Per Ostmo: Thank you for joining us. During today's webinar, researchers from the University of Minnesota Rural Health Research Center will provide a timely update on critical issues impacting maternal health in rural U.S. communities. Today's webinar is brought to you by the Rural Health Research Gateway funded by the Federal Office of Rural Health Policy, also known as FORHP. Please note that all attendees have been muted, but you may submit questions for our speakers using the Q&A function. Today's session will be recorded and posted to the Gateway website for later viewing. Next slide, please.

My name is Per Ostmo and I'm the program director for Gateway. I will drop my email into the chat, so please reach out if you have any questions. If you are unfamiliar with Gateway, we provide easy and timely access to research conducted by the FORHP-funded rural health research centers. You can stay up to date on the latest rural health research by subscribing to Gateway's Research Alert emails or by following Gateway on social media. Next slide, please.

So before we begin today, I would like to point out that next week on Thursday is National Rural Health Day, and this year's theme is advancing maternal health in rural communities. So I'm going to share just a few events and resources with you. First head over to powerofrural.org to learn more about National Rural Health Day, there is an event calendar on that website. Next, I'd like to call attention to RHI Hub's excellent rural Maternal Health Webinar series and the Exploring Rural Health podcast. Next week's podcast will feature FORHP's chief medical director who will be discussing rural maternal health. The National Maternal Mental Health hotline is free, confidential and available 24/7 in English and Spanish. And finally, if you are not subscribed to FORHP announcements, then you might not be aware of FORHP's various maternal health programs. We have Karis Tyner on the call today. Karis is the program officer for both Gateway and the research centers at FORHP. So, Karis, what other maternal health programs should our audience be aware of?

Karis Tyner: Thanks, Per. I'm going to talk just for a moment about the maternal health work supported by my office. The Federal Office of Rural Health Policy sits in the Health Resources and Services Administration and the Department of Health and Human Services. Our mission includes improving access for rural communities to healthcare and fostering care that's effective, equitable, safe, and high quality, versus working across its bureaus and offices to enhance access to maternal health in rural communities by improving distances to care and public transportation, training a skilled workforce and expanding broadband services. Our rural Maternity and Obstetrics management program empowers communities to create targeted responses to help their communities address the loss of obstetric units, higher rates of maternal mortality, and any risk factors contributing to maternal mortality in rural areas. In January, HRSA launched its Enhancing Maternal Health Initiative aimed to accelerate HRSA's efforts to improve maternal health outcomes in partnership with grant recipients, community organizations, and state and local health officials.

The initiative focuses on parts of the country where HRSA has significant investments, where there are significant opportunities for new partnerships and collaborations. The Maternal, Infant and early childhood home visiting program supports voluntary evidence-based home visiting services for pregnant people and parents with young children. The National Maternal Mental Health Hotline that HRSA launched on Mother's Day in 2022 has since responded to more than 46,000 calls and texts serving pregnant people and those who recently gave birth who struggled with mental health concerns as well as their loved ones.

Within FORHP, our rural residency planning and development grant program prioritizes applicants seeking to establish residency programs for physicians and family medicine with OB and rural OB training within our technical assistance programs for finance and operations or compiling what our consultants have observed around the ways that administrations can support success in maternity care so that these approaches can be more broadly available. Finally, FORHP supports maternal health research through our Rural Health Research Center program. I'm so grateful to Gateway for hosting these webinars to the researchers doing this important work to all these attendees and all the people working across our country to improve the health and healthcare available to our residents in America. Thanks.

Per Ostmo: Thank you so much, Karis, and these slides will be available. We're going to record this webinar. We're going to post the recording, slide deck, and transcript on our website, if not Friday, then by Monday. So now it is my pleasure to introduce our presenters and we have two today. First is Dr. Katy Kozhimannil. She is a distinguished McKnight professor at the University of Minnesota School of Public Health and she is the co-director of the University's Rural Health Research Center. Her research contributes evidence for clinical and policy strategies advancing racial gender and geographic equity. And second, we have Dr. Julia Interrante. She is a research fellow and statistical lead at the University of Minnesota Rural Health Research Center. Her work examines the impact of health policy on reproductive and maternal healthcare access and outcomes. Now I'm going to hand things over to our first presenter Dr. Kozhimannil.

