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# THE OPIOID EPIDEMIC AND HIV THE INDIANA HIV/HCV OUTBREAK: IMPLICATIONS FOR PREVENTION

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## **The Opioid Epidemic and HIV**

### **The Indiana HIV/HCV Outbreak: Implications for Prevention**

#### **[video transcript]**

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Good afternoon, everybody. Good to see you. And welcome back to those of you who've been to this meeting before. It's really a great pleasure to speak to this audience for whom I have a real special place in my heart because I think this is a great conference.

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I'm going to speak to you today about this event that occurred in Austin, Indiana about early part of 2015 and, as Kate mentioned, the implications that this has for public health since I work at CDC in the division of HIV/AIDS Prevention.

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Have no financial affiliations to disclose.

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You all pay my bills. Thank you for paying your taxes. Couple of things you can learn after this presentation. I hope they're self-evident. I'll leave that there for a moment so you can review.

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But I wanted to start by first summarizing what this event is that I described at the beginning. This was an outbreak of HIV infection in a very small community in southeastern Indiana, a place called Scott County, folks in the town of Austin within Scott. And we knew very early on in the investigation that HIV transmission was related to injection drug use of a prescription opioid. And this HIV infection spread tremendously fast within a very tight network of injection drug users. We estimate that there were approximately somewhere to 400 to 600 injection drug users in a small community and that they were injecting very frequently. Some details about Scott County are that it was very under-resourced. It ranked 92nd in many health and social indicators among the state's 92 counties, including having the lowest life expectancy, unemployment, twice the national average at the time, and a fifth of the people living in the county were either impoverished or had not completed high school and importantly for this talk, most of the people were uninsured. But thankfully, the month before the outbreak was detected, the state had expanded Medicaid through the ACA and we were able to get health insurance to cover many people's antiretroviral therapy. This event came as a bit of a surprise to us because HIV related to injection drug use has been a problem that we've been seeing disappear. In fact, this may be among our greatest collective public health and clinical successes in HIV medicine.

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Shown here our rates of HIV by three key risk groups: men have sex with men, heterosexuals, and at the bottom is injection drug use. Declined in the 10-year period 2005 to 2014 by 10 percent, representing

now just under, in 2015, six percent of all reported HIV infections. And to really put this into context, for those of you who remember back to the early 90s, HIV infection in 1993 accounted for 30 percent of AIDS cases. So, this was all going in the right direction. But then something changed.

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What I'd like to do first is describe to you a little bit about the details of the response, which took place in four phases. Shown here in this diagram is a histogram with the number of cases on the left. And then each week during which the investigation we were testing people, the number of people diagnosed that week. You can see that-- I don't think have a pointer but can I use this? No. Okay. Early on in the outbreak, we had to first detect and confirm what was going on. It may seem odd to folks that it took so long to figure it out but it was due to a very astute public health nurse in this community recognizing that two people recently diagnosed with HIV, in a community, by the way, which had seen fewer than one infection in the prior 10 years, were related. They had been injecting drugs together. And it takes time to follow up on their contacts, test those people, and examine the viruses phylogenetically to show that they're actually the same virus. Once that was done, however, an enormous number of resources were brought to bear in this community, including folks from the federal government, state government, county government, and disease intervention specialists from throughout the United States. The main focus of our early deployment of emergency command was to do HIV testing and contact tracing and begin to deliver services. We established jail-based testing in the local jail in the county Scott, as well as surrounding counties, in order to see whether there was evidence of this infection, this strain of HIV, was being diagnosed outside the area. We then sent teams of disease intervention specialists to every named contact in the community. This required approximately 40 people from 10 states. They would go and do a point of care rapid HIV test, draw venous blood for confirmatory testing, screening for acute HIV as well as Hep C, and then provide education counseling if indicated. However, if they tested positive, they were directed to services, including initiation of ART, and were also offered prevention services shown here. Following this, there was a consolidation phase where we kind of began implementing even more heavily the treatment and prevention services, and those included especially getting people involved in a syringe service program that I'll talk about a little bit more in a moment. And then lastly, we instituted a number of retesting blitzes so that after we came up with not diagnosing any more people, we would go back and retest as many people as we possibly could. So, by February of 2016, approximately a year after the event was identified, there were 188 persons diagnosed with an infection and within the county of Scott, that would have given you a prevalence of 1 percent. And for comparison, the United States area with the highest prevalence of HIV infection is the Miami Metropolitan Statistical Area, that's 1.03 and the average MSA prevalence is 0.3 percent, so this is pretty high. But then if you home in on Austin and if we allowed 80 percent of the adults in the county to reside in Austin, that would give you a prevalence of 4.6 percent. Today there have been 215 cases diagnosed now in Scott County, giving a prevalence over 5 percent in Austin. Now, something reassuring about these late diagnoses, as shown in pink here, many of them were persons who declined early testing. You can imagine that injection drug use is a stigmatized and criminalized behavior and not everybody was willing to come forward and be tested when folks in the government came to their front door. But as trust in the community grew, more and more of these people came into contact with public health and were diagnosed. But importantly, there's one person on here in black who is a person who we had tested previously, was negative, and acquired infection despite our prevention services. And this is to illustrate that it takes an awful lot to respond to an outbreak like this.

