

# Injury Prevention and Control in Rural America – Insights from the CDC MMWR Rural Health Series 11/15/17

**Kristine Sande:**

Good afternoon everyone. I'm Kristine Sande and I'm the program director of the Rural Health Information Hub. I'd like to welcome you to today's webinar, Injury Prevention and Control in Rural America - Insights from the CDC MMWR Rural Health Series. This is the fourth webinar in a series highlighting the work of the CDC's MMWR rural health series, and we are delighted to have a great slate of speakers from the CDC here with us again today.

Before we begin, I'll run through a few housekeeping items. We do hope to have time for your questions at the end of today's webinar. If you have questions for our presenters, please submit those towards the end of the webinar using the Q and A section that will appear in the lower right hand of the screen following the presentations.

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Now it is my pleasure to introduce our speakers for today's webinar. We will have opening remarks from Dr. Arlene Greenspan. Dr. Greenspan is currently the Associate Director of Science at CDC's National Center for Injury Prevention and Control, otherwise known as the injury center. As the injury center's lead scientist, she is responsible for overseeing the center's research portfolio. Dr. Greenspan started her career at CDC as an epidemic intelligence officer in 1991. Her research in programmatic efforts at CDC have included the study of traumatic brain injury and concussion, motor vehicle safety and unintentional injury prevention.

Ms. Laurie Beck, NPH has served as an epidemiologist on the Transportation Safety Team within the Division of Unintentional Injury Prevention since 2003. Her research interests includes seatbelt use, safe transportation for older adults, and pedestrian safety. Prior to joining the transportation safety team, she worked as a contractor for CDC's National Center for Chronic Disease Prevention and Control, focusing on surveillance of pregnancy-related behaviors and conditions.

Dr. Asha Ivey-Stevenson is a behavioral scientist and epidemiologist at the CDC in the National Center for Injury Prevention and Control's Division of Violence Prevention. She serves as a subject matter expert in the area of suicide prevention, while also working on other aspects of violence prevention, such as youth violence and homicide. She is also currently a lieutenant commander in the United States public health service.

Finally, Dr. Karin Mack is the Associate Director for Science for the Division of Analysis Research and Practice Integration in the National Center for Injury Prevention and Control. As the Associate Director for Science, she provides leadership to the division's management and staff on scientific activities and research methodologies. Her research activities focus primarily on the topics of prescription drug overdose prevention, population-level change to reduce injuries, and healthy and safe homes.

So welcome to all of our speakers, and at this point I'll turn it over to Dr. Greenspan.

**Arlene Greenspan:**

Thank you so much for the opportunity to speak to you all today. In 2017, CDC initiated a year-long series of articles that highlighted disparities between rural and urban population. As part of that effort, we partnered with our colleagues at the Federal Office of Rural Health Policy, and the Rural Health Information Hub to help us ensure that these articles and their findings get into the hands of people like you who can help move our data to action.

On today's webinar, we will be sharing the findings from a subset of those articles that focused on rural health issues related to injury and violence. We're often asked the question why focus on injury and violence, and why does the CDC focus on those areas? People are often surprised to hear that CDC works in the area of injuries and violence. What you may not realize is that in the first half of life, more Americans die from violence and injuries such as motor vehicle crashes, falls, homicides than any other cause, including cancer, HIV or the flu. We also know that rural populations suffer disproportionately from injury.

In fact, unintentional injury deaths are 50% higher in rural areas compared to urban areas. Suicide rates are also higher in rural areas, sorry, with the gap between rural and urban widening noticeably since 2007 to 2008.

This past December, CDC released the most recent update on life expectancy and found that for the first time in many years, the overall US death rate had increased and the life expectancy had decreased. So we don't understand the full picture yet.

It appears that two of the drivers of the ship are suicide and unintentional injuries like opioid overdoses. The good news is that there are evidence-based public health strategies, practices and policies that when implemented can prevent injuries and death to both unintentional and violent causes.

For more than two decades, CDC's injury center has been working toward that very goal. We are the nation's leading authority on violence and injury prevention, and the only federal agency that addresses those two key issues in non-occupational settings. Persons like you play a key role in making this happen. When we work together, we multiply our efforts to save lives and protect people from injuries and violence, and in turn create a culture of safety.

As each of the speakers will address, we have reason to be optimistic. Each of the areas that will be discussed have evidence-based or promising strategies that when implemented, have the potential to save many, many lives.

The three public health issues that we will be focusing on in today's webinar are motor vehicle injuries, suicide, and opioid overdose. Reducing motor vehicle crash deaths was one of the great public health achievements of the 20th century for the United States. And while deaths and injuries from motor vehicle crashes have declined, too many people are still killed or injured in motor vehicle crashes each year. In fact, compared to other high-income countries, the US has lower rates of front belt seatbelt use, and higher rates of death. This tells us that there's still more progress to be made in reducing motor vehicle crash deaths. In a few minutes, you will be hearing from Dr. Beck who will talk about rural and urban differences in seatbelt use and motor vehicle crash deaths.

The next topic, suicide and suicide attempts, are common, costly and growing. Suicide is highly prevalent, connected to other forms of violence and have significant health and economic consequences. Many people don't realize that suicide is in fact the 10th leading cause of death in the United States. Since 1999, suicide rates have increased across the country, but the gap between urban and rural areas has widened, particularly in the time since the economic recession. We don't know for sure, but the suicide rate in rural areas might reflect suicide risk

factors known to be common in rural areas, such as limited access to mental health care, social isolation, and opioid overdose. However, as with motor vehicle crashes, suicide is preventable. CDC's public health approach to preventing suicide is unique. We're trying to reduce risk factors like depression, mental illness, hopelessness, substance abuse, lack of access to healthcare, and financial and work stress, and promote protective factors like economic support, protective environments, connectiveness, coping and problem solving skills.

Rural communities play a huge role in the effort. As Dr. Ivey Stevenson will share more about that in a moment.

Lastly, as you've probably seen in the news, and may be experiencing in your communities, over the past several years, one of the biggest public health issues our nation faces today is the opioid overdoses epidemic. Prescription opioids are consumed at a greater rate in the United States than in any other nation in the world, making over-prescribing one of the primary drivers of the overdose epidemic.

And more recently, there is an escalating crisis around overdose deaths related to heroin and synthetic opioids such as fentanyl. Rates of opioid misuse and overdose are highest among poor and rural populations. The data points to the need to design, implement, and monitor locally informed initiatives in rural communities that we can effectively prevent and treat opioid misuse and overdose.

Dr. Mack will tell us more about one piece of this epidemic, illicit drug overdose, and share resources you can use in your community to fight back. With that, I will turn this over to my presenters.

**Laurie Beck:**

All right, thank you. I'm Laurie Beck and I'm gonna be first sharing the results from our report on rural and urban differences and passenger vehicle occupant deaths and seatbelt use in young adults in the United States.

Before I start, I want to acknowledge my co-authors on the report, Erin Sauber-Schatz, John Downs, and Mark Stevens. And I'll start by giving a little background to set the context for what we did in our report. This chart illustrates the points that Dr. Greenspan made a few minutes ago about injuries and violence as leading causes of death in the United States. Here we have the 10 leading causes of death by age group in the US, and the colored boxes are injury-related causes of death. Specifically the blue boxes are all injury-related, excuse me, are all unintentional injury deaths, which include traffic crashes. And we can see that unintentional injuries are one of the leading causes of death and are the leading cause of death for people ages one through 44 in the US.

This chart focuses in specifically on the injury deaths only, and this time the colored boxes represent unintentional causes of injury. The bright blue boxes are traffic crash deaths. And we can see that traffic crashes are the number one or number two cause of death across the lifespan, excuse me, cause of injury deaths across the lifespan with the exception of infants.

Of course we also know that the deaths really only tell part of the story. For every one person killed in a motor vehicle crash, eight people are hospitalized, and 100 people are treated and released from an emergency department.

In the US, most travel takes place in passenger vehicles, and two thirds of all crash deaths are to passenger vehicle occupants. This includes drivers and passengers. Seat belts reduce the risk of serious injury or death in a crash by half, and it's for this reason that wearing seat belts on every trip and in every seat are so important.

Given that background, the purpose of our study was to investigate rural and urban differences among adults in passenger vehicle occupant death rates, and the proportion of occupants who were unrestrained at the time of the fatal crash, and self-reported seatbelt use, and also to examine these differences using a six-level rural/urban continuum variable.

We also looked at differences in these outcomes by type of seatbelt enforcement in each state, and that meant examining by primary or secondary enforcement laws. And for those who aren't familiar, primary enforcement seatbelt laws allow police officer to stop a vehicle and issue a ticket for non-use of seat belts, simply because a driver or passenger is not wearing their belt. And in states that allow for secondary enforcement, a police officer is only allowed to issue a ticket for non-use of seatbelt if the vehicle has been first stopped for another violation such as speeding or some other traffic violation.

Okay, so turning now to the study method, our study population included adults in the US from the year 2014. We used multiple data sets for this study, which I'll describe briefly before I share results. The first data source was the fatality analysis reporting system, or FARS. This is a census of all fatal traffic crashes in the United States. It's maintained by the National Highway Traffic Safety Administration, or NHTSA, within the Department of Transportation. And the outcomes selected for study from FARS were passenger vehicle occupant deaths among adults, and also adult occupants killed who were unrestrained at the time of the fatal crash.

We also used data from the behavioral risk factor surveillance system, or BRFSS. This is ongoing national and state-based surveillance of selected health related risk behaviors, chronic health conditions, and use of preventative services. It's maintained by the CDC, and the outcomes selected for study here is self-reported seatbelt use, which we defined as always wears a seatbelt.

Our data for the rural and urban variable came from USDA's rural urban continuum code, and these consist of nine county-level codes that are basically defined as each code is defined as being in a metropolitan or non-metropolitan area, then metropolitan counties are further classified by the population size of the larger metro area to which they belong. And non-metropolitan counties are classified by the degree of urbanization within that county, as well as whether they're physically adjacent to a metropolitan area.

We modified these RUCC codes slightly for our study by collapsing the nine original categories into six. We did this by combining non-metro counties with the same size urban population without regard to whether they were adjacent to a metro area. So here you see the six categories that we used for the study that range from the most urban down to the most rural category.

Finally, we consulted the insurance institute for highway safety to identify what type of seatbelt enforcement law was present at the state level in 2014. In 2014, there were a total of 33 states and D.C. with primary enforcement, which you see with the dark blue states. There were 16 states that had secondary enforcement, those were the striped marks. And one state, New Hampshire, had no requirement for seatbelt use among adults. But New Hampshire was grouped with the secondary law states for the purposes of our analysis.

So now onto our key findings. First, we have passenger vehicle occupant death rates among adults, and these were presented by region. Here I've highlighted in the green box death rates for the most urban counties in each region, and as we move across this chart here, and we go to increasingly rural areas, we can see that death rates increase and the increase is statistically significant. The death rates here in the most rural counties are three to ten times higher than

those in the most urban counties. I also want to point out here that the death rates in the most rural counties for the northeast region were suppressed due to small numbers.

Okay, and now I want to compare within each region seatbelt use in primary versus secondary enforcement states to see what the effect of enforcement type is on the death rate. So we'll start here with the northeast region. And we can see here that in the metropolitan areas of the northeast, death rates are higher in counties located in secondary enforcement states than in counties in primary enforcement states. You'll see a similar trend in the northeast non-metro areas, but the difference is not statistically significant.

Moving onto the Midwest, we see again that death rates are higher in the metro areas and counties located in secondary enforcement states, but they're low ... excuse me, they're higher in counties located in secondary enforcement states than in those in primary enforcement states. And we see the same effect, and this is statistically significant in the non-metro areas of the Midwest with higher death rates in counties with secondary enforcement.

We see the same thing in the west. Death rates are higher in both metro and non-metro areas if the state has a secondary enforcement law versus primary.

In the south, we actually observed an unexpected relationship between seatbelt use and ... excuse me, between seatbelt enforcement and death rate. So in the metro areas of the south, death rates were higher under primary enforcement than under secondary enforcement. And the same was true in the non-metro areas of the south.

So in trying to interpret these findings, I do want to point out the distribution of state seatbelt enforcement in the south region. In the other three regions, there was a fairly balanced representation of both primary and secondary enforcement states. But in the south, 16 of 17 states, and I'm counting D.C. here as a state, 16 of 17 states in the south have primary enforcement, which gave us only one state, Virginia, to use in the secondary enforcement category. So we feel that the primary secondary comparison here may not have been very robust, and this may influence kind of what we're seeing in terms of relationship, so I wanted to point that out specifically.

Okay, so let's turn now to the proportion of occupants who were unrestrained at the time of the fatal crash. And here we're looking at the proportion for each level along the rural urban continuum with the most urban category being the group of bars at the left, and the most rural categories being the far right of the slide. We see that overall the proportion of occupants who were unrestrained at the time of the fatal crash increases as we get into increasingly rural communities. We can also again look at the effect of primary versus secondary enforcement on the proportion of unrestrained occupants. If we look, for example, at the most urban category on the left-hand side of this figure, we see that there's a higher proportion of unrestrained occupants in states with secondary seatbelt enforcement than there are when the state has primary enforcement, and that's true, we see that trend across the board.

Okay. And I'm gonna turn now to our BRFSS data. The data that I've presented up 'till now is from our data source FARS that looked only at fatalities among passenger vehicle occupants. This data is from BRFSS, and it's a general population survey of adults in the United States and this is self-reported seatbelt use in young adults. Again, we see the similar trends from what we saw before with increasing rurality leading to higher risk, and in this case, lower levels of seatbelt use.

This trend of decreasing seatbelt use with increasing rurality is statistically significant as we move into the more rural communities. And we also see, again, comparing within each rural

urban category comparing primary and secondary enforcement with the higher levels of seatbelt use in counties that are located in primary enforcement states versus the counties located in secondary enforcement states.

For example, in the most rural counties at the far right of the figure, seatbelt use in primary enforcement states in rural counties is 79% versus 65% in the counties in states with secondary laws.

Okay. So turning now to our conclusions, the highlights from the study are that as rurality increases, passenger vehicle occupant death rates among adults increased. Proportion of occupants who are unrestrained at the time of a fatal crash increases, and self-reported seatbelt use decreases. We further found that primary seatbelt enforcement laws were effective even in the most rural areas where we saw higher levels of seatbelt use and lower death rates for each census region except for the south.

In conclusion, improving seatbelt use remains a critical strategy to reduce crash-related deaths in the United States, especially in rural areas. States and communities can consider using evidence-based interventions to reduce rural urban disparities in seatbelt use and passenger vehicle occupant death rates. And I want to say that even though some of these interventions were not designed specifically for rural communities, they may be effective among these populations as we observed with the primary seatbelt enforcement.

Before I turn it over to Dr. Ivey Stevenson, I wanted to share some resources that may be useful as you're planning transportation safety activities in your communities. The first is MV PICCS, which is the Motor Vehicle Prioritizing Interventions and Cost Calculator for States. This is a tool that can help decision makers prioritize and select from a suite of 14 evidence-based interventions, and these interventions were selected on what type of intervention it was, what we know about the effectiveness, state's role in implementation, and also the current use of these interventions. And by that I mean interventions that are already in place in all 50 states we didn't include in this calculator, because if they're already being used, we figure it's not something that people are gonna be considering as they're planning activities.

So this information, the tool provides information about cost and benefits of each intervention and can help in setting priorities and choosing activities, and it's available on our website at this link.

We also have a number of state fact sheets with data for each of the 50 states on restraint use, alcohol impaired driving and cost of motor vehicle crash deaths. We have several recent resources for tribal communities on tribal road safety, and we also have several other resources that I've listed here. And I wanted to point out one new resource that's available from the Rural Health Info Hub, which is the rural transportation tool kit. That is focused specifically for rural communities and might be of use to those of you who are listening today.

So with that, I want to turn it over for the next presentation.

**Asha Ivey-Stephenson:** Thanks so much Laurie, great presentation. And to continue along the lines, let me first say good afternoon to those in the central and eastern time zones, we're approaching the noon hour for the mountain time zone and good morning to those in the pacific area.

Today I'll be talking about suicide in rural areas with particular emphasis on findings from our recent MMWR, suicide trends among and within urbanization levels by sex, race, ethnicity, age group, and mechanism of death for the United States between 2001 and 2015.

Let's start with a little bit of a background on why is suicidal behavior a public health issue. Suicide is the 10th leading cause of death in 2015 which is the most recent year that we have the national mortality data. Regarding morbidity, I have up here actually presented on this slide 2014 data, but I want to update it with 2015 data where over 500,000 emergency department visits for self-inflicted injury occurred in 2015. So you see the increase from 2014 to '15 alone.

To help consequences of suicidal behavior can be found in many areas including physical, mental, and behavioral. With a focus on prevention, a focus on sound science base, and a multi-disciplinary approach, there is great potential for impact by public health on suicidal behavior. Little technical difficulties here, so we're advancing the slides here now.

We just wanted to focus for a second on some of what Dr. Greenspan already talked about, which is CDC's unique role in public health, and particularly in this case suicide prevention. At CDC we're stewards of the public health approach to prevention, which is why CDC has a particularly unique role in suicide prevention.

First, we assess the problem using sound science and epidemiology. Then we identify the causes that need to be addressed in prevention programs and policies. We evaluate interventions and policies to determine which approaches are working, and finally in the blue box in the bottom left corner, we encourage widespread adoption, so implementation and dissemination of programs and policies based on scientific evidence.

While it's important to identify and get help for those who are at risk for suicide, it's also integral to prevent the development of risk in the first place. And for this reason, we are big proponents of upstream suicide prevention approaches here at CDC.

Let's start with the first piece of this puzzle, and do a quick assessment of the problem. As mentioned earlier, suicide is the 10th leading cause of death. You see it here on the very bottom. Accounting for over 44,000 deaths in the United States. On this slide, we're looking at specific age groups, suicide is the third leading cause of death for those aged 10 to 14, the second for those age 15 to 39, the fourth for those aged 40 to 49 years, and the seventh leading cause of death for those aged 50 to 59 years old.

This slide we're looking at rates by sex. What you can see here is that males represented in the blue line have higher rates than females who are represented in the red lines. If we delve with it deeper, we're looking at rates by sex among those aged 15 to 19 years in particular, males shown in green here still have higher rates than females who are shown in blue on this particular graph.

When we assess the problem by age group and sex, just for 2015 among all persons age 10 years or older, we see here that rates for males are higher than females. Now this is the case for all age groups shown here, with the largest disparity among those ages 85 and older, and you see that on the far right.

Now we're looking at race ethnicity and age group. What you'll see here is that non-Hispanic American, actually Natives have the highest rates among those 10 to 44 years, while non-Hispanic whites have the highest rates among those age 45 and older.

Then with regards to method or mechanism of death, we see here the large percent is firearms at 49, almost 50%, accounting for the largest percent, followed by suffocation, then followed by poisoning.

Here you see a map of the United States. What we're doing here is looking at age-adjusted suicide rates by state, and you can see that Alaska along with states in and surrounding the rocky mountain region are among those with the highest rates, and that's represented kind of in the dark blue.

While I just gave you a very quick assessment of the problem of suicide in the United States, it's important to note that death due to the suicide are just the tip of the iceberg. This is what you also heard from Laurie Beck in terms of what she just presented on deaths due to motor vehicles, this is just the tip of the iceberg.

Here we have the burden of injury for suicidal behavior extending beyond deaths, the hospitalizations, ED visits, events reported on surveys, and even more events that are not reported.

What I want to add is some actual numbers to that figure and to give you a quick summary for every death, there are approximately three people hospitalized, approximately nine people visiting the emergency department, approximately 27 suicide attempts, and 228 people who seriously consider suicide. Here I want to also note that I present 2014 data because the data particularly on hospitalizations are only available through 2014, and I wanted to make sure those comparisons were appropriate. But in this slide, I do add on 2015 data, which are available for deaths, emergency department visits, suicide attempts, and seriously consider suicide. And excuse the formatting there, there seems to be a few issues going on here. But you can see, and the take home point is that the burden continues to increase, and the need for prevention is great.

If you recall, the public health approach to suicidal behavior presented earlier, the step after assessing the problem is to assess the causes by trying to identify risk and protective factors. Before I present the results from our MMWR on suicide in rural areas, I'd first like to highlight a few risk and protective factors specific to rural communities.

First, isolation is a risk factor in general for suicidal behavior, and rural areas in particular are prone to greater physical isolation, barriers to accessing mental health treatments including lack of mental health professionals in rural areas, various agricultural challenges, and stigma associated with suicide and help seeking. Regarding protective factors, family and community support serve as general protective factors for suicide, however we definitely emphasize this and are trying to emphasize this more in rural communities. Increasing connectedness, particularly in rural areas may be achieved through vehicles such as telemedicine or other people may hear it as telebehavioral health. Essentially this includes telephone, video, web-based technologies.

Now it's time to move on to our study method and findings. I'd like to thank my co-authors Alex Crosby who is here in the room with me today, also Shane Jack, Tadesse Haileyesus, and Marcie Jo Kresnow-Sedacca.

In order to be consistent with and expand upon the results of an MMWR weekly report that was published in March of this year by Scott Kegler and colleagues, in that particular MMWR was also in trend by level of urbanization. We used the same urbanization classification scheme, which was the 2006 urbanization classification scheme for our analysis. What we did instead of using those six levels, we collapsed from six to three, and the three being large metropolitan, medium small metropolitan, and non-metropolitan or rural areas. The national vital statistics system annual compressed mortality data files during 2001 to 2015 were used to identify suicides, then we used the US Census Bureau county-level population estimates for calculating the annual suicide rates.