Katy Kozhimanni...: Hello. Oh, thank you. Good morning everyone. Thank you, Per, and Karis for the lovely introduction. And thank you to Julia. I'm so excited to present together with my colleague Julia, who's an actual genius and I am also so excited and grateful to each of you for being here today to talk about something that is beautiful and hopeful and a source of energy and family and it's childbirth and maternity care and how we care for people as they transition into parenthood in our rural communities. And I'm just really grateful to have a chance to share with all of you. This is a topic that I have been working closely on for almost two decades and I am just very honored to have a chance to be here and talk today. We also have a lot to get through, so we're going to go ahead and get started.

I would like to start by... Oh, first I'd like to have the slides advance. Now that they're working. Okay. I would like to start by acknowledging the places that we

live and work as the land, the traditional ancestral and contemporary lands of Dakota and Anishinaabe people here in Minnesota. I encourage everyone to consider that indigenous people experience disproportionately high rates of maternal mortality and generally have to travel further distances to birth their babies. This is important in our rural communities that include many reservation lands and in all across this nation and where we are. So again, I just want to make sure that that's something that is centering us as we start this work. Secondly, huge shout out to FORHP, which has already been introduced for all the amazing things they're doing on maternity care. Our work could not be conducted without the support of our federal funders and the Federal Office of Rural Health Policy.

Thank you, Karis. And to all of your colleagues. We also want to acknowledge with deep gratitude the members of our maternity care team here at the University of Minnesota, our partners at other universities and in communities across the country. This work is not possible without our awesome team members and all the folks that are our RHRC, our expert work group and the participation and support of so many hospital administrators, clinicians, and birthing people and families. I know some of you are on this call today. Thank you. Here are our topics for today. This is our outline. Together Julia and I hope to cover maternal health disparities in rural U.S. communities, which I will discuss briefly. I'll turn it over to Julia and she will highlight both the methodology that we use and recent findings on declining access to obstetric care in rural communities and hospitals all across the country in both rural and urban areas.

I will talk a little bit about the consequences of rural obstetric unit closures and transition quickly into understanding why hospitals close their obstetric units in rural communities and some policy solutions that address maternal healthcare access and equity. I will end with a brief summary and reference to a new document that we published. It's a practical implications document that is a synthesis of research that we hope is relevant for rural people and communities about maternity care, about low volume obstetric care, and about the costs and consequences of closures when they happen. So that's what's coming up and we will get started now. We're going to start, I started us in a positive place because I think birth is fundamentally important to how people give birth is fundamentally important to how they know themselves to their own health and well-being and how babies come into the world is important for individuals, for families and communities.

However, the information that I need to share upfront is tragic and I don't want to minimize that in any way. We are going to present aggregate numbers of things and I want to be extremely clear that every single data point is a person, is a family, is a life, and especially as we start moving into discussions of maternal mortality, I want us to think about every family and every person that's involved here. I never want to minimize that when we're talking about numbers that are all together too big. We all know the U.S. has a maternal mortality crisis. Too many moms are dying and the data here indicate that in

hospital severe maternal morbidity and mortality and pregnancy related maternal mortality are elevated for rural residents compared to urban residents. And this is even after controlling for socio-demographic predictors and clinical predictors of maternal morbidity and mortality. These disproportionate deaths are not an accident, they are preventable in most cases and they reveal inequities that can be rectified.

Before we move on, just a brief moment on the topic of defining rurality. Most of the research that we conduct uses county as a unit of analysis and that can be categorized in multiple ways. The basic is the dichotomy of metropolitan and non-metropolitan counties. Here on the right side we see six category designations as well where both micropolitan and non-core counties are considered rural. There are many ways of defining rurality and I just want to speak to and say right up front that there are many, many limitations to this research that we're going to present and there are limitations to the data and it's important that we are clear about those limitations and clear about exactly what we're doing and how we're measuring it so that we understand and are respectful of the reality on the ground that rural residents are facing and that rural communities are facing.

Another important thing that we are seeing as we think about data and measurement is the importance of storytelling and narrative. Being healthy and safe during pregnancy childbirth in the postpartum period is a challenge for residents of rural U.S. We have seen story after story highlighting this and it is such an important way of contextualizing the data that we find. These inequities have long been true in rural U.S. communities and it continues to be true with headline after headline, talking about loss of obstetric services in rural communities, workforce shortages, financial challenges, clinical safety concerns, growing risks of maternal morbidity and mortality, and importantly elevated risks for black and indigenous folks in rural communities. I'll share some of our research about this complex context and policy opportunities for making change. I want to pause for a moment and talk about language before I turn it over to Julia. In maternity care, the very language that we use to describe this problem such as maternity care desert points to the errors we are making in tackling it first naturally occurring phenomena like deserts are distinct from structurally designed inequities that result in medically underserved areas.

There's nothing natural about where health care facilities are located or not. That is not a naturally occurring thing and the term maternity care desert obscures the deliberate policy decisions that allocate resources to some communities and not to others. Additionally, the word desert used in this context is used to imply evacuous empty space where nothing exists. The U.S.'s deserts are in fact thriving environments that have been home to indigenous people for thousands of years. Indigenous people, especially those living in rural communities, have among the least access to maternity care and using the term desert in this context erases them and their thriving communities.

And it's not only inaccurate because it's not, again, not natural, but it causes further harm to these communities. It would be more accurate to describe places without maternity care as a place without maternity care explicitly as such direct attention toward the decisions and structural inequities that have left entire communities without access to care. Maternity care desert is three words, place without maternity care, community without maternity care. That's the same thing and it's not faster and it's not accurate. So I'm going to ask us when we're discussing this to please not use that language. And now let's talk about those communities and the problems that are associated with declining access to maternity care as well as how we can measure and understand it. For that, I'm going to turn it over to Julia.

Julia Interrant...: Sorry, trouble in meeting. Of course, years into Zoom, still happens. Thank you so much Katy and thank you everyone for joining and I'm going to be really digging into the data here and talking about measurement and methodology, which is I think very important as I hope we highlight in this webinar. Next slide. So it's actually quite difficult to figure out which hospitals actually provide obstetric services and which do not. I think anyone who has tried to dig in this data has probably realized that, but a lot of people don't work in the data every day and may not be aware of how difficult this process is. So us at the Rural Health Research Center, we have developed an enhanced methodology for identifying the presence or absence of obstetric services at hospitals across the United States. This method is a two stage assessment. The first stage we look at single year assessments of obstetric unit status using multiple American Hospital Association annual survey variables and also data from the centers for Medicare and Medicaid services, provider of services file data.

And then we go move on to a multi-year assessment that involves multiple checks for and corrections of obstetric unit status and inconsistencies including dealing with pieces of hospital mergers and acquisitions. In the link to our methodology brief, it's publicly available and it's on the slide. So I will do an overview, but if you have more questions or want more information about exactly how we do that, please do see that methodology brief. Next slide. So this is our algorithm. As I mentioned, it is complicated, so we want to take you through some of these I already mentioned. The first stage is the part on the left where we go through a single year assessment and we have run a bunch of validations on this to try to make sure that we are being as accurate as possible and addressing any potential data issues that arise in the second stage where we're looking for consistency checks across years at the hospital and system level, we look at things like are there one or more inconsistencies across years of whether a hospital looks like it has obstetric services or not.

We also look at concordance between the AHA data and the provider of services file data and check for and correct errors when we see those. We also look for when there are large sudden changes in obstetric service provision within states as a possible indicator of systematic data errors and try to correct those when we can. As I mentioned, we decouple mergers in the data and examine potential hidden closures because of that, and I'll talk more about that in a few slides.

And with all of this we end up reviewing hospital websites and news sources and contacting hospitals when we do see these inconsistencies to try to make sure that we are being as accurate as possible when we're talking about which places have loss obstetric services. Next slide, please.

So, again, as I mentioned, the process is complicated and I do want to highlight some limitations of very commonly cited measures on maternity care access and obstetric unit closures. I think one of the very common cited sources is March of Dimes and they have done some great work in this area, but I just want to highlight there are limitