

Per Ostmo:

Now it is my pleasure to introduce our presenters and we have three today. First is Mariana Tuttle. She is a research fellow at the University of Minnesota Rural Health Research Center. She has contributed to research on rural health issues across the lifespan from maternal and child health to aging in older adults. Her research has also included work on sexual orientation and gender identity, living alone, access to care for rural residents and evaluation of rural health grant programs.

Next we have Madeleine Pick. She is also a research fellow with the University of Minnesota Rural Health Research Center and she is with the Flex Monitoring Team. Her work has focused on quality of care and best practices in critical access hospitals and access to healthcare for rural residents. She has also contributed to work addressing needs of marginalized populations, including the health and well-being of rural LGBTQ+ residents and language interpreter services in critical access hospitals.

And third, we have Katie Rydberg. She is a Program Manager at the University of Minnesota Rural Health Research Center. She has contributed to federally funded research projects including evaluations of two HRSA planning grant programs and research on the rural direct care workforce, rural housing, the impact of ransomware attacks on rural hospitals and rural medical debt. Now I'm going to hand things over to our presenters. And Mariana, I believe you are first today.

Mariana Tuttle:

I sure am. Thanks Per. Well, hello, my name is Mariana Tuttle and I'm here with my colleagues Katie Rydberg and Maddie Pick from the University of Minnesota Rural Health Research Center. Today we are very excited to share with you our work on housing as a social driver of health for rural residents. Next slide please. In addition to the team giving our presentation today, we also worked with a number of other individuals at the University of Minnesota on this project, including Dr. Carrie Henning Smith, Megan Lahr, Dr. Jonathan Schroeder, Dr. Alexis Swendener and Hawking Yam. And we'd also like to acknowledge that we could not do this work without the support of the Federal Office of Rural Health Policy where we are funded through a cooperative agreement there listed on the screen.

Here's where we're going today. First, I will offer a little bit of background on housing as a social driver of health generally and what we know about how this might intersect with rural. Next, we'll discuss our team's quantitative work, where we've done secondary data analyses on three large national surveys, including the National Health Interview Survey, American Community Survey and American Housing Survey to examine some measures of health and housing for rural residents. Then we'll move into our qualitative key informant interviews and case studies, highlight some key takeaways from all of this work and have a bit of time for Q&A.

Let's get into the background. It shouldn't be a surprise to anyone here that housing is a really critical social driver of health. There are so many factors

related to housing that impact our health, first, housing instability. If you are having to move frequently or have to couch-surf or if you're homeless, this is going to take a huge toll on your physical and mental health. You may not have consistent access to care and the stress of not knowing where you have a place to live or for how long is deeply impactful to mental health as well.

Safety and quality of housing are other important factors. We know from the literature that physical home environment is very much linked to health outcomes. For example, poor air quality negatively impacts the respiratory systems. Lead paint, especially in older homes impacts brain development and pest exposures get people sick. And also accessibility on the home environment impacts health, especially for older adults and for people with disabilities. And finally, affordability of housing is incredibly an important factor impacting health. So when housing is expensive, people have to make really difficult choices whether to pay their rent or their mortgage or whether to pay for their medical bills or medications, they might put off going to the doctor because they can't afford care. They might also not be able to make healthy choices at the grocery store because most of their income is going toward housing.

When it comes to the intersection of housing and health in rural areas, there are several important conditions to think about, many of which are interconnected. First, the housing stock in rural communities tends to be older. That means that many homes are in need of repairs and updates in order for people to safely live in them. For example, repairing leaks in roofs, updating insulation or lead paint abatement. An older home might also not be accessible for someone who has a disability or an older adult. And the appliances like heating and air conditioning may be outdated and just not function as well. Air quality is another factor to think about in rural homes, especially in the context of many rural homes being older. Older homes are more susceptible to air quality issues related to mold, mildew, and asbestos.

Access to clean water is also a critical issue. Many rural communities, and the data and literature also show that especially for many rural tribal communities, they do not have access to clean water in their homes. This is extremely problematic as having clean water is fundamental for health and hygiene. And crowded housing is another factor to think about in rural communities. We will discuss this more in depth later in the presentation. But with the cost of housing getting more and more expensive, many people will double up with family and friends and have multiple households living together, especially in areas where housing stock is not readily available. Literature has shown that living in crowded housing is often associated with worse health outcomes, including food insecurity and poor mental health. And it also increases the transmission of diseases because social distancing is just harder to do when you live in a crowded space.

And finally, rural housing does also impact access to care. For many people in rural communities, where they're able to live might not be close at all to healthcare facilities and there often isn't the transportation infrastructure to get

people to providers when someone needs care. And as we know, many rural communities don't have broadband internet available for people to utilize telemedicine if that would otherwise be an option.