What you'll see here is we had five key findings from our study, and this is the first. Just please take a moment to orient yourself to the figure. We have age adjusted suicide rates presented on the y-axis, and the years presented on the x-axis. This figure illustrates our first key finding that suicide rates were consistently higher in rural areas than in metropolitan areas. Now while this particular finding is consistent with previous studies, we go a step further in our study to provide trends both among and within urbanization level by select demographics and mechanism of death, and that's gonna be presented in the next few slides.

With respect to sex, suicide rates for males were four to five times higher than females, and this is across all urbanization levels. But the rates for both males and females were highest in rural areas, and you can see the rural areas represented in the graph on the right, the non-metropolitan/rural and the rates are highest there.

With respect to race ethnicity, while race tended to increase for all groups in all areas, it's really important to note some key differences. Non-Hispanic American Indian/Alaska Natives had the highest rates in rural counties. Non-Hispanic whites had the highest rates in metropolitan counties, and contrary to the general trend, non-Hispanic blacks had the lowest rates in rural counties.

Moving onto our findings with respect to age group, we grouped ages into 10 to 14, 15 to 24, 25 to 34, 35 to 64, then greater than or equal to 64 years. What we found was that rates increased for all groups across all counties, but again the same theme of the highest rates being among those in rural areas, and particularly among those age 35 to 64 years.

Lastly, with respect to mechanism of death, suicide rates by firearm in rural areas were almost double the rates of those in metropolitan areas, and you can see the increase going from left to right, looking at firearms then we have followed by rates of hanging suffocation, then poisoning.

In conclusion, it's clear that prevention efforts are needed for suicides occurring in rural areas. A focus on comprehensive suicide prevention efforts will be important with particular emphasis on protective factors and innovative prevention strategies, such as telebehavioral health, which I mentioned earlier, that can increase access to health and mental healthcare in rural communities.

Lastly, the distribution of socio-economic factors such as housing foreclosures, poverty, and unemployment vary in communities often with greater prevalences found in rural areas. So we really need to get a better handle and understanding on these variations in order to further our efforts in suicide prevention, because as Dr. Greenspan stated in the very beginning, suicide is a preventable public health problem.

While there are a number of resources available regarding suicide prevention, I wanted to highlight one in particular. CDC's National Center for Injury Prevention and Control recently released a series of technical packages. Technical packages are essentially a compilation of core set of strategies that were developed using the best available evidence that have the greatest prevention potential.

What you see here is the suicide technical package, and it's a technical package of policies, programs and practices to prevent suicides that includes examples of programs that can be tailored to fit the cultural needs of different groups. One of the suicide prevention programs included in this technical package is called Courses of Strength. Some of you may have heard of this program, it was developed with rural and tribal communities in North Dakota to promote connectedness between youth and adults. Local implementers may need to tailor programs like this or other programs discussed in this technical package for suicide prevention so the specific

needs of a particular rural community along with tailoring programs to the specific cultural practices and traditions of tribes in rural areas in particular.

Here I just wanted to highlight, and you see this seven strategies. They have corresponding approaches. This is what the technical package is kind of the base here. We have strategies that start with strengthening economic support, and I won't read all of them, but you can see that we have corresponding approaches, and a link is provided at the very bottom. I do want to, because I can't get into the details of the technical package in this presentation, wanted to provide the link so that you can download a copy and review its entirety at your leisure.

At this time, I'd just like to thank you. Please feel free to address any questions that you might have to me at [iym9@cdc.gov](mailto:iym9@cdc.gov), and I'd like to pass it on to Dr. Karin Mack.

**Karin Mack:**

Thank you. Good morning or good afternoon depending on where you are. Thank you for your interest in this topic, and attending the webinar today. Ms. Beck and Dr. Ivey-Stevenson provided you with some interesting and thoughtful research, and I hope that you'll indulge us just a big longer to go through our final topic, which is drug use and drug overdoses.

I also want to acknowledge my co-authors, that's Dr. Jones and Ballesteros and thank them for their contributions to the report.

The age adjusted death rates for the five leading causes of death in the United States, that is heart disease, cancer, unintentional injury, chronic lower respiratory disease and stroke are higher in rural areas than in urban areas. Many factors influence the rural-urban mortality gap, including socio-economic differences, health related behaviors, and access to healthcare services. Residents of rural areas in the United States tend to be poorer and sicker than their urban counterparts, with rural residents in the south and west experiencing some of the most adverse health outcomes.

All cause injury death rates are also higher in rural areas in the United States than in urban areas. You are all likely very familiar with what's happening with overdoses in the United States. It would be hard to avoid hearing news stories on the topic. Drug overdoses are now the leading cause of injury death in the United States. There are new studies out on the topic everyday.

CDC has added a page to their MMWR website just for opioid related reports. So if you go to the [CDC.gov/MMWR](http://CDC.gov/MMWR), on the top right there will be a button just for opioid related reports. On this slide, you see the 2015 final number of overdose deaths, over 52,000 overdose deaths. And the provisional counts for 2016 and 2017 from the national center for health statistics indicate a continued overall increase in overdose deaths.

The rapidly evolving literature on drug overdoses shows that they are complicated mix of factors, such as the type of drug used, licit versus illicit, recreational versus pharmaceutical use, the combination of drugs used, that's over-the-counter, prescription, illicit, and combinations within those categories, the routes of administration, for example injection versus oral administration, the amount of drugs prescribed, the place the drugs are used, whether it's in the home or in the community, the knowledge of the potential adverse outcomes from the drugs or drug combinations such as using opioids and benzodiazepines concurrently, the access to overdose reversal drugs, access to emergency services, and substance abuse treatment services access and quality. You may well have many other factors you'd like added to this list.