But consider what it takes to keep those services in place to keep those 215 people from transmitting the infection further to others. So ultimately, the cost of this outbreak so far to the state is estimated to be somewhere around \$100 million over the lifetime of the persons who've been infected.

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Of course, folks naturally asked why did this event happen?

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The first lesson you learn if you are an epidemiologist is a look for what changed.

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What changed in this case is what Kate alluded to before. There's been a terrible epidemic of prescription opioid and heroin abuse spreading throughout the United States. And it was featured in this issue of TIME magazine basically in part because of the events that occurred in Austin.

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And I want to give you a sense of how this sort of crept up on us because I'm always sort of amazed by this. This is a figure showing rate of death due to two conditions. In blue are motor vehicle accidents and in green are deaths due to drug overdose. And I'm sure you can appreciate that as we reduced the speed at which people travel, improved cars and all sorts of other things, driver safety, DUI arrests, motor vehicle accident deaths went down steadily. But in the background, in green, death due to opioids were going up. And I'm sorry, death due to overdose were going up. You might rightly ask, "Well, you know, there are a lot of drugs that you can overdose on and kill you. Were these all opioids? Well, in-- let me get this to go ahead. Oh sorry, this was just to point out-- I'm sorry, I should have mentioned that after 2009, death due to overdose now exceeds death due to motor vehicle accident and this trend has continued into 2014 as well as 15. But I don't have the data on this presentation.

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If we look at the fraction of those overdose deaths due to opioids, it was 30 percent around 2000 and was up as high as 60 percent in 2010. And we have good reason to believe this is continuing to increase. This really was an overdose epidemic due primarily to opioids.

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Where opioid use is occurring, we know that injection drug use is occurring. A certain fraction of users of prescription pills will move on to injection drug use. We can predict that fraction but we can't predict what individual will be one of those people who will end up injecting drugs, unfortunately, or we would be able to do a lot of good in the country.

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But one of our big concerns as an agency was when this event occurred in Austin, we were like holy patootie, you know, what other places do we need to start worrying about? I mean, I really, my heart sank when I heard about this because, you know, I was like geez, there's a lot of places like Scott County. So, we really wanted, to address this, we wanted to first ask ourselves where is unsafe injection drug use

occurring? You know, how can I find out where that is? Well, we don't have a surveillance system for it. It's very, very difficult to assess in the absence of robust surveillance. And as I mentioned the main reason for that is this is stigmatized and criminalized behavior. We have an annual survey, the National--NHANES. Anyway, it's a survey of America, I can't remember what the acronym stands for anymore. But they come to your door and oh boy, you've been selected as one of 50,000 Americans to go through all these tests and questions and things and you can imagine when they ask just the average American, "Are you shooting up drugs?" you're not going to get an honest response. Well, in some cases you might, some cases you might, but I don't think most will say yes. But the point here is we have to look for some other way of identifying where problematic injection drug use is occurring. And we used for that the condition of acute hepatitis C. We used it as a proxy measure for unsafe injection drug use because we know, as I'll mentioned a little bit later, that a very large fraction of acute hepatitis C diagnoses in the United States today are due to injection drug use. Two reasons, mainly that HCV is highly transmissible, considerably more so than HIV. And it's transmitted with particular efficiency through non-sterile injection use. Further, the acute phase of the infection is very closely linked in both time and space to the injection event. You know, a period of acute infection disappears and so you can say that when I've diagnosed acute Hep C that infection event must have been much closer. That's in contrast to HIV, where a person could be diagnosed many years after their infection had occurred.

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Well, one, it is an illustration of how a problem with injection drug use is spreading throughout the United States. I'm showing here rates of acute hepatitis C infection in counties in the United States, mostly east of the Mississippi, in the years 2006, 2012, a really nice analysis done by colleagues of mine at the Division of Viral Hepatitis. Now, I hope you can appreciate that over that six to seven year period, the rates of an acute hepatitis C infection were steadily rising, predominantly in rural parts of the eastern United States.

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Another survey of four states in this area demonstrated that this was occurring more so in non-urban areas than urban areas. Non-urban here is shown in the light blue, urban areas in the dark blue. And it's evident, I hope, to you right here that the incidence of acute Hep C in non-urban areas was more than twice that in urban areas and increasing at a faster rate. Note that that figure I just showed you begins in 2006.

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That was probably our best year for acute hepatitis C. Here are incidents of acute hepatitis C shown by age group in the U.S. 2000 to 2014. 2006 is right there in the middle at the bottom of the bathtub. If you look to the left, you'll see that the age at which the age groups mostly affected by acute hepatitis C were a little bit older. The age group 40 to 49, 30 to 39, sort of the so-called baby boomer generation, born from 45 to 65. But as injection drug use began to expand in the United States with the opioid epidemic, Hep C began going up again and it was affecting, and continues to affect, younger age groups, mostly 20 to 29 and 30 to 39.

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And based on three surveys that we've completed, we're certain that at least 70 percent, and probably more, of acute hepatitis C infections diagnosed since 2006 are due to injection drug use. So, there's also been the shift, as I mentioned, from older persons to younger persons.

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Other demographic changes that have occurred in addition to the geographic focus shifting from urban to rural and semi-urban areas. Race/ethnicity is shifting. This is entirely a reflection of who lives where. It has nothing to do, necessarily, with race. And the male to female ratio is changing as well. Traditionally, two to one for HIV due to injection drug use and Hepatitis C, now one to one.

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So, we wanted to undertake an exercise to figure out where should we tell people to start looking for the next outbreak. Where could something happen and they need to really buffer their prevention services to prevent it from happening. So, we undertook an exercise to identify those places potentially vulnerable to the rapid dissemination of both infections if they were introduced into injection drug users. And I say that specifically with regard to injection drug users because let's say a county is found vulnerable it doesn't mean everyone in the county is at risk. It means that the injection drug users in that county are at risk.

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We did this in a two-step process where we first tried to find the most parsimonious set of variables that would best predict where problematic injection drug use was occurring. Think of it like a Framingham score where they pare down to the minimal number of variables you need to accurately predict ten-year heart risk, heart disease risk, for CVD risk. We were looking for the fewest number of variables that could predict where problematic drug use was occurring. We used acute hepatitis C rates as our outcome. We got a big group of subject matter experts together in a room and we started brainstorming about all the things we know were related to injection drug use or plausibly related to injection drug use, requiring that they be pertinent to today. They have to be at a national level, they have to be recent. We don't care so much about yesterday we're looking forward if we can. And it had to be complete so we can say that this is applicable to everyone in the country. We came down to a set of six variables, which I'll show you in just a minute. We then took those variables and for each county we sort of calculated its vulnerability score, the way you may calculate a Framingham score for an individual, plugging in the data on those variables for the county and then giving a composite total vulnerability score, which we then ranked the counties top to bottom, all 3,143, to get the top most vulnerable places.

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These were the variables most highly associated that represented our parsimonious set. And they were: percent non-Hispanic white population, drug overdose deaths per hundred thousand population, the income in the county was inversely related, percent unemployed, prescription opioid sales, and then lastly, this interesting variable, buprenorphine prescribing potential by waiver per ten thousand people. That's a mouthful. What this basically represents is the capacity that that community has to prescribe medication assisted therapy. Medication assisted therapy is methadone, where you give somebody an

oral medication so they don't have to stick a needle in their arm to not feel withdrawal. Buprenorphine is a drug like methadone that can be prescribed by people and we know in the federal government through our agency Samsa how many providers are able to prescribe the drug and how many people they're able to prescribe it to. And we believe this is a measure of demand for addiction services in communities.

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So, here's the slide showing the at-risk communities. And they're focused in five main areas. The most vulnerable were focused in the Appalachian region. Then there's another small focus down in the Ozarks, in the upper part of the Lower Peninsula of Michigan, up in some rural northeast counties, and then in sporadic counties throughout the West. The final total number of counties we estimated were at this very highest risk were 220. There's a very clear break point in our curve of vulnerability scores at that point. And they represented about 5 percent of all U.S. counties.

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What do all of these counties have in common is that they're predominantly rural. And I'll come back to what that means in just a moment.

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But what I want to first talk about is some of the things we can do to prevent this from happening again. The first thing, though, is to recognize that this was not an unexpected event in terms of the rapidity with which it occurred. We were asked over and over my god, how did this happen so quickly? Just look back to the beginning of the HIV epidemic. These are data from I think approximately 10 cities in the early-- well, I guess here the late 70s up until the late 90s-- looking at the rate at which HIV penetrated communities of injection drug users. And in all of these about 40 percent of users had seroconverted within one to two years of introduction of HIV in that community. So, it can spread like wildfire in a place where the conditions are right.

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But there's a lot we can do to prevent this. I mentioned the principle of medication assisted therapy, sometimes also called opioid substitution therapy. In this meta-analysis you can get a 64 percent reduction in the risk for HIV incidence by helping people get off the needle and onto medication to prevent withdrawal. Likewise, needle and syringe programs, or often sometimes now we call them syringe service programs, can reduce HIV incidence in this meta analysis by 56 percent. Now neither of these are 100 percent in themselves but of course together you're going to get a lot of bang for your buck.

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But when you talk about syringe service programs, I want to point out the important principle here which is it is for some people a very unpalatable choice and they will feel compelled to put some restrictions on it. They'll say well you can only get as many-- we're only gonna give you up to 50 needles a week, or 25 needles a week. Or they'll have a one to one policy: you can only get as many needles as you bring back to me, even though we know that what is called secondary exchange, where I give

somebody extra needles that they might share with friends and partners who are injecting but too ashamed to come to the SSP, can have a big impact. And not providing a few extra for an emergency. If you're too strict and say yeah, I know we're closed on weekends but I'm not going to give you five more just because we're closed. As you remove those barriers, as shown in this figure, the fraction of persons who are able to achieve 100 percent safe injection steadily increases.

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And as demonstrated in the example of Vancouver, where they had an excellent injection drug use policy in place and a lot of effort to prevent HIV infection through that practice, before removal-- sorry, rather when they removed a one to one policy, shown by where the blue arrows are here, they saw decreases in the amount of syringe borrowing and syringe lending because there was plenty of material for people to use. I also wanted to allude to the fact that it does take combination effort. We used a number of different interventions in Austin. We did use the syringe service program, but I'll explain how we came by that in just a minute, but we began enrolling people in medication assisted therapy and other combination services. Published just this last week in Journal of Infectious Disease, this is an experience very much like that we had in Austin but this is with Athens, Greece. They've always had a low level of HIV infection in their injecting drug community, but in 2011 and then particularly 2012, it stepped up. They did almost exactly the same thing that we did in Austin but it was a few years before our outbreak. And darn, I wish I'd known about this. I wish I spoke Greek. Maybe I would have read it earlier in the paper. But there's a lot that we shared in common. They instituted a system called Aristotle, which basically was an intensive contact tracing effort together with services to get people to stop injecting and saw a very rapid decline in HIV incidence and they've been able to maintain that to the present.

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So, I alluded to the fact that in rural areas you're really faced with a lot of challenges instituting these efforts that I've alluded to. You have limited access to services, there are large distances people have to travel with few transportation options. We don't have an interstate bus system as robust as we used to. And many people who are using drugs have sold their cars to get the drugs. And, as I also alluded to, many people are uninsured in rural America. There's a longstanding distrust between people who inject drugs, PWID, and law enforcement and community leaders. We've been fighting a war on drugs for 30 years in America and law enforcement are, often what they see as their first role, is to arrest a person who's using drugs or is found with needles. But they also are increasingly the people who go to someone's home and tell a parent their child has died or call to resuscitate someone with Narcan. And we're at a very good place right now in the U.S. where we're able to work with law enforcement to get both part, two really important public health entities to work together to take care of a community. And we're finding that once law enforcement understands the public health goals and how it really will benefit them as well, they'll come on board with what we're doing. And then lastly, there's incredibly limited infrastructure in rural America. I mean, HIV and viral hepatitis testing are quite limited, there are not clinical HIV or Hep C care services available in rural counties, there wasn't any in Austin. And it was after this outbreak the Midwest AIDS education training center sent folks down to Austin, Indiana to train the only doctor in the community how to take care of folks and he's doing a great job. He was just



featured in a article yesterday in the paper USA Today. And I mentioned medication assisted therapy-- very hard to find in many communities and of course, syringe service programs.

