDL

States use several strategies to address the safety of drivers younger than 18. The most common and effective countermeasure is Graduated Driver Licensing (GDL), a series of restrictions that allow novice drivers to gain experience while limiting exposure to risk.[56] GDL works by separating risk factors. The Swiss Cheese graphic (Figure 31) in the Safe System section of this report illustrates how redundant layers of protection can help to prevent crashes and reduce crash severity. It also shows how multiple risk factors create more chances for a crash to occur and for that crash to be severe. Inexperience is a risk factor that can only be eliminated with time and practice. GDL improves safety by separating other known risk factors from inexperience.

GDL provisions typically include an older minimum age for permit and licensure, a minimum learner's permit holding period, supervised practice hours, and nighttime and passenger restrictions. Some states also ban the use of cell phones and other electronic devices, as well as require the driver and all passengers to be properly restrained. Several states' GDL laws include novice drivers over age 18. Maryland's Rookie Driver program applies to all novice drivers, regardless of age. New Jersey, too, places restrictions on new drivers of all ages to help minimize risk while they gain behind-the-wheel experience.

Exceptions, however, reduce GDL effectiveness. Several of these restrictions tend to be weak or underutilized in rural areas. Long distances make parents eager for teens to drive themselves and peers, even late at night. Rural teens can obtain licenses at younger ages in several states, and "off the farm" provisions can allow very young drivers on the road in rural areas.

While SHSOs can't lobby to address loopholes in GDL laws, they can educate policymakers about the extent of the young driver safety problem by providing data for their districts segmented by age, causation factors and road type. They can also share information about the effectiveness of key provisions that may be missing from their current state law. IIHS offers a Graduated Licensing Calculator that shows how critical GDL provisions can affect outcomes in each state. Previous GHSA teen driving research reports also discuss the effectiveness of GDL and key provisions and highlight programs for SHSO consideration.

Training, Practice and Rewards

Ensuring that novice drivers — especially those that age out of a state's GDL program before obtaining a license — have access to driver education and behind the wheel training is critical. A free resource to fill this gap is TeenDrivingPlan (TDP), a web-based program developed by the Center for Injury Research and Prevention at the Children's Hospital of Philadelphia. TDP uses brief videos and a practice planner to promote driving in a variety of settings. It also includes a logging and rating tool to track practice hours and skill development. Teens who used the TDP were found to perform better than non-TDP users on a rigorous on-road driving assessment. They also reported more practice driving in various environments and greater parental involvement.[57]

One of the few programs that includes drivers aged 21-24 is State Farm's Steer Clear Safe Driver program. With the use of an app, Steer Clear provides qualifying drivers under age 25 five secondary

56 Williams, A. F., & Ferguson, S. A. (2002). Rationale for graduated licensing and the risks it should address. *Injury Prevention*, 8(suppl 2), ii9-ii16.

57 Center for Injury Prevention and Research. (2022). TeenDrivingPlan research [Web page]. Children's Hospital of Philadelphia. https://injury.research.chop.edu/teen-driving-safety/teendrivingplan

driver education training modules, a log for driving mentors and practice sessions. Young drivers who complete the program are eligible for an insurance discount.

Families and Peers Can Promote Safe Driving

States are encouraged to promote parental involvement in their teen and young adults early driving years. Outreach and education initiatives should convey the risk that rural roads pose for young drivers, especially when it comes to speeding. The latter is critical as the proportion of fatal crashes that involved speeding was higher for teenage drivers than for any other age groups. Additionally, these crashes (for all new drivers 16-20) also are more likely to happen on non-freeway and local roads, which have fewer safety features such as median barriers to help prevent head-on collisions or a safety edge between the driving lane and the shoulder that helps prevent run off the road crashes.[58]

A handful of states require parents to participate in an education program as a prerequisite for their teen to obtain a permit or license, while others offer and/or fund voluntary programs. SHSOs are encouraged to review these programs and incorporate information about rural road safety, where applicable.

Peer-to-peer programs, a proven countermeasure when used as a component of a broader environmental strategy for preventing teen crashes,[59] use an assortment of strategies to promote safe teen driving. For example, the school-based Family, Career and Community Leaders of America (FCCLA) spearheads the Families Acting for Community Traffic Safety (FACTS) that promotes driving safety with peer education efforts planned and implemented by and for middle and high school students. Students complete projects that can win national recognition and cash awards. FCCLA serves more than 160,000 students annually through a network of 5,300 chapters in nearly every state. Many of these programs are based in rural communities, presenting an opportunity for SHSOs to not only provide grant funding, but also share local data and other resources.

Kansas' Seat Belts Are for Everyone (SAFE) is a peer-to-peer, student-led program that includes community engagement. Education, rewards, enforcement and observational measurements are used to improve seat belt use. SAFE has spread to most Kansas counties and has offshoots in Oklahoma and Missouri. The program's success in significantly bolstering seat belt use among teens has spurred members to initiate efforts to combat distracted driving and promote compliance with other traffic safety laws.

The Texas-based Teens in the Driver Seat (TDS) program is a year-round, fully youth-led initiative that engages with students at 1,000 junior and senior high schools. TDS is also active in 40 other states including Georgia, Nebraska and Colorado, reaching more than 1.3 million youth. The students focus on five primary teen driving risks — distraction, nighttime driving, impairment, seat belt use and speeding. The college edition, U in the Driver Seat (UDS) is currently active on 22 college and university campuses across Texas. It is led by more than 550 students who are engaging with approximately 267,000 of their peers. While UDS initially addressed alcohol and drug impaired driving, the focus was expanded to include distraction and drowsy driving.[60]

58 Retting, R. (2021). Teens and speeding: Breaking the deadly cycle. Governors Highway Safety Association.
59 Fischer, P. (March, 2019). Peer-to-peer teen traffic safety program guide. (DOT HS 812 631). National Highway Traffic Safety Administration.
60 Ibid.

Recommendations for SHSOs

- Expand current novice or teen driver initiatives to include drivers aged 20-24, rebranding it as young drivers, as their risk is associated with their youth.
- Review your state's Graduated Driver License law to identify dangerous loopholes, educate policymakers about the rural road safety problem for teens and young adults and provide district-specific data.
- Educate parents about the risks rural roads pose for their young drivers. Promote parental engagement throughout the young driver years and the availability of free driving training resources.
- Expand current peer-to-peer programming to include college-age students.

Driver Age: Older Drivers

Older road users 65 plus experience a host of limitations on their perceptions, decision-making and execution.[61] These include decrements in visual acuity, field of view, night vision and the ability to adjust to varying levels of illumination. Older drivers also experience slower cognition, have longer reaction times and may have difficulty with some of the physical aspects of the driving task that require strength (e.g., manual steering) and flexibility (e.g., shoulder check). Physical vulnerability also increases the severity of injuries for older road users involved in a crash.

Improving Rural Road Safety

A great deal of safety research has focused on older road users, but effective countermeasures are limited. Practices backed by substantial research include licensure screening and testing, referrals to licensing agencies and license restrictions. Missouri, for example, requires in-person license renewal every three years once a driver reaches age 70. These countermeasures generally reduce risk by limiting driving or ceasing it altogether. NHTSA is currently gathering information on promising approaches that could improve licensing policies.

Training Officers to Conduct Roadside Assessment

Educating law enforcement officials to recognize and assess the warnings signs that may necessitate a driver's license re-examination is critical. In rural communities, where police officers may be on a first-name basis with local residents, being trained to recognize the warning signs for an older driver

61 Staplin, L., Ball, K. K., Park, D., Decina, L. E., Lococo, K. H., Gish, K. W., & Kotwal, B. (1999). Synthesis of human factors research on older drivers and highway safety, Volume I: Older dresearch synthesis. (FHWA-RD-97-094). Federal Highway Administration. SYNTHESIS OF HUMAN FACTORS RESEARCH ON OLDER DRIVERS AND HIGHWAY SAFETY, Volume I: Older Driver Research Synthesis (bts.gov)

could be a lifesaver. *Law Enforcement's Role in Older Driver Safety* is a two-hour Peace Officer's Standards and Training (POST) certified program delivered by a team of health and law enforcement professionals. A 30-minute video version of the training is available for briefings, making it viable for small, rural departments.

Training officers to screen for cognitive impairment, which can affect drivers of all ages, is also important. The Driver Orientation Screen for Cognitive Impairment (DOSCI) is a nine-question tool that enables officers to screen at roadside using a smartphone with a secure login for law enforcement. DOSCI also provides resources and contact information to assist with referrals. A 10-minute training video provides instruction on the use of the tool and smartphone application. A 9-minute video includes a demonstration of the use of DOSCI during a traffic stop (this is also included in the 30-minute video discussed above), while a 15-minute video discusses medical conditions that can interfere with driving and how to recognize those conditions. All told, a rural police officer could be trained to use DOSCI in less than 45 minutes.

Provide Alternative Transportation

Rural residents are likely to resist driving cessation. In rural areas, a lack of alternative transportation options can leave older drivers with the impression they must continue driving to maintain their independence. The National Rural Transit Assistance Program (RTAP) offers resources for rural and tribal transit including training, peer networking and technical assistance.

Screening and Other Services

Older drivers generally prefer to continue driving as long as they can do so safely. Some unproven but potentially useful practices include older driver training courses and renewal requirements of vision tests and/or written or road tests.[62]

Older drivers or others who have experienced an adverse medical event can obtain testing and adaptive equipment through a Driver Rehabilitation Specialist (DRS). On an individual basis, a DRS can help drivers assess whether and how they can drive safely. In rural areas, a DRS is most likely found through a hospital affiliation. The Association for Driver Rehabilitation Specialists offers more information.

Older Drivers can also take advantage of CarFit, a free education program that helps them check how well their personal vehicles "fit" them. Sponsored by AAA, AARP and the American Occupational Therapy Association, trained individuals work with each participant to ensure they fit their vehicle properly for maximum safety and comfort. A CarFit check typically takes place at community-based setting and lasts approximately 20 minutes. The program was impacted by the pandemic, requiring a pivot to an all-virtual environment. In-person events are once again being offered, as well as a 45-minute on demand CarFit virtual workshop that includes a self-assessment checklist. The latter would be particularly beneficial to older drivers in rural areas that are less likely to be served by an in-person event.

62 Venkatraman, V., Richard, C. M., Magee, K., & Johnson, K. (2021). Countermeasures that work: A highway safety countermeasure guide for state highway safety offices, 2020 (No. DOT HS 813 097). National Highway Traffic Safety Administration.

Recommendations for SHSOs

- Partner with state licensing agencies to identify and implement best practices in addressing older driver safety such as routine screening.
- Promote law enforcement's use of the Driver Orientation Screen for Cognitive Impairment.
- Identify counties with a high proportion of residents 65+ and provide information about alternative transportation, CarFit, Driver Rehabilitation Specialists and other resources.
- Partner with AAA, AARP and AOTA to build a cadre of CarFit trained volunteers who can provide in-person events in rural communities.

Distraction

Rural areas are at least as vulnerable to distraction as other environments. Distraction is self-rewarding. Long rural drives can be boring, and the social engagement offered by a cell phone is pleasant. The risks are not obvious. A lack of other traffic promotes a false sense of safety, and the very distraction of the device can make drivers less likely to detect decrements in their performance.[63] In the survey of SHSOs conducted for this report, countermeasures to address distracted driving included education as well as enforcement of state and local bans.

Improving Rural Road Safety

GHSA's recently released report, *Directing Drivers' Attention: State Highway Safety Office Roadmap for Combating Distracted Driving*, offers detailed information about distracted driving and appropriate countermeasures. For rural roads, centerline and edge line rumble strips can be especially useful to reorient drivers' attention and provide valuable feedback when vehicles begin to stray from the travel lane.[64] In addition, median barriers, which separate opposing traffic on divided highways, have been shown to reduce all fatalities due to head-on collisions by 8%, but that reduction increases to 97% for rural, four-lane freeways.[65] SHSOs are encouraged to partner with state DOTs to promote the use of these engineering treatments and to educate drivers about their effectiveness.

Enforce Distracted Driving Bans

Countermeasures tend to focus on the use of cell phones, though all sources of distraction have long been recognized as hazardous. Most states ban texting while driving, and some ban all use of hand-

63 Lesch, M. F., & Hancock, P. A. (2004). Driving performance during concurrent cell-phone use: are drivers aware of their performance decrements? *Accident Analysis & Prevention*, 36(3), 471-480.

64 Raymond, P., Anderson, R., & Sykes, K. (2020). Practical safety solutions for local and tribal roads: A human factors approach (No. HWA-SA-20-071). Federal Highway Administration.