Unfortunately we don't have time to get into any of this today, but we did want to at least name and recognize the impact of historical discriminatory housing practices, especially race-based discrimination that have shaped today's housing landscape and intergenerational wealth. This all impacts who has and who doesn't have access to affordable housing and the quality of housing people own or rent, which all greatly impacts health. But for now, we'll move on to the first of our quantitative analyses, which was done using the National Health Interview Survey or NHIS. The NHIS is a nationally representative survey of the US civilian population, it's done every year. And for our analyses, we used data from 2021 and we included all adults with complete information on housing and health, which gave us a little over 28,000 for our sample size.

And the outcomes we looked at were residential stability and the use of governmental rental assistance. Now you might be saying, "Those don't seem strictly like health measures." And they're admittedly our least direct health outcome measures, but I will discuss how this is linked to health and then we'll look at some results and we'll move on to more directly connected health measures from other surveys. Residential stability is something that is often connected to positive outcomes like social cohesion or the ability to age in place, but it also can potentially be related to challenges with being stuck in one's home if there are reasons for needing or wanting to move from their home. For example, accessibility, upkeep or health needs.

Next slide please. There we go. What we found when we looked at the length of time folks were living in their current home, is that rural residents were less likely to have recently moved into their homes and they were more likely to have lived in their homes for 20 years or more. And then when we sliced this to tease out measures of health, rural residents living in their home for 20 plus years we're significantly more likely to have a disability, be in fair or poor health or to have both a disability and be in fair or poor health. That's not necessarily surprising as rural residents are older and in poorer health generally, but it may indicate a lack of fit between health or functional status and housing.

And along with residential stability, we looked at governmental rental assistance in the NHIS data, and we published these findings in the Journal of Rural Health, which is linked there on our website and I've showed a PDF there on the screen. For the sake of time today, I'll just mention that rural residents are less likely to rent their homes. Among those who rent, they are more likely to receive governmental rental assistance, which may reflect the greater need for rental assistance among rural residents who are in poorer health and of lower socioeconomic status than urban renters. But this is an open access journal article, so feel free to explore more in depth if that's an area of interest for you.

And for now, I will move on to another area of interest that we have explored related to housing and health, which is mobile and manufactured homes. These types of homes can be positive in providing affordability and flexibility, and yet they are associated with poorer health outcomes including health issues and vulnerability to extreme weather and climate change, respiratory health issues, I'll say specifically, and vulnerability to extreme weather and climate change. They're also associated with greater financial vulnerability due to the home losing value after it's purchased, which is unique to this type of housing compared to other housing types. And this analysis that we did was done with the American Community Survey, which is US Census data and which we used for a number of other analyses that my colleague Maddie will explore shortly.

But for mobile and manufactured homes, here you can see the percent of all those living in mobile homes where lighter colors indicate a lower percent of population living in mobile homes and darker is higher. So you can see here that there are strong regional patterns in this analysis where living in mobile or manufactured homes is much more common in the south and in the west. And the final piece of our mobile home analysis looked at the percent of folks in mobile homes by rurality and by poverty status. This beautiful and perhaps a little complicated graphic here is showing us that mobile homes are more common in rural counties, both non-core and micro-rural counties than in urban counties. And for counties with very low poverty rate, mobile home residency is universally uncommon. But then as poverty rate increases, mobile home residency increases much more in rural and in outlying counties than in central metro counties. And with that, I will pass it on to my colleague Maddie, who will share additional results from our quantitative work.

Madeleine Pick:

Thank you, Mariana. Next we drew upon the American Community Survey to examine how housing quality and affordability differ by rural and urban location as well as by race and ethnicity and disability status. For this analysis, we looked at four different housing quality outcomes that were available in the data, which were housing cost burden, crowded housing, incomplete kitchen and incomplete plumbing. And I'll explain each of these in a little bit more detail. The data for this come from the 2015 to 2019 ACS Public Use Microdata Sample and included nearly 12 million adults living in households. So this does not include people living in group quarters or group homes. We used a rural urban dichotomous variable based on the Public Use Microdata area population because this was the only sub-state area identified in the public use data.

And then we categorized race and ethnicity and disability status in ways that are standard for those using Census data. Overall, in our analyses, we used Chi-square tests to determine statistically significant differences and all analyses were weighted to produce population level estimates. Next slide. First I will talk a little bit about differences in housing cost burden. We computed housing cost burden as the percentage of the household's monthly income that goes toward housing related costs, so this includes rent and mortgage as well as utilities and other fees and taxes associated with housing costs. We categorized this based on commonly used levels in the literature, which were 30% of income being

used for housing or 50% of income being used for housing in the case of severe housing cost burden. And as Mariana mentioned, I just want to revisit the impact that this has on health. We know that housing cost burden affects health in many ways, including stress and frequent moving as well as having fewer financial resources to put toward medical care, prescriptions, nutrition, and so on.