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I did not want to walk away from this without also showing you one other critical intervention and that is the prevention benefit of treatment. Treating people with HIV is good for the individual and good for the public because it is the most potent intervention we have to prevent new HIV infections. Elegantly demonstrated by two trials with completely different designs but each had the exact same finding that there were no genetically linked infections from a suppressed patient to an uninfected sexual partner despite, in the case of one of the trials, 55,000 condomless sex acts.

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So, I've talked a little bit about the things that we can do. I want to show you here what happens when you match up a map of syringe service programs to those risk counties or the vulnerable counties I mentioned before. The vulnerable counties are now shown in bubblegum pink and the syringe service programs as green dots. And I hope that you can see pretty rapidly the lack of overlap between these two maps. This to me is evidence that the reason those areas with green dots were not found to have any vulnerable counties is that the presence of these services there reduced their risk for acute Hep C and other things that we were looking for. And some people say well, maybe it's because, you know, it's an epidemiologic thing. In the big urban centers you have a gigantic denominator and if you have the same number of injection drug users you've got a lower rate of Hep C so they won't seem to be vulnerable. But that's not the case. Because even in some very rural areas, New Mexico, Wisconsin, and northern New York State, where the syringe service programs were in place, we didn't find any vulnerability.

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And I'm going to point out here that honing in on the area of Appalachia where there really is the most need, we think, there are now five syringe service programs in Indiana. Before this outbreak occurred, syringe service programs were illegal in Indiana, as they are in many states in the United States still.

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But the governor, after just a few weeks of the outbreak being identified, he's presently our vice president. On May, I believe it was May-- March the 6th of 2015, emergency ordered for a syringe service program. This was the first emergency syringe service program we're aware of having ever been created. Followed by a renewal of that order a month later and then finally, the state passing a law that permitted syringe service programs. There were some restrictions on it. They had to demonstrate that it was an emergency, they had to get the approval of the state health commissioner, Jerome Adams, the man shown to Mike Pence's left. But this year, due to the success of the program and the growing urgent need, they changed that law and reduced all of these barriers. They avoided a one to one, for instance, exchange restriction.

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January 6, 2016. Federal law changed. Prior to that date, the use of federal funds for any aspect of a syringe service program were illegal. But the law was changed, partly as a result of this outbreak, and there were just a couple of restrictions. The first was that the funds-- they have to come through the Department of Health and Human Services-- they can't be used to buy needles and syringes. You might think my God, I mean, that's totally undercutting the entire program, but it's not. These are not the biggest cost of a program. Running a syringe service program you have to hire people, get space, buy vehicles, get all kinds of infrastructure. That's the big money. Needles and syringes are actually quite inexpensive and many places are very willing to donate them if they get a tax write off. The other restriction was that in order for federal funds to be distributed and used for a certain service program in a jurisdiction, the health department of that jurisdiction must first consult my agency, CDC, to demonstrate they have a need for the syringe service program. But the law made it relatively easy. They just have to show that they're experiencing or at risk for an outbreak of viral hepatitis or HIV and somehow link that to injection drug use. And we have gone to great length to help health departments do this.

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Note that any health department can apply from a city to a county to a state, but we like it better when it's the state because we'd like the whole state to be covered. Even in states where a syringe service program is illegal, we recommend that the public health authority, together with academic and other clinical partners, compile the data necessary to demonstrate the need because this will create a very compelling narrative that you can then go to decision makers with and say, "We've got a problem just like Indiana. We need to do something." We've received 29 requests to date. Most have been approved. Two are pending review and you can find the names of those jurisdictions in the website I've listed here.

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So in summary, which I'll come back to here, the U.S. is in the midst of an expanding, rapidly expanding, epidemic of prescription opioid and heroin abuse and this epidemic is generating a new population of people who inject drugs that we would not have traditionally considered vulnerable to HIV or hepatitis C infection. This predominately people living in rural settings have very limited resources. And to me the bottom line here is that this could really erode the progress I shared with you early on. Controlling PWID-associated HIV infections if we don't act on this today. We know there are numerous interventions, those that have already been proven, and I'm sure maybe people in this audience will come up with others that we can use to prevent transmission of blood borne pathogens to people who inject drugs. Our biggest barrier is perhaps that models on how to operationalize these in rural settings are lacking. And if you're looking for a great project, this might be an area that you'd want work on. There are some people in Kentucky, Maine, New York and other states that are very interested in doing this.

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The other thing I just want to point out is I think the odds are really in our favor. You hear a lot about how big a problem it is, are we going to bring it under control. But as long as we use science to guide how we make decisions, I think we can make the right choices and help convince our partners in policy to do the same. So, thank you very much and I guess, are we taking questions? Okay.

**[Video end]**