Urban-Rural Differences in Injury and Drug Overdose Death Rates: Data from the National Vital Statistics System – Transcript 8/29/19

Kristine Sande: Hello, everyone. I'm Kristine Sande and I'm the program director for the Rural Health Information Hub and I'd like to welcome you to today's webinar. We are delighted to be partnering today with the CDC's National Center for Health Statistics to bring you an update on urban rural differences in injury and drug overdose death rates. I'm going to quickly run through a few housekeeping items before we get into the presentations. We do hope to have some time for your questions at the end of today's webinar. If you have questions for our presenters, we ask that you hold those and submit them towards the end of the webinar using the Q&A section that will appear on the lower right-hand corner of the screen following the presentations. We have provided a PDF copy of the presentation on the RHIhub website and that's accessible from the URL on your screen and we've also just pasted it in the chat function as a clickable link.

For technical issues during the webinar, we ask that you please call WebEx support at 866-229-3239. And now, it is my pleasure to introduce our speakers for the webinar. First, we will hear from Dr. Holly Hedegaard. Holly is an injury epidemiologist at the CDC's National Center for Health Statistics. Prior to joining NCHS in 2012, Holly served as a medical and injury epidemiologist at the State Health Department in Colorado. She also taught and conducted research as an adjunct faculty member in the Department of Preventative Medicine and Biometrics at the Colorado School of Public Health. Holly has served on several national and international injury surveillance work groups, including the steering committee of the international collaborative effort on injuries, statistics, and methods. Her areas of research include all aspects of injury with a focus on suicide and drug overdose.

Next, we will hear from Dr. Henry Olaisen. Henry is a second year epidemic intelligence service fellow with the Centers for Disease Control and Prevention stationed at the National Center for Health Statistics. He is an applied scientist who enjoys using data-driven approaches to inform public health practice. He holds a PhD in epidemiology and biostatistics from Case Western Reserve University and an MPH from San Jose State University and is board certified in public health. With the far from linear career path, his journey includes having been a professional swimming coach, leading social enterprise in Palo Alto, California and learning what works at the local level. He is originally from rural Norway. And with that, I will turn it over to Dr. Hedegaard.

Holly Hedegaard: Hello, everyone and thank you for this opportunity of sharing some of the information from the National Center for Health Statistics. As mentioned, there's going to be two presentations, but before sort of getting into the details of the presentations, I want to go over a little bit of background information that's relevant that both Henry and I used as we were doing our study and our analysis. I want to talk about the datasets that we used and also the methods that we used to classify counties as being either urban or rural.

So, let me start off with describing a little bit about the datasets that we used. The data that we use come from the National Vital Statistics System mortality data, and this is data that's compiled from information on death certificates. So, when a death happens, particularly injury-related deaths or drug related death, typically they get investigated by the local coroner or medical examiner who fills out the information on the death certificate about the cause and manner of death. Those death certificates then go to the state vital registrar and the state vital registrar offices then provide a subset of that data to the National Center for Health Statistics, and that's where we compile the full national dataset.

The National Vital Statistics System mortality data includes all U.S. residents and the types of information that's included in that data system include demographic characteristics of the person who died, the causes of death, geographic information and other variables. And the information about the cause and manner of death is coded using a system called the International Classification of Diseases and the 10th revision is the one that we use right now. That coding schema is one that's developed by the World Health Organization and it's used to promote international comparability in looking at causes and manner of death, and we can use particular ICD 10 codes to draw out those deaths that are from particular causes.

Let me now talk for a few minutes about the methods that we use for classifying counties as to being urban or rural. So, there was a schema that was developed by the National Center for Health Statistics back in 2014 and it's known as the 2013 NCHS Urban Rural Classification Scheme. And in this methodology, basically we looked at information about counties, primarily population density based on data from the 2010 census. And using that information, the counties are assigned to one of six different urban rural classifications. And again, as I mentioned, it's basically organized based on population size and whether or not there's a central location or a principal city within that metropolitan statistical area.