Overall, we found that a significantly higher proportion of urban adults are housing cost burdened compared to rural adults at both the 30% level on the left and at the 50% severe housing cost burden level on the right. And while it's not shown here, I do want to talk about another finding that we saw when we looked within rural differences by race and ethnicity, which was that Black, non-Hispanic residents were most likely to experience housing cost burden with roughly one third experiencing housing cost burden.

We also examined this measure by rurality and disability status. So we found that when comparing within location, people with disabilities were significantly more likely to be housing cost burdened at either the 30 or 50% level within both urban and rural locations. And then across location, urban residents were more likely to be cost burdened. Notably here, over 35% of urban adults with disabilities and nearly 30% of rural adults with disabilities are housing cost burdened. So even though on that last slide we saw that a higher proportion of urban adults are housing cost burdened, it's clear that the impact is different for different marginalized groups, specifically those with disabilities as well as Black non-Hispanic residents.

Next we examined another factor of housing quality, which is crowded housing. And we defined crowded housing as those reporting more than one person per bedroom in the household with an exception for couples needing only one bedroom. So this is a slightly more conservative estimate of commonly used crowded housing measures that simply count more than one person per bedroom. But our measure reflects the reality that married or cohabitating couples can occupy one bedroom without it feeling or being considered overcrowded. And again, I want to revisit the health impacts of crowded housing. Crowded housing is linked to stress and negative health outcomes and is also really important when we are thinking about COVID-19 and other communicable diseases, as in crowded housing situations, it's much more difficult for someone who is sick to isolate.

Overall, we found that a higher proportion of urban adults, 19%, live in crowded housing conditions compared to rural adults at 14%. You can go to the next slide. But we do find differences again when we examine rurality alongside race and ethnicity. So we see that urban Hispanic adults have the highest proportion in crowded housing at 40%, followed by both rural Hispanic adults and rural American Indian adults, both of which had about one third of people in crowded housing conditions. And I do want to acknowledge that there are cultural and individual differences and housing preferences, which include living with extended family or having multiple generations of a family in one household.

However, it is also important for homes to be large enough to house all members of a household comfortably regardless of those housing preferences as I mentioned before, with crowding being linked to stress and negative health outcomes.

Two other important elements of housing quality are whether a home is equipped with complete plumbing and kitchen facilities. The Census defines a home with an incomplete kitchen as lacking a stove or range, refrigerator or a sink with a faucet. And incomplete plumbing facilities are defined as missing either hot and cold running water or a bathtub or shower unit. And I think the impact here is pretty clear, but I want to again, name it for everyone. Having these facilities is important in terms of food safety and preparation as well as having access to adequate hygiene. And you can go to the next slide.

A higher proportion of rural residents had incomplete kitchens, as you can see on the left or incomplete plumbing facilities that you can see on the right compared to urban residents. The most common missing kitchen element was a stove or range while a lack of hot water was the most common missing plumbing element. And you might notice on these graphs that this is a fairly small proportion of people when we look at the percentages, but this still results in over 368,000 rural and 1.5 million urban residents with substandard facilities in their housing.

When we examine these measures by morality and disability, we find distinct differences in lack of facilities as well. People with disabilities we're more likely to have incomplete kitchens and or incomplete plumbing. And I want to remind folks too, that this data set, we only looked at people living in households, so this isn't including people living in group quarters or group homes. Looking at kitchens, we see that a slightly but significantly higher proportion of urban adults with disabilities have incomplete kitchen facilities compared to their rural counterparts. But among adults without a disability, rural residents have a higher proportion with an incomplete kitchen compared to urban. But the results are a little bit different for plumbing, so here we saw a more distinct rural disparity with rural residents being more likely to have incomplete plumbing, particularly for those with disabilities.

We looked at this measure by race and ethnicity as well. And there's a lot of information on this slide, but I think the most startling finding, and I think the most obvious one here is that, when we look at incomplete plumbing and incomplete kitchens, the largest disparity is among rural American Indian or Alaska Native adults where over 3.5% have incomplete kitchens and over 5% have homes with incomplete plumbing. And these, [inaudible 00:19:40], are much higher than other groups, and I think just really hit home the fact that these incomplete facilities or inadequate housing impacts different groups very differently. I'm going to shift now to talking about another data set, which is the American Housing Survey.

Per Ostmo:

Maddie.

Madeleine Pick: Yes.

Per Ostmo: Do you mind if we knock out a couple of Q&As right now? There's a couple-

Madeleine Pick: Yeah, absolutely.

Per Ostmo: Okay. Our first question is about, does the crowded housing, the one person per bedroom have an age range? So for example, there could be small children that share a house or share a room.

Madeleine Pick: Sure. This data set was only looking at adults, but I don't think that there were other parameters around age, but it wouldn't include children.

Per Ostmo: Okay, thank you. The next question was about kitchens. So with an incomplete kitchen, is the question on the survey asked if they have a working stove or refrigerator or if they don't have one?

Madeleine Pick: That I do not know off the top of my head. I am inclined to say that if it's a working one or not, but I would have to go back to the actual survey. But yes, that's an important distinction, is whether it's working or whether they just don't have one at all.

Per Ostmo: Okay. Our next question, this is a new term for me, how were Colonias captured, if at all in this analysis? Colonias are rural communities within the US, Mexico border region that lack adequate water, sewer, or decent housing. Have you heard of this term Colonias and if that was captured at all?

Madeleine Pick: Unfortunately, I don't know that I can speak to that. I maybe should have put this caveat up top that I was not the person to conduct this analysis. So a lot of these specifics I may not be able to speak to. I don't know that those are specifically identified in the dataset and if they are, that's not something that we pulled out specifically. But I do think that it's an important question and perhaps an area of future research to look at specific locations.

Per Ostmo: Okay, excellent. I'm going to ask one more here before we move on. There's a few folks that would be interested to know how these results overlay with tribal reservation borders and how would that complicate your work?

Madeleine Pick: That's a great question. Again, not something that we looked at for this, but I think the findings that we saw with those big disparities for American Indian and Alaska Native residents, it's an important question to dive into further. Unfortunately, I don't have an answer or that wasn't part of our analysis, but great thing to continue thinking about.

Per Ostmo: All right. Thank you Maddie. I'm going to let you continue here and I might pause later on for Q&A.

Madeleine Pick:

Yeah, sounds good. Thank you. Like I said, moving on to a different data set, which is the American Housing Survey. To further understand rural-urban differences in housing issues, we use these data to look at how specific housing quality characteristics differ by rural-urban location. And we looked at, again, four major housing areas available in the dataset which were inadequate, upkeep, inadequate heating, inadequate plumbing, and inadequate wiring in the home. I'll again, explain each of these in a little bit more detail. The American Housing Survey is a nationally representative longitudinal housing unit survey conducted on the quality of housing in the US since 1973. We use cross-sectional data from 2019 for all housing units in the study. And we define rural and urban using rural-urban continuum codes, and more information is there on the slide for that. All analyses were post weighted to produce housing unit estimates across the US. Next slide.

First, I'm going to talk about differences in inadequate upkeep and heating. Inadequate upkeep included signs of mice or rats in the last 12 months, open cracks or holes wider than a dime, leakage such as from the roof, basement, windows or doors and broken windows. And inadequate heating indicates whether the house has the normal adequate heating capacity or caused residents to be uncomfortably cold for more than 24 hours the previous winter. Again, tying these all back to the impacts on health, Mariana spoke to pests such as rodents and insects can carry diseases that can be transmitted to humans and lead to serious health problems. They can also contaminate food stores and damage crops and livestock, which is really important, particularly in areas where residents rely on hunting, fishing, or farming to provide food for their families or as part of their business.

Structural concerns such as holes, cracks and broken windows can lead to greater dampness and draftiness within the home leading to other health issues and can also exacerbate any pest issues. Dampness and the spread of mold can trigger allergies and asthma. And these structural issues can also lead to poor energy efficiency, which can result in higher utility costs and undue financial strain. It's clear that all of these components are really closely connected and can cause a lot of health issues as well as financial issues for folks dealing with these things.

Next slide. In this graph we can see that compared to urban residents, specific quality issues were more common in rural housing units. This included the presence of mice or rats inside the home, open cracks or holes in the interior, broken windows and leakage. And all of these differences were statistically significant. Urban residents on the other hand were more likely than rural residents to not have had adequate heating equipment in the past winter. But again, that said nearly 1.4 million rural housing units did not have adequate heating equipment. Again, sometimes these percentages or the differences look small, but when you think about the number of people that it impacts, it puts things into perspective.

Inadequate plumbing and wiring was another measure that we looked at in this data set. Inadequate plumbing means that water stoppage of hot and cold piped water in the last three months, that lasted six consecutive hours or more. And the flush toilet measure was very similar to that in definition. Inadequate wiring was defined as a room with no working wall outlet and three blown fuses or tripped circuit breaker in the last three months. And I already talked a little bit about plumbing and the impacts on health, but again, plumbing is particularly important for personal hygiene. And inadequate wiring can have many health impacts as well, including being a safety concern and a fire hazard being necessary for some medical devices as well as daily living activities including refrigerating and preparing food and having adequate lighting. So all very important things for daily life.

In regard to these housing amenities, rural residents were also more likely to experience deficiencies in flush toilets, hot or cold piped water supply and inadequate wiring. And again, even though the percentages here seem narrow, these were all statistically significant differences. And when we think about the absolute value, these all impact tens of thousands of rural residents and has a huge impact on daily living. Now I'm going to pass to Katie to share some of our qualitative work.

Per Ostmo: Thanks Maddie. We're going to take care of a couple more questions real quick. There is that slide about inadequate heating, but what about inadequate cooling for areas like the southwest?

Madeleine Pick: That's a great question. I don't believe that that is... It's not something that we looked at and I don't know that that is available in the American Housing Survey. But that's a really important consideration and something that we talked about a bit with heating as well is that the impact or the necessity of that as well as cooling is really dependent on where you live and what the climate is like. So that would definitely be another important area to look at.