Drug use and drug use disorder data from the 2003 to 2014 National Survey on Drug Use and Health or NSDUH, which is managed by the substance abuse and mental health services administration center for behavioral health statistics and quality. NSDUH collects information

through face-to-face helpful interviews about the use of illicit drugs, alcohol, and tobacco among the US non-institutionalized civilian population age greater than equal to 12 years. Respondents include residents of households and civilians living on military bases. NSDUH uses an independent multi-stage area probability sample design for each of the 50 states and D.C., which allows for the production of state level and urban status that is the county of residence estimate.

NSDUH variables included sex, age, race, ethnicity, residence, annual household income, self-supported drug use, and drug use disorders. Metropolitan, non-metropolitan status was coded using NSDUH's core base statistical area CBSA measure, which was available across the study period.

This measure uses three segments of population density. CBSA with population of greater or equal to one million persons, which is the large metro area, CBSA with a population of less than one million persons, or a small metro area, and not a CBSA or a non-metropolitan area. For this report, CBSAs were considered metropolitan or urban, and those classified as not a CBSA were considered non-metropolitan or rural.

Self-supported drug use in NSDUH includes past month use of illicit drugs or non-medical use of prescription type drugs, opioids, sedatives, tranquilizers and stimulants. The presence of a past year illicit drug use disorder was defined using criteria specified within the fourth edition of the diagnostic and statistical manual of mental disorders, which includes symptoms such as withdrawal, tolerance, use in dangerous situations, trouble with the law, and interference with major obligations at work, school or home. Respondents were asked questions about substance use disorders if they have reported use of illicit drugs in the past 12 months. The full survey instrument is available online.

Mortality data for US residents were from the 1999 to 2015 national vital statistics system, which is based on information from all death certificates filed in the 50 states and D.C.. Mortality data are provided to CDC's national center for health statistics through the vital statistics cooperative program and are coded according to ICD10, by NCHS. Analysis were restricted to deaths with an underlying cause of death based on the ICD10 codes for drug overdoses. That is X40 to X44, X60 to 64, X85 and Y10 to 14. Variables included decedent characteristics, sex, age, race, ethnicity, and information on the intent, whether it's unintentional, suicide, homicide or undetermined and location of death such as medical facility, in a home or other, and county of residence. Deaths were categorized as urban or rural based on the county of residence. Non-metropolitan and metropolitan areas were identified using the NCHS 2013 county base county classification scheme, which has six levels that we collapsed down to two.

For this table and subsequent tables and figures, we're showing some of the results and highlights. There are more detailed findings in the report. Here we look at changes in overall illicit drug use reports by urban status and over time. From 2003 to 2005, the prevalence of self-reported past month use of illicit drugs was higher in large metro areas. For example, 8.3% of large metro area residents reported past month use of illicit drugs in the first period of 2003 to 2005, compared to 8.2 in small metro and 6% in non-metro or rural areas.

All three urban status groups, large-metro, small-metro, and non-metro experienced significant increases from the first period to the last in the prevalence of past month illicit drug use overall. Reports of past month use of illicit drugs went up 21.7% in large-metro areas, 15.9% in small-metro areas and 13.3% in rural areas.

We don't show it here, but I'd like to mention that prevalence was higher for males than for females during all time intervals in the urban status groups. However, in the large-metro group, the percent increased in the prevalence from the early study period to the last study period is greater for females at 23.4% than for males at 21.6%.

This slide looks at self-reported illicit drug use by age group. Respondents age 18 to 25 years, which are left off the slide for parsimony had the higher prevalence of past month use of illicit drugs for all urban levels. I wanted to focus on the younger and older age groups.

The youngest respondents that is those age 12 to 17 years self-reported past month use of illicit drugs declined over the study period. The large-urban areas went from 10.4% from 2003 to 2005 to 9.3% in 2012 to 2014 for a 10.6% decline. The largest decline was among rural area use at 13.2% between the study periods.

Past month use of illicit drugs increased significantly amongst all three urban areas for persons age greater than or equal to 35 years. Reported use increased 35.6% in large-metro areas, 41.9% in small metro areas, and 36.4% in rural areas.

The prevalence of past year illicit drug use disorders among persons reporting illicit drug use in the past year varied by urban and rural area and changed over time. All three geographic groups experienced statistically significant decline in the overall prevalence of drug use disorders during the study period. For residents in large-metropolitan areas, prevalence declined 12.6%, going from 19.1% in 2003 to 2005 to 16.7% during 2012 to 2014. For residents in small metro-areas, prevalence declined 20.7%, going from 20.8% in the early period to 16.5% in the later period. Among non-metropolitan or rural residents, the prevalence of past year illicit drug use disorders decreased 12.8%, going from 18.8% in 2003 to 2005, to 16.4% during 2012 to 2014. During 2012 to 2014, the prevalence was similar across the three geographic groups, all at roughly 16.5%.

This chart shows reported illicit drug use disorders among persons reporting illicit drug use in the past year by urban status, time and gender. Males who reported illicit drug use in the past year consistently had higher prevalence of illicit drug use disorders compared with females. In general, females experienced consistently larger declines during the study period. The prevalence of illicit drug use disorders among females declined 14.9% among those living in large-metro areas, 19.3% among those living in small-metro areas, and 23% among rural residents.

In 2015, nearly six times as many drug overdose deaths were reported in urban areas than in rural areas. That's over 45,000 deaths in metro areas, and over 7,000 deaths in non-metro areas. The overall percent change in the number of deaths for rural areas over the time period was 325%. Although age adjusted drug overdose death rates for urban areas were higher than in rural areas in 1999, that is 6.4 versus 4.0. The rates converged in 2004, 9.4 in both areas, and the rural rates have been higher since 2006.

Not shown here, but the age adjusted drug overdose death rate for females was higher in urban areas during 1999 to 2003, and higher in rural areas thereafter. The drug overdose death rate for males was higher in urban areas in all years except 2010 and 2011, but the largest difference between urban and rural rates occurring in 1999.

Also not shown here is American Indian Alaska Natives had the highest drug overdose death rates in 2015. The urban rate at 22.1, the rural rate at 19.8, and the largest percentage change in the number of deaths over time with an increase in rural areas of 519%.

Drug overdose death rates were lowest among Asian Pacific Islanders in all years.

We also looked at where people died from drug overdoses. More drug overdose deaths occurred in the home versus in a medical facility or other location in each year for both urban and rural areas. The distribution changed over time, however, but the percentage of deaths that occurred in the home increasing from 1999 to 2015 in both urban and rural areas. In 1999, 45.2% of the deaths in urban areas occurred in homes, versus 2015 where over half at 51% occurred at home. In rural areas, in 1999 43.3% of the deaths occurred at home, versus 2015 were also over half at 53.5% occurred at home.

This report presents an overview of illicit drug use, illicit drug use disorders, and overall drug overdose deaths for urban and rural areas in the United States. Variations in trends and drug overdose death rates differed by urban status. Trends among sub-groups indicate that certain groups are more profoundly affected by the epidemic than others. The findings of the study indicate that trends varied and showed hope and concern. On the one hand, the decline in illicit drug use by year and the lower prevalence of illicit drug use disorders are encouraging signs. On the other hand, the increasing rate of drug overdose deaths is cause for concern. The percent change increase between 1999 and 2015 in drug overdose deaths in concerning and carries across urban, status, sex, race, and intent.

Understanding the differences between urban and rural areas and drug use, drug use disorders, and overdose deaths can help public health professionals to identify, monitor, and prioritize responses. In both urban and rural areas, the majority of overdose deaths occurred in the home, and rescue care could fall to friends or relatives who might lack the knowledge about Naloxone administration and follow up care. In private locations such as home, bystanders might not know to call for emergency services after giving Naloxone. Intervention for drug overdoses such as Naloxone administration, rescue breathing or calling 911 are obviously most useful when someone is there to administer them.

Although prevalence rates of drug use in rural areas are lower in this report, the consequences of use appear to be higher. Specific interventions to address overdose deaths in rural areas have been discussed in literature, but warrant further study. Educating opioid prescribers on the CDC guidelines for prescribing opioids for chronic pain and better access to evidence-based substance abuse treatment Medicaid assisted treatment for opioid addiction are critical steps that can be taken in communities heavily impacted by substance abuse.

To raise awareness of prescription opioid abuse and overdose, CDC launched Rx Awareness, its first prescription opioid overdose prevention campaign. The Rx Awareness Campaign is evidence-driven and tells the real stories of people whose lives were torn apart by opioid use and abuse. The campaign focuses on adults age 25 to 54 who have taken opioids at least once for medical or recreational use and it highlights the importance of reducing opioid abuse to prevent overdoses. The goals of the campaign are to increase awareness that opioids can be addictive and dangerous, and to decrease the number of individuals who use opioids non-medically.

CDC incorporated first person stories into the campaign based on past effective use of testimonials to communicate about complex and sensitive health behaviors. The cornerstone of the campaign is a series of videos that feature individuals who are either living in recovery from opioid use disorder or who are family members who lost someone to a prescription opioid overdose.

In addition to video ads, the campaign includes radio advertisements, digital materials such as web banners, and materials for billboards and newspaper ads. State and local health departments and community organizations can take part in the RX Awareness Campaign and use the tested campaign materials and resources to launch campaigns, support local prevention

activities, and raise awareness about the risk of prescription opioids. The campaign elements, tools, and additional resources are all located on the CDC website.

Thank you for attending the session today, and thank you for the interest in the topic. I hope what you've heard is helpful. Here is a list of some available resources including the RX Awareness Campaign, the CDC guideline page, and resources from other agencies such as SAMHSA and BJA and of course the Rural Health Information Hub's toolkit on substance abuse.

Overdoses are a complicated and emotional public health issue, and I hope that we can all work together to understand the best way to save lives and change the course of this public health epidemic.

I'd like to turn it back to the moderator and to Dr. Greenspan.

**Arlene Greenspan:** Again, I would like to thank everybody for your participation. It's important for our partnerships for moving ahead and resolving some of these crises that are affecting our country. We at the CDC's injury center continue to be committed to addressing the disproportionate impact of injury and violence upon the more than 46 million Americans living in rural areas. We hope you will visit our website at [CDC.gov/injury](https://www.cdc.gov/injury) as well as the other CDC websites mentioned by the speakers on their topical areas.

To learn more about the data and tools you can use to take action in your community for promoting motor vehicle prevention, motor vehicle safety, to understanding comprehensive evidence-based suicide prevention, to engaging in safer prescribing of opioids for pain.

Rural communities are unique and there is no one-size-fits-all approach as I think you are all aware. We look to all of you experts on your specific needs, and the realities in your state and communities. We hope to continue the conversation and learn more about how our tools might be tailored to fit the needs of your state and community, what additional tools might be needed, and what additional questions need to be answered with data.

Thank you all for joining today's webinar. We look forward to addressing your questions and working together to protect people, save lives, and reduce the cost of injury and violence.

**Kristine Sande:** Thank you so much, those were great presentations. And at this point, we'll open up the webinar for questions. You should see a Q and A box on the lower right hand corner of your screen, and you can enter your questions there. As you enter those questions, I would ask that you select the option to send the question to all panelists, and that way your question shouldn't get missed. It might if you direct it at a particular presenter.

We do have one question already at this point for Karin. Can you comment on the use of the word illicit as we analyze drug use in states where marijuana is legalized versus states where it has not been legalized?

**Karin Mack:** Yes, thank you for that question. I think you need to understand within your own context the drugs that are prevalent in your communities and how they're used, and different drug combinations. I would encourage that questioner to work with the resources that they have, the data sources they have within their communities to understand how that would fit into the larger picture of illicit drug use and drug overdoses.

**Kristine Sande:** Thank you. Another question has come in. Are there any common risk factors for these rural issues that could be or are being addressed by existing programs?

**Laurie Beck:** I don't know about existing programs. This is Laurie Beck speaking. But I know one concern that comes up with transportation injuries, and I think I heard it through the other presentations as well is kind of access to healthcare and access to services as an issue in rural communities.

**Karin Mack:** Right, and response from emergency services, certainly in the distance to services, isolation are all common across.

**Laurie Beck:** Yeah.

**Arlene Greenspan:** And another I think common more upstream risk factor that cuts across both injury and violence is use of alcohol. I would encourage folks to look at how alcohol may be contributing both to motor vehicle crashes, combinations of the use of alcohol and opioids, as well as it may be contributed to suicide and other forms of violence.

**Kristine Sande:** Great, thanks. A question for Laurie. I was just wondering, did you look at seatbelt use among different types of vehicles and is that a factor in terms of especially in rural areas?

**Laurie Beck:** Yeah, we didn't ... we looked at passenger vehicle occupants, which included cars, vans, and trucks and sport utility vehicles. But we didn't have the ability to break it down into each one of those individual groups, but we do know from other research that seatbelt use is lower in truck drivers and passengers than in cars. So that is one factor that could be something to address in rural communities. I know that a couple of different rural communities have addressed truck drivers and passengers specifically with campaigns to try to increase seatbelt use in those populations, and I don't have the names of those programs off the top of my head.

**Arlene Greenspan:** I know that there was a few years ago Colorado Department of Public Health did a study looking at trying to increase seatbelt use among truck drivers, so you may want to contact Colorado Department of Health for their results and the success of their campaigns.

**Kristine Sande:** Great, thank you. A related question, have you also looked at child passenger restraints and usage?

**Laurie Beck:** We did not look at that, really because our data source with BRFSS surveys only adults, so we were kind of limited to that population, and we then selected adults when we were looking at the deaths, just to be comparable to the self-reported seatbelt use. But child passenger safety certainly is an important issue, and it's an area that we're trying to address here. We have done several reports and have some programs in that area.

**Kristine Sande:** All right. Another question, and this person says, "Lots of data in a short time period. Thank you, where can we get more information on evidence-based strategies to promote the protective factors associated with both suicide and opioid use disorder?"

**Asha Ivey-Stephenson:** Definitely the suicide technical package has some of those specific evidence-based strategies, and we here at CDC are actually in the process of a number of scientists here are interested and prioritizing looking just at that, the protective factors that overlap between suicide and opioid use, but also the risk factors that overlap and trying to identify those as well. But just to give the person a kind of at their fingertips resource, the suicide technical package is a good place to start for those particular evidence-based strategies.

**Kristine Sande:** And I would also mention that the RHihub has lots of information related to these issues, and you can check out our topic guide on substance abuse and mental health. Also we do have that toolkit on prevention and treatment of substance abuse disorders that has some strategies laid out in that. And also our models and innovation section highlights some promising practices in

rural communities across the country on some of these issues. I would encourage you to check those out as well.

I don't see anymore questions at this point. Oh here's another one. Regarding shared risk and protective factors, is there a complete and/or exhaustive list of shared risk and protective factors available for substance abuse? Moreover, are there specific strategies to address each risk and/or protective factor?

**Alex Crosby:**

This is Alex Crosby. One of the things that the injury center has worked on is this project called connecting the dots. What we have done is we have looked at the overlap of risk and protective factors across the different forms of violence. For example, child abuse and neglect, intimate partner violence, sexual violence, suicidal behavior, along with youth violence. So there is a document on the injury center's website that talks about those overlapping factors for those different forms of violence, and what someone might be able to do is to take a look at some of the risk factors and protective factors that are mentioned for substance abuse and compare it with that list to see which ones overlap across those different subject areas.

**Arlene Greenspan:**

I would say this is an area that is of real interest to us. I don't think there is something definitive and exhaustive on shared risk and protective factors. It's something that we continue to work on, we'd love to do more partnerships on, and would like to have you share with us and do it as a partnership on what you find especially in rural communities that we can help with you in terms of dissemination. But it is something that is one of our priorities in research. I wish we did have that exhaustive list break down.

**Asha Ivey-Stephenson:** We're all shaking our heads.

**Kristine Sande:**

All right. Well I am not seeing any more questions at this time, so I think we will wrap up the webinar at this point. On behalf of RHHub, I'd like to just really sincerely thank our speakers today for the great information and the insights that you've shared with us. I'd also like to thank all of our participants for being with us today. A survey will automatically open at the end of today's webinar. We do encourage you to complete that survey to provide us with feedback so that we can use that as we plan future webinars.

The slides used in today's webinars are currently available at [www.ruralhealthinfo.org/webinars](http://www.ruralhealthinfo.org/webinars). In addition, a recording and a transcript of today's webinar will be made available on the RHHub website, and that will also be sent to you by email in the near future so that you can listen again or can share this presentation with your colleagues.

Thank you again, and have a great day.