The six different groups are shown here. There are the large central metro, the large fringe metro, medium metro, small metro, then micropolitan and non-core. So, the four metro levels are sometimes grouped as an urban classification, and then the two on non-metro which are micropolitan and non-core are grouped together as rural. So, one way of thinking about this is you could either use each of these individual groupings or you could combine some of the groupings, and you'll see that Henry groups some things a little differently than in my presentation. I just use the two larger groups of metro and non-metro.

And then finally, here's a map that shows you how all the counties are assigned. So, in this particular map, any counties that are in green, either dark green or light green, are considered rural counties. And then any of the counties that are in a light yellow to orange color are considered some level of metropolitan counties. So, with that, I'm going to hand it over to Henry who will do the first presentation.

Henry Olaisen: Hello, everybody. Thank you for having us, and we're excited, like Holly said, to be sharing our work from the National Center for Health Statistics. The title of my talk is Unintentional Injury Deaths Rates in Rural and Urban Areas, United States 1999 through 2017. I'll begin by providing some context to this study building on what Holly has already shared and focusing on the specific objectives that motivated this study. This work is based on a Centers for Disease Control and Prevention, National Center for Health Statistics data brief, which is a type of quick read report that we here at the NCHS produce for the general public on topics of public health importance. This specific data brief, number 343, was published in mid-July last month and can be downloaded from www.cdc.gov/nchs/product/databrief.htm.

My senior colleagues were Laura Rossen, Margaret Warner and Bob Anderson, namely my boss and the chief for fatality mortality statistics with NCHS and CDC. I would be remiss if I did not also acknowledge the contributions and insights of Hanyu Ni, our divisions associate director of science and Joaquin Chu, who independently verified our results.

Now, moving into our study of unintentionally injury death rates and place of living, I want to touch on four points to ground our thinking. Unintentional injury as distinct from intentional, the complexity of measurement of place of living and outlining the specific study objectives followed by briefly over viewing our methods. First, as it relates to unintentional injuries. Among all the deaths in the U.S., and there are about 2.8 million deaths per year, 91% are due to

diseases as the underlying cause of death and only 9% currently fall within external causes of that, an umbrella term that includes both intentional and unintentional injuries.

External causes of death are unique in that they do not occur due to diseases but rather due to something external, hence their classification. But to give appreciation to this subset of deaths that we're going to be talking about now in the next few minutes that are unintentional, meaning deaths that are due to, for example, motor vehicle traffic, unintentional drug overdose, unintentional falls and unintentional drowning among others, in this first figure, we take note that's for all ages, 6% of all U.S. deaths are unintentional. That's about 170,000 deaths per year currently. Also, the distribution of unintentional injuries vary by age group. So, for 2017, unintentional injury death rates were most common in the one to 14 age group, followed by the 15 to 24 age group. As we get into this topic, and this is important to take account for, take account of age at the risk pool.

The second contextual point I'd like to bring up to ground these results is the issue of measurement of geography. As Holly pointed out, we at CDC use the National Center for Health Statistics Urban Rural Classification Scheme, which uses the county as the unit of measure, employing discreet classifications. This is especially important to keep in mind because with any measurement scale, we make trade-offs. That said, I want to acknowledge that there are other measures that quantify geography, including the Index of Relative Rurality used by the Kaiser Family Foundation, for example, which is a continuous measure. The strength of using county as our NCHS Urban Rural Classification Scheme, which this is based on rather than something more granular such as census tract or a census block is that it's generally more stable and does not change much over time, making comparison more comparable.

The study objective of this data brief were two-fold. First, describing the trends in the death rates for unintentional injuries and three leading classes of death due to unintentional injury. And second, to assess differences by urbanization level by leading causes of unintentional injury deaths for 2014 and 2017. The results I'm about to present uses data from the National Vital Statistics System, as Holly mentioned. These data are only made possible thanks to the collaboration and contribution from states and jurisdictions who share their death certificate records with us in the federal government for the production of National Vital Statistics to guide decision making and policy making. If you're inclined to run these numbers yourself, you could simply go to CDC WONDER, click Detailed Mortality and run queries to produce the same numbers. For ease, we do provide the actual numbers in table formats and they are accessible from the online data brief. If you have difficulty running these queries, feel free to reach out to us and we'd be happy to assist.

From a measurement perspective, unintentional injuries include a range of ICD 10 codes, including the V01 through X59 and the Y85 and Y86 codes. They do not include intentional injuries, but make up the larger share of external causes of death, namely 69% in 2017. For this report, we go beyond a binary world of rural versus not rural and use a granularity of the NCHS scheme, namely four discreet ordinal levels, rural, small-medium towns, suburban and large metro.

This study uses death rates as the key outcome, which is an age-adjusted to the 2000 standard population accounting for underlying differences in the population by age in these areas. And there will be three types of statistical comparisons and they will include trajectories, comparisons between urbanization levels and comparisons by year. With this background context, let's review the key findings and then later, after Holly has presented, discuss implications for rural health wellness.

To address the first objective, describing the trend in the death rates for unintentional injuries and the three leading causes of death due to unintentional injury, we observe on the X-horizontal axis the years under investigation from 1999 through 2017. On the Y-vertical axis, we plot death rates per 100,000 standard population. First, looking at the black trendline, overall age-adjusted unintentional death rates increased 40% from 35 per 100,000 standard population in 1999 to 49 in 2017 with an average annual increase below 2% per year for the first seven years, a flattening period between 2006 and 2013 as you can observe and a 7% increase from 2014 to 2017.

Looking specifically at the leading causes of unintentional injury deaths, these are motor vehicle traffic, unintentional drug overdose and unintentional falls. Let's look closer at motor vehicle traffic, the green line. The age-adjusted death rates were stable from 1999 through 2006, declined 8.5% annually from 2006 to 2009, and then stable again from 2009 to 2014 before increasing nearly 4% annually from 2014 to 2017. For unintentional drug overdose, the blue line, this trend increased nearly five folds from four to 19.1 per 100,000 standard population in 2017 with an average increase of 11% initially from '99 to 2005, 5% annually from 2005 to 2014 and 16% annual increase from 2014 to 2017. And for unintentional falls, the gray line, we observe a steady linear increase over time, specifically 4% annual increase over the time period. And the last notable comment about this graph and reference point is that it was in 2013 that motor vehicle traffic was surpassed by drug overdose as the leading cause of unintentional injury deaths.

I will now segment to focus on each of the leading causes of death. First, motor vehicle, then unintentional drug overdose and finishing up with unintentional falls, comparing 2014 versus 2017 and by dis-aggregating the results by place of living. So, to focus specifically on what each of these measures mean from my lived experience at your county level, by rural, we mean a non-metropolitan county with less than 50,000 residents. In total, there are nearly 2,000 counties that fall into this category throughout the U.S., making up about 64% of all counties. By small metro, we refer to any county that has more than 50,000 residents but fewer than a million. In total, there are about 700 counties that fall in this category. For large fringe counties, these are our suburban areas, areas without a large principle city. We have nearly 400 suburban counties in the U.S. and for large central metro, this is your classic urban area and we only have 68 of these areas with one-million or more people and the principal city of a size of 250,000 or more within the boundaries.

The big takeaway here, looking at motor vehicle traffic, is that rural counties had the highest rates for motor vehicle traffic deaths in both 2014 and 2017. The rate is more than double that of large central metro. Rural counties observed a 14% increase in motor vehicle traffic deaths. Also, age-adjusted death rates for motor vehicle traffic injuries increased across all levels of urbanization between 2014 and 2017. For unintentional drug overdose, the largest increase over the three year period was observed in suburban areas, 71% from 11.9 in 2014 to 20.3 in 2017. The good news here is relatively that the rural counties experienced the lowest increase among the four geographies, only 34% from 12.9 to 17.3%. A second point to stress, age-adjusted death rates for unintentional drug overdoses increased across all levels of urbanization between 2014 and 2017.

Looking at unintentional falls, the third and last of the result slides. Well, in looking at this next graph, I want to point out that we're using the same scale on the Y-axis to highlight the difference in burden of deaths compared with motor vehicle traffic and unintentional drug overdose. As for the results themselves, for unintentional falls, age-adjusted death rates increased in rural, small metro and large fringe, but not large central metro between 2014 and 2017. Between 2014 and 2017, rural counties had the largest increase in death rates due to unintentional falls. 11% from 8.9 as you see to 9.9 per 100,000. So, to recap, we observe an

increase in unintentional injuries when taking a long view point, and the trends varied by leading causes of unintentional injury deaths While motor vehicle traffic was historically the leading cause, this changed in 2013. Motor vehicle traffic death rates are consistently highest in both 2014 and 2017 compared to small metro, suburban and large metro counties in rural areas. Suburban counties had the largest increase in death rates for unintentional drug overdose while rural counties had the lowest increase, again, for 2014 to 2017. And rural counties remains having the highest burden of unintentional falls, true in both 2014 and tied with small metro counties in 2017.

Thank you so much for your time and active listening. Once Holly has presented her data brief, I'd be happy to engage in further discussion.

Holly Hedegaard:	All right. Well, I want to go into a little bit more depth with regard to what's going on around drug overdose death rates and the urban rural differences that we see. So, in my presentation, I'm going to be talking a little bit about these differences by sex, by age group and by the types of drugs that are involved. So, as mentioned earlier, the data that was used in this study came from the National Vital Statistics System mortality data. And this study differs a little bit from Henry's in that in looking at drug overdose deaths, we considered all intents. So, Henry specifically spoke to unintentional drug overdose, but in this study, we also included intentional drug overdose. So, that would include drug overdose for suicides as well as what we call undetermined intent.

The reason that we chose to do that is that there can be differences by coroner and medical examiner and by jurisdiction in terms of whether or not a death is considered to be unintentional, suicide or undetermined. A lot of times for drug overdose deaths, it's unclear which intent is really meant. And so in general, our practice is to try to include all intents when we look at drug overdose death.

That being said, the majority of these deaths really are unintentional. So, in 2017, 87% of the drug overdose deaths were considered unintentional, about 7% of the drug overdose deaths were due to suicide and about 5% of the deaths were of undetermined intent. The other thing I want to emphasize is a lot of times when I talk about drug overdose deaths, people think that it's equivalent to talking about drug overdose deaths due to opioids, but opioids are only a subset of these, and what I'm going to be showing you are a numbers based on drug overdose deaths involving all types of drugs, not just opioids but all types of drugs. I will be talking a little bit about opioids later when I talk about the types of drugs that are involved, but keep in mind when I just use the term drug overdose, it can be more than just opioids. It can be other types of drugs that have been involved in a drug overdose death.

And then as mentioned earlier, these deaths are now grouped based on the decedent's county of residence. And the way that I group them is slightly different than how Henry did and I grouped so that there were really only two groups, an urban group and a rural group. So, for urban, I included those four categories of large central metro, large fringe metro, medium metro and small metro. And then for the rural counties, I included just micropolitan and non-core. So, if you remember back to that map that I showed, anything that was in the yellow to orange sort of colors, those are considered the urban counties and anything in the light green or dark green are considered the rural counties.

So, with that, let me show you some trends in what was happening around drug overdose in urban and rural areas. So, this graph shows you the age-adjusted rate of drug overdose deaths by urban and rural. The green line is for rural and the orange line is for urban. And what's interesting here is that the pattern is very similar between rural and urban, although there have been time periods where one has been higher than the other. So, for example, from 1999 to

about 2003, the rate of drug overdose deaths were higher in urban areas than in rural areas. From 2004 to 2006, they were fairly similar. From 2007 to 2015, the rates actually were higher in rural areas. And then in 2016 and 2017, the rate is now higher in urban areas.

If we just look at what's going on in 2017 and look at differences by sex, what we see is in 2017, the rates of drug overdose deaths were actually higher for females in rural areas compared to in urban areas, but we see the opposite for males. So, for males, the rates were higher in urban areas than in rural areas. If we look at urban and rural differences based on age group, we've got the different age groups here across the bottom of the graph. And you can see that for most of the age categories, the rates are actually higher for urban areas than for rural areas. That's true for the ages 15 to 24, 45 to 64 and 65 and over. For both urban and rural residents, the rates are highest for the 25 to 44 year old age group, but the rates in urban and rural are similar between those two. So, there's not one higher than the other, at least in 2017.

This next figure now delves a little bit into the specific drugs that were involved in the deaths and it's a rather complicated slide. So, I'm just going to sort of work my way through it starting at the left and sort of progressing to the right. So, the first group of drugs that we looked at are what are called natural and semi-synthetic opioids and this group includes drugs like hydrocodone or oxycodone, morphine, codeine, a lot of drugs that people think of as prescription opioids. And if we look here in 2017, we see that the rate for drug overdose deaths involving these natural and semi-synthetic opioids is actually higher in rural areas compared to urban areas.

If we move to the next grouping of heroin, heroin isn't a legal drug and here, we see that the rates are higher in urban areas than in rural areas. The next category, synthetic opioids other than methadone, this is the category that includes fentanyl. And so of course, fentanyl has been getting a lot of attention in the media. It can be found both as a prescription medication, but also more and more, it's being found as an illicit medication and there are fentanyl analogs, there are carfentanil, which is the elephant tranquilizer that people might hear about. It's what's also causing a lot of the drug overdose deaths in the U.S. and here, when we look at the rates of drug overdose deaths involving synthetic opioids other than methadone, those rates are higher in urban areas than in rural areas.

The next category is cocaine. Again, the rates are higher in urban areas than in rural areas. And then the last group is a group called psychostimulants with abuse potential. This group of drugs includes methamphetamine. And when we look here at the urban rural differences, we see that the rates are higher in rural areas than in urban areas. One thing to remember is even though I've sort of talked about each of these drug categories independently, the reality is that most drug overdose deaths involve a combination of drugs. So, often, you will have a... A death might involve both heroin and fentanyl or might involve oxycodone and fentanyl. And so in those instances, that one death would be counted in more than one of these categories.

So, with that, just to summarize, in 2017, the drug overdose death rate was higher in urban areas than in rural areas, but we saw differences by sex. So, for females, the rate was higher in rural areas. For males, the rate was higher in urban areas. For both urban and rural, the rates are highest for ages 25 to 44 and the rates were similar between the two. Rates for drug overdose deaths involving the natural and semi-synthetic opioids or involving psychostimulants such as methamphetamine were higher in rural areas and rates for drug overdose deaths involving synthetic opioids such as fentanyl or heroin or cocaine were higher in urban areas than in rural areas.

So, this is my contact information if you have any questions or want to learn more. And also, here's the link to the actual full data brief if you have interest in wanting to read the entire data

brief. And with that, I think we're now at a point where we're open for conversation and questions.

Kristine Sande: Thank you so much for those great presentations. And we will open the webinar up for your questions at this point. So, you should see a Q&A box down in the lower right-hand corner where you can type your questions. We do ask that you select the option to send the question to all panelists just so we don't miss your question when you enter it. And just a brief commercial for some RHIhub products. We did a rural monitor article in 2017 about unintentional injuries and the fact that they're preventable in most cases, and so kind of what can be done to prevent those unintentional injuries. So, if people are interested in that, they might want to look up that rural monitor article from 2017. And we also did a couple of articles related to death certificates and the importance of those documents and informing care more at the local level, but also research like this. Dr. Hedegaard, anything you'd want to add about that, about the importance of those deaths certificates and the accuracy?