Per Ostmo: All right, thank you. And one more here quick is about different cultures. So one of our questions is curious for Native Americans without a complete kitchen, does this recognize things like outdoor cooking habits, which could be different across cultures?

Madeleine Pick: Great question. I don't believe it does account for that because it's based on those three specific things that they look for in a kitchen. And so that's something that I think is really a limitation of the data set, that it has a narrow view of what's considered a kitchen or what's considered appropriate, what's considered adequate housing. It's definitely going to differ a little bit depending on cultural norms and how people live their lives. And so I think that that again, is another important area to consider and a limitation of the data set for sure.

Per Ostmo: All right. Thanks Maddie. We're going to do one more question and then we'll move on to Katie here. Does the data show that as the level of rurality

increases, so do the rates of inadequacies and are there certain inadequacies that increase at higher rates than others as rurality increases?

Madeleine Pick: Great question. For the two data sets that I talked about, we used a dichotomous variable. So we looked at housing units being either rural or urban, which obviously again is a limitation. So that's not something that I can speak to, but again, I think would be really interesting to see if folks who live in very rural areas experience more of these issues or have compounding housing quality issues compared to folks that maybe live in less rural areas but not in urban areas. Again, I think a really interesting area to look at, but not something I can speak to from this analysis.

Per Ostmo: All right. Thanks Maddie. We're going to move on with Katie here and we'll have some time at the end for some more Q&A.

Katie Rydberg: All right. Hi everyone. As part of this work on rural housing, we also completed some qualitative work on this topic. And so we conducted key informant interviews with representatives from 27 organizations whose work focuses on housing. These organizations' work in housing is national in scope, and a number of them do have a specific focus on rural housing. Our primary questions for our interview participants were around barriers to housing in rural areas, how these barriers impact the health of rural residents and about potential policy solutions to address the needs of rural housing and health.

When it came to our first big question to interview participants about barriers to housing in rural areas, there were a number of things that people spoke about. And so the two most common barriers to housing that were brought up in the interviews were around housing affordability and availability. And these two things are very interconnected as well. The cost of buying a house or the cost of rent has risen over the years across the country, but what makes things more challenging in rural areas, that our participants brought up, is that there isn't a lot of available housing in rural. And so what tends to be available is more expensive, especially if it's new construction or if the supply of housing limited. And so the cost of housing is often disproportionate when it comes to local incomes as well.

And so not only is the cost of rent or a mortgage expensive, but the cost of utilities are also a barrier for many individuals, it's expensive to be able to do upkeep and maintenance on houses, which is another expense that people have to take into account in terms of housing. So many individuals experience housing cost burden because they're putting so much of their income into their housing. And then in terms of availability, like I previously mentioned, people described how housing options tend to be more limited in rural areas. They talk about how there isn't a lot of variety in the kinds of housing that are available, such as multi-generational housing rentals, mobile homes, housing for older adults or recovery housing.

People also mentioned that in rural communities there just isn't the new housing stock or construction available because there isn't the investment in rural areas, because in some areas population is smaller and declining, so investors might not think that it's worth to build new construction in rural. Another important barrier that our interview participants mentioned was housing quality and safety. And so it was frequently mentioned that the housing stock that does exist in rural areas tends to be older, which oftentimes means that housing is in need of repairs and upgrades. Many of our participants discussed how for older adults living in rural areas or for individuals with disabilities, housing might not be accessible and would need modifications for someone to safely be able to live there. And so there are also a number of environmental factors that people mentioned that impact the quality and safety of a home such as pests infestations and air quality.

Our interview participants also mentioned some policies that are barriers to housing, such as policies related to the cost of rent, the low income tax credit, city regulations that might impact new construction or maintenance of existing housing stock. And then also the theme of housing instability was mentioned as a barrier across several interviews. And this encompassed things like homelessness, couch-surfing, crowded housing, multiple families living together and having to move frequently because people can't afford the cost of their housing. And then there were a few other categories of barriers that were also mentioned that are worth noting here, including infrastructure, lack of funding and lack of services. Infrastructure encompassed issues with utilities in rural communities such as water and waste management, other community level barriers such as lack of transportation. Infrastructure also touched on being able to access materials to build new housing developments and make home repairs.

When people talked about lack of funding, it was also related to the lack of investment in new housing stock in rural areas as well. And lack of services included a number of different factors such as the lack of workforce to help with home repairs, the lack of shelters or other safety net providers to help people facing housing instability and homelessness. Both homelessness and housing instability were mentioned in quite a few of our interviews as a theme for barriers to housing in rural areas. And these issues are often thought of as an urban problem, but the way that it manifests itself in rural areas can look different and the resources and interventions needed to address it in rural are just not as robust as they are in urban areas.

I want to quickly share a quote that's directly from our key informant interviews that we thought was really interesting to highlight because of the intersection of barriers to housing and also access to healthcare. And so this person said, "We do recognize that for patients and for care providers, housing is a really big issue and we want to be able to do as much as we can. And some of those care providers wouldn't qualify for direct housing funding because it's for very low income folks. If you're a doctor in a very small town, you probably aren't in the lower tier of income for that area, but that doesn't mean that that makes housing magically appear." And so I think this really captures the importance of

having housing in rural communities not only for those with low incomes, but having housing readily available for healthcare providers. If a community needs more providers in their community to increase access to care but doesn't have enough housing stock, that makes it much harder to recruit providers to the area if they have nowhere to live.

And on that note, related to health, our second big question for our key informant interview participants was how these barriers to housing impacts the health of rural residents. And so the most commonly discussed factor was the impact of the housing environment on safety and health. And so participants brought up a number of different things related to this, like water and fire damage, mold, mildew, lead paint, radon, air quality, climate control issues, insulation, pest infestations, functioning bathrooms, having utilities like clean water and sewage, buildings falling apart, fall risks for older adults and the ability to safely store food. People also mentioned crowded housing and not being able to socially distance, particularly within the context of COVID-19 and also living in unsanitary conditions.

The second most commonly discussed factor when it came to this question was around access and distance to healthcare. And so participants discussed how there are limited healthcare services depending on one's rural community and location generally, but they also named some specific healthcare services that people were concerned about access to care, specifically maternity care, hospitals and nursing homes. Access to pharmacies were also mentioned as an issue as well. And they also discuss how it's difficult for many to access services due to transportation difficulties and services not being able to meet people where they're at.

Mental health was also mentioned when it came to housing and health. The lack of mental health supports and services were mentioned, but participants mentioned the lack of social support and isolation that many individuals face when they might not live near their support networks, as well as the stress that unstable housing has on one's mental health. The cost of housing was talked about, some when it comes to people's health. And so I think this was already mentioned in this presentation earlier, but if people are spending a lot of their income on housing, it makes it so much more difficult for people to pay for medications, for medical bills and for food. And it also makes it difficult for people to afford their utilities and any repairs that might be needed to for their housing.

And then the last thing that was briefly mentioned here was workforce. And this included availability of healthcare workforce in rural communities as well as how jobs available in rural areas might impact one's health. And so they also spoke about the lack of resources and workforce to fix housing problems and then the implications that that has on the health of rural residents. And so in regards to health, one interview participant had this to say, "So when a home is not well maintained, is not well insulated, well heated, well ventilated, where it has some type of damage, fire or water or infestation, that it hasn't been

repaired, there can be a direct correlation between that and the resident. If the resident doesn't have the financial means to address those deficiencies and/or there isn't a local resource or labor pool, which is also a big challenge sometimes, then that housing just continues to become increasingly substandard." And so I think the statement does a good job of capturing the impact of environmental and safety factors on one's health, but it also touches on the cost issue as well.

And so the last question from our interviews was about what policy changes at the federal, state and local levels did they think would improve housing quality and or health related issues related to housing for rural residents? And so here we received a wide variety of responses, but most commonly were funding flexibility and coordination and partnerships. Increasing funding was the most common response, and many of these recommendations were very broad and referenced more funding in general for housing rural communities. But others did include more specific funding recommendations such as more federal support to preserve homeownership and improve access to rental housing, new and additional funding for home rehabilitation and modification programs and funding to improve housing quality, as well as funding for landlords to get rental units up to housing quality standards and to help increase the availability of rental units.

For flexibility, people reference how current funding and policy could be more flexible to be able to better address housing challenges commonly found in rural communities like availability, affordability, and housing quality. They noted how for many existing programs, there are restrictions on eligibility for funding and how that funding can be used. So increasing flexibility would help make these existing programs more accessible. And then for coordination and partnerships, the key informant participants noted this within two specific areas, so within federal government and then within rural communities.

And so there are a number of federal entities who are doing work on housing and have funding opportunities for and around rural housing or have funding that's specific to certain populations who live in rural areas who may need assistance with housing. But often these agencies are very siloed, so participants noted that there needs to be better coordination across program and funding streams at the federal level, but even also at the local rural community level, people mentioned that there's a need for better partnerships and coordination among local organizations and entities.

And then some additional themes that were noted included infrastructure, so improving clean water, sewer systems and access to broadband, policies to bring more housing services and providers to rural areas, addressing restrictive zoning and coding limits for developers in order to increase housing opportunities in rural communities, as well as creating more policies to incentivize landlords and builders to increase housing opportunities in rural.

I want to share one last quote here that really speaks to the key informant interviews' thoughts on policy changes, particularly when it comes to increasing coordination and partnerships. And so this person said, "The aging sector and the housing sector, there are partnerships, but there needs to be a lot more. And that's where I think a lot of innovation we see when states adopt policies and programs to really further those partnerships, that does a lot to spur those connections at the community level where that really needs to happen." And so I think this quote really hits on the need for greater coordination and partnerships, but also flexibility, that's been previously mentioned on making funding and programming around housing more accessible in rural communities in a way that really meets the needs of rural people in rural communities.

And so before I wrap up here, I want to briefly put in a plug for one of our latest research products that has come out of this work that was just recently published. And so we did a case series that focused on housing for rural residents recovering from substance use disorders. As was previously mentioned in some of our slides around barriers, the need for recovery housing was something that was brought up in some of our key informant interviews. And so we were curious to learn about what models exist across rural communities to increase opportunities for housing for individuals in recovery. So this case series highlights three organizations in Minnesota, Oregon and West Virginia that have different housing models and opportunities for individuals in recovery in their rural communities. And so if you're interested in this topic, please check out this work on the Rural Health Research Gateway website.

As we wrap up, we want to reiterate that there are many complex variations in housing quality and affordability by different intersections of race, ethnicity, disability, and rural urban location. Housing policy needs to reflect both the need for quality housing amongst rural residents as well as the need for both quality and accessible housing for people with disabilities in rural and urban locations. It's also important to know that rural housing policies should be tailored to the needs of systemically marginalized groups, especially among rural American Indians living in substandard housing.

And also through policy recommendations in our qualitative interviews, it's important to consider how policy improvements can be flexible and involve collaboration at all levels of government to be able to best address some of the rural specific housing issues that we've talked about. And so overall, improving housing quality and affordability is a crucial way to address the social determinants of health and improve health equity in rural communities. Thank you so much for your time and attention. And so we have some time left here, so we're happy to answer any additional questions that you have.

Per Ostmo:

Thank you, Katie. Before I tee up some of these question and answers here, I'm posting in the chat one more time. There's a link to the Rural Health Research Gateway slash projects slash 994. So that is this large housing research project. There's eight different publications that came out of this work. So as you look

through them all, you'll find answers to different questions across different publications. That being said, I want to ask a couple of questions related to policy. The first one is, do you know of anyone working on policy issues such as HUD Regulation that a grantee cannot assist rural households without potable water? You might not have an answer for that, but I wanted to ask you, you have two publications. One is on key informant interviews and one is the case series, do those publications have insight into some of these policy questions?

Mariana Tuttle: I'll just jump in and say, I don't think our publications have insight into that question specifically. But I just wanted to emphasize that that's an incredibly important question in the sense of, we get this between a rock and a hard place, these folks are the ones who need the help the most, but we can't actually help them until they have potable water, but they can't have potable water until they get help. And so I think that's captured a little bit in some of the key informant interviews in terms of respondents saying the need for more alignment and less silos, like certain programs not talking to each other, actually getting hugely in the way of offering help to folks who need it the most. Feel free to jump in more Maddie or Katie if you have anything else, but I did just want to note that.

Madeleine Pick: Yeah. I will put a plug for the Housing Assistance Council and I can drop them in the chat as well. They do a lot of work on policy in rural housing and were one of the folks that we talked to. I don't know specifically if they're working on that, but I think they, and a lot of other folks talked about the gaps that aren't quite being filled by the current policies. So I'll drop their website in the chat for those interested.

Per Ostmo: All right. Our next question, the ever important, what is your definition of rural? Now, I know you use the American Community Survey for some of this and that has its own definition of rural, so could you elaborate on what that is?

Mariana Tuttle: Based on the timing of that question? I'm wondering if that was about the qualitative, but I don't know. Katie, if you want to speak to how we recognized what folks were talking about with rural, otherwise we can... Maybe I'm making the wrong assumption there.

Katie Rydberg: Yeah. If it's in relation to the qualitative work, I think when we were speaking to our key informant participants, I think we were really going off of what their organizations or entities define as rural. If you look at our publication, you have a list of all of the different organizations and federal entities that we spoke to. And I believe that a lot of them... There are some variations in everyone's definitions of rural, so I want to put that into account and context for that particular product. But, [inaudible 00:50:31], you two speak to some of the other products then.

Madeleine Pick: Yeah. Sorry, I was trying to put the link in for folks. But the question is about defining rural in the different products. So the quantitative work that I spoke to both define things a little bit differently. In the American Community Survey, we

used the rural urban continuum codes to define rural and urban, and then in the American Housing Survey we did it something similar. But for all of those, they can also be found in the corresponding brief. But it's always a good question for how are we defining these things and it is such a spectrum and every definition has its pros and cons.

Per Ostmo: I'm guessing the answer to this next question is going to be, "No." But does the data allow for persons and households choosing to live off the grid? Are people off the grid captured at all?

Mariana Tuttle: By off the grid, do you mean... Sorry, Maddie, you can go ahead. This is AHS data, I think.

Madeleine Pick: Yeah. It's a good question. I would assume that they're not captured in the data.

Per Ostmo: I guess we need a definition of what off the grid is as well.

Mariana Tuttle: Yeah. I'm just wondering if that means they chose intentionally to not have an inside stove or potable water, those kinds of things, or whether it was more along the lines of for folks who aren't answering the survey questions? While I'm talking, I was just going to answer the manufactured homes question really briefly because my fingers don't type that fast. So it is essentially, especially financial. So mobile and manufactured homes, I lumped them into the same category because that's what we did. They are a little bit distinct. Manufactured homes tend to have a little bit thicker insulation, they're not designed to move. There are some higher quality issues with manufactured homes.

That being said, there are still some structural issues, depends on the construction. And the main thing is that they depreciate over time. Now I went away, but someone mentioned that in the chat, so I'm glad that that was noted. But they don't increase in value like other homes do, and that there can be issues with renting the land on which you own the home. So there are many things to get into and I won't go into that today, but I did just want to answer that while I have the chance.

Per Ostmo: All right, thank you. Our next question is with regard to the plumbing and wiring inadequacies in particular, is there any visibility into the capacity of residents to address those issues financially? And what are the policy implications of that?

Madeleine Pick: Yeah. That's a great question. The data set doesn't get into that level of detail in terms of financial capability to repair those things or why they're in disrepair. But I think that's also something that we heard about in our key informant interviews as well, is the need for funding to make those repairs and the flexibility to provide that for folks. Sometimes there's certain qualifications they have to meet in terms of either income or where they live or their house needs to be in a certain condition to begin with in order to obtain funds to make those changes. And so I think reducing those barriers and also making sure that those

types of programs are accessible to folks is at least a good starting point in terms of policy. But unfortunately the data set that we looked at didn't get into that level of detail, but it's a good question.

Per Ostmo: All right, thank you. Our next question are, what are some programs to help people get grants or funding to build a home in rural areas? And are there things like income limits? Let's say you're a medical provider that you're willing to move, but there aren't homes in the area? Speaking with your informant interviews, did anyone address programs like that?

Katie Rydberg: I'm not thinking of any specifically named programs off of the top of my head. I don't know if Marianna or Maddie in any of the interviews that you conducted as well, if you can think of anything. But I think, the income level does tend to be a barrier, because often a lot of those programs are targeted to more low income individuals, which there is obviously a need for that. But it does make it more difficult if you are trying to attract healthcare providers to a rural community, if there aren't programs or supports in places in order to be able to find housing for those individuals.

And especially in rural communities, that tend to be a little bit more remote. Trying to attract them to serve in a community where there's that need for access to care, but if they don't have housing and they need to live in a community that's an hour, an hour and a half away, two hours away and have to commute that distance to be able to provide care, that's certainly a barrier. But I can't think of any specific programs off the top of my head that would, [inaudible 00:56:26].

Mariana Tuttle: No programs were raised, it was more just raised as an issue. Yes, it was definitely mentioned, but not as a solutions, more as a challenge, especially related to the healthcare workforce and recruiting for housing in rural areas.

Per Ostmo: Okay. One of our attendees chimed in and said, "Habitat for Humanity could be one and Guaranteed Rural Development Loans is another program." So thanks for our attendees for throwing that in there. Our next question, did you find any glaring limitations to speaking mostly with national organizations versus state or community-based organizations, state, tribal community-based, that sort of thing?

Mariana Tuttle: Yeah. I'll just say, there are pros and cons of any sample set and we tried to get at hyper local and then large national in a lot of the different kinds of work we do. Obviously, I think that there's a limitation in so far as the closer you get to a rural community where folks are actually having lived experience in that physical rural community. They can speak to problems in a different way than that large federal or national level where they're seeing a lot of different kinds of rural communities, which increases the visibility of more different kinds of rural communities, but without the same level of locality. And so yes, that is a limitation. That's just one of the things that we had to weigh in terms of who we were speaking with and the respondents that we ended up going with were

folks who represent anything related to housing, but not necessarily at a local level. But that's something that's super important for future research.

Per Ostmo: All right, and we have time for one last question here. Are RVs included in the mobile home sector? RVs have become an inadequate option for many lower income individuals and families.

Mariana Tuttle: That's a great question and I actually don't know the answer to that. The colleague that I mentioned earlier, and I can try to maybe pop this in, type the answer, nope, it's disappeared. I don't know if folks get the chat or not, but Jonathan Schroeder, our colleague at the University of Minnesota here, the Population Center, he did all of this in-depth analysis and he would definitely know the answer to that question. But I apologize, I do not.

Per Ostmo: All right, thank you so much. Before we go, I just popped in the chat one last link. This is the signup for Gateway's Research Alert emails. The recording slide deck and transcript for this webinar should be on the website on Friday. If you are subscribed to our alerts, then you'll be notified when it all gets archived. It is one o'clock Central Time. I want to thank all of our presenters for being here today and thank all of our audience for joining us. So thank you everyone and have a great rest of the day. Bye.