65 Federal Highway Administration. (2022). Crash modification factor clearinghouse [Web page]. https://www.cmfclearinghouse.org

held devices. Research confirms that strong and unambiguous states laws, particularly those that ban holding a cell phone under any circumstances,[66] can help prevent crashes.[67] HVE of these laws, combined with education and public outreach, is effective in reducing distracted driving. Enforcement, however, faces challenges. Officers must witness violations but getting an accurate view of a driver's device is difficult in the daytime, and even more so at night. Like most safety challenges, enforcement of distracted driving in rural areas is even more difficult than in urban areas.

To aid in this effort, states may wish to consider designating rural highways with a high incidence of distracted driving crashes as "safety corridors." Ohio implemented the nation's first Distracted Driving Safety Corridor in 2018. Using Section 148 Highway Safety Improvement Program funds, the state DOT (ODOT) placed signage along the corridor that included a counter telling motorists the number of days since a serious crash had occurred. ODOT then rolled out a media campaign to increase public awareness and partnered with the Department of Public Safety to increase enforcement. Most of the enforcement activity was education related. During the first two years of the program, all crashes and injury crashes fell 30% and 31%, respectively.[68]

PROMISING PRACTICE

SHIFT Idaho uses outreach and messaging to address several traffic safety issues including distracted driving. Positive phrasing ("DO this" rather than "DON'T do that"), a social norms component and social media engagement are used to encourage safe driving behaviors by residents and tourists. Stanley Sasquatch, widely recognized by the locals, helps convey the messages.

Recognizing the manpower issues faced by rural law enforcement agencies, technology may offer a solution to addressing distracted driving. Acusensus offers a safety camera program that leverages artificial intelligence to detect distracted driving and other illegal driving behaviors. Cameras positioned adjacent to roadways can autonomously capture real time photographic evidence that may be able to identify distracted driving at travel speeds more effectively than individual police officers.

Data collected in this manner can help law enforcement agencies and SHSOs better understand the extent of the problem and enable real-time deployment of education through message signs based on that data. Dynamic feedback signs have not been evaluated to determine their effectiveness with distracted drivers. However, research has shown using them to notify drivers they were speeding was effective in getting them to slow down in a variety of contexts and locations.[69]

66 Insurance Institute for Highway (2022, August). More sweeping cell phone laws reduce crash rates [News release].

67 National Academies of Sciences, Engineering, and Medicine. (2021). Using electronic devices while driving: Legislation and enforcement. http://nap.edu/26082

68 Simpkins, M. (2020). Ohio's first distracted driving safety corridor. Ohio Department of Transportation.

69 National Highway Traffic Safety Administration. (2021, July). Effectiveness of dynamic feedback signs. (Traffic Tech. Report No. DOT HS 813 164).

Recommendations for SHSOs

- Partner with state Departments of Transportation to promote the use of engineering countermeasures that mitigate the impact of driver distraction. Educate drivers about their effectiveness coupled with the danger of driving distracted.
- Partner with traffic safety stakeholders to promote the effectiveness of a strong and unambiguous hand-held cell phone law.
- Identify high-risk rural corridors in your state and partner with the state DOT and highway patrol to pilot and evaluate a “safety corridors” program.
- Use social norms and/or a social media challenge to engage the public in changing the safety culture.
- Partner with a rural community to pilot and evaluate a safety camera program that provides dynamic feedback to distracted drivers.

Final Thoughts

The nation's rural roads are deadly, but the risky behaviors and age-related factors that put road users at risk can be mitigated through a holistic approach that includes behavioral safety. This report discusses the unique challenges of the rural landscape and offers recommendations for SHSO consideration. It also identifies proven countermeasures and promising practices to help SHSOs and their partners address the leading rural road fatality factors identified through analysis of the five most recent years of available FARS data. Several broad themes emerged because of this research that merit SHSOs' attention.

First, **bring training to those who need it** — whether it's specialized law enforcement training to draw blood for drug involvement evidence, or CPST training to help caregivers correctly install and use car seats. Rural and tribal jurisdictions have limited resources. But the burden of travel, accommodations and time invested is greater for rural and tribal trainees than for their urban counterparts. When you bring the training to the people who need it, as North Carolina did with their rural CPST initiative, engagement flourishes.

Second **promote the sharing of resources**. Across topic areas, rural communities have successfully shared equipment, expertise, personnel and other resources. A single rural or tribal community might not need or want a full-time DUI court or have enough personnel to conduct a sobriety checkpoint every month. But sharing resources across communities can ensure that all have access.

Can communities share speed feedback signs or automated enforcement equipment? Can they coordinate among CPSTs to staff rotating events in neighboring counties or reservations? Can they pool resources to create educational materials that are reflective of their region and address their deadliest crash factors? Sharing resources, experts and equipment warrants promotion.

Finally, separate risk factors whenever possible. Not all risk factors can be eliminated. But keeping risk factors from coinciding can improve safety. For example, lack of access to emergency medical care is a risk factor, as is an especially challenging road. Can cell phone and 911 coverage be expanded to high crash locations on rural roads? Youth is a risk factor, and so is speeding. Can enhanced sanctions keep drivers under age 25 from speeding? GDL has demonstrated that it's possible to separate risk factors and improve safety. System-wide, any separation of risk factors has the potential to save lives.

General Resources

GHSA offers a wealth of resources for rural road safety. These include information on high-risk impaired drivers, teens and speeding, equity and enforcement, behavioral safety in the context of the Safe System approach, and distracted driving.

The International Association of Chiefs of Police (IACP) provides guidance in *Evidence-Based Strategies for Crime Reduction Strategies for Small, Rural and Tribal Agencies*. This guide of evidence-based policing practices includes strategies for culturally appropriate engagement, low-cost training options, allocation of limited resources, and the use of social media for outreach. Combine this guidance with Data-Driven Approaches to Crime and Traffic Safety (DDACTS 2.0) to efficiently deploy enforcement resources and collaborate with communities. Combining data from crime reports, crashes and calls for service, DDACTS 2.0 provides enforcement strategies to reduce crime and crashes and improve quality of life.

The National Center for Rural Road Safety is the premier hub for rural road safety training, resources and technical assistance. In this role, they connect and partner with organizations across the country to equip local agencies to make their roads safer.

The U.S. Department of Transportation has developed a *National Roadway Safety Strategy* that employs the Safe System approach to address the nation's road safety crisis..

NHTSA's *Countermeasures That Work* summarizes a vast body of literature and includes information on data underpinnings, effectiveness and cost. NHTSA has also developed a Drug-Impaired Driving Criminal Justice Evaluation Tool and offers communications resources at Traffic Safety Marketing.

FHWA's *Proven Safety Countermeasures* condenses information on 28 countermeasures into an interactive tool. This resource includes information on local road safety plans and road safety audits as well as a webinar and links to other resources.

Tribal communities have unique challenges and solutions. Tribal Safety.org provides an array of resources.

FHWA Report 600, *Human Factors in Road Systems*, provides a thorough examination of human capabilities and limitations in the relationship between road users, vehicles and environments.

FHWA also offers a brief introductory primer in human factors for local and tribal road practitioners, *Practical Safety Solutions for Local and Tribal Roads: A Human Factors Approach*. This resource briefly and simply explains six basic human factors principles and applies them to eleven common safety challenges.

AASHTO offers detailed guidance and training associated with the Highway Safety Manual (HSM): AASHTO - Highway Safety Manual.

FHWA's Crash Modification Factors Clearinghouse provides a calculator to compute the expected number of crashes after an engineering countermeasure is implemented. A searchable database, guidance and links to other resources are included.

The National Rural Transit Assistance Program (RTAP) offers rural and tribal transit solutions. Resources include technical assistance, training, collaborations and a library of information.

The U.S. Department of Transportation provides rural resources in the Rural Opportunities to Use Transportation for Economic Success (ROUTES) initiative. This comprehensive site includes supporting statistics, grant information, training, and links to other resources.

The Building a Better America Fact Sheet for Rural Communities lays out projects and priorities to improve rural infrastructure.

Safe Kids Worldwide trains and certifies Child Passenger Safety Technicians to conduct car seat inspections and train caregivers to properly install and use car seats. A broad array of resources for CPSTs are offered, including online training resources.

Older driver resources are available from FHWA, NHTSA, AAA, the CDC and GHSA.

www.ghsa.org

The Governors Highway Safety Association (GHSA) is a nonprofit association representing the highway safety offices of states, territories, the District of Columbia and Puerto Rico. GHSA provides leadership and representation for the states and territories to improve traffic safety, influence national policy, enhance program management and promote best practices. Its members are appointed by their Governors to administer federal and state highway safety funds and implement state highway safety plans.

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