Holly Hedegaard: Well, NCHS has been working with the state vital registrars and the coroners and medical examiners to really try to improve the detailed information provided on death certificates. For all deaths, it's really important that the circumstances around the death be accurately described on the death certificate. For the drug overdose deaths, it's been really important that they write down the names of the drugs that are involved in the death. Often, we'll get death certificates that just say drug overdose and that's enough to tell us that, obviously, the cause of death was a drug overdose, but as there has been more and more interest in the drugs, we've done a lot of outreach to coroners and medical examiners in vital registrars to try to improve the quality of the information on the death certificate around naming the drugs that are involved, and we've seen substantial improvements in the last five or six years.

At one point, there was only about maybe 75 to 78% of the drug overdose death, name the drugs that were involved and now we're up to 88% of the drug overdose deaths, including the information about the drugs. So, we continue to encourage the coroners and medical examiners to be detailed as possible as relevant on the death certificates.

Kristine Sande: Great. Thank you for that. That's an interesting tidbit, and it's great to hear that there's improvements being made in that area. Let's see a question. Is the information broken up by state and county?

Holly Hedegaard: So, I can speak a little bit to my presentation in looking solely at the drug overdose death. We often look at drug overdose death rates by state. We typically don't go down to the county level because of the issue I was mentioning earlier about the completeness of the information on the death certificates with regard to the drugs that are involved. There can be a lot of missing information that make comparisons difficult. So, for example, if in one county the practice is to always write down the name of the drugs, but in another county the practice is not to write down the names of the drugs, it might look like that one county doesn't have any problem with opioids, but it's more a matter of they didn't write those names down on the death certificate.

So, NCHS typically... Particularly drug overdose deaths involving specific drugs, we typically only look at the state level and even at that point, not all states. We have certain criteria about the quality of the data before we'll start reporting drug overdose deaths by specific drug at the state level. So, there is some information available at the state level, less information available at the County level and then to break a county or a state down into urban-rural would depend on the quality of the information that we have on the death certificates.

Kristine Sande: All right.

Henry Olaisen: And just to add to that, Kristine, I see this message came in from Diana. When I was finishing my PhD, which was just recently, I did not realize up until I came here to NCHS just how capable it is that CDC WONDER data system is to really query things at the state level. Even though it has limitations, as Holly points out, I think this is a highly under-utilized platform for decision making at the state level and I encourage anyone, who is whether you're in a nonprofit or academia or healthcare organization, to really tap into the CDC WONDER to explore, A, if the data is robust enough, but if it's... By and large, you can break it down at your state into different rural urban areas. You cannot took it at the county level. That's the limitation. At the CDC WONDER, you can only look at it at the state level, but you can break it down by age group, male, female, urban, rural and so forth. So, I encourage people to explore it. It's very user-friendly.

Kristine Sande: All right. Well, thank you. So, the unintentional injury information, is that available at the county level at all? We had another question about how to access specific county data. And is there a way to access any of that?

Henry Olaisen: Yeah. So, the closest we bring it down is at the state level. That being said, if somebody is sitting in the county and they wanted the information, it is possible to get this type of level data directly from your state because remember, the data originally comes from your county, gets rolled up to the state, the state pushes it over to us at the federal level. We harmonize the data and then we bring it back to the states so that they have the extra new variables that we have harmonized on, and this data is readily accessible. You do have to go through our data user agreement, but I did it myself when I was doing my PhD in Cleveland and it's quite readily available and the states want us to use this data. So, I encourage people to explore it.

Kristine Sande: Great. Thank you. I don't see any other questions at this point, so I think we will bring the webinar to a close. On behalf of RHIhub, I'd like to really, again, thank our speakers for the wonderful information that you've shared with us today and I'd also like to thank our participants for joining us. A survey will automatically open at the end of the webinar and we encourage you to complete the survey to provide us with feedback that we can use in hosting future webinars. The slides used in today's webinars are currently available at www.ruralhealthinfo.org/webinars. In addition, a recording and a transcript of today's webinar will be made available on the RHIhub website, and we'll also send that out to you by email in the near future so that you can listen again or share the presentation with your colleagues. Thank you again for joining us, and have a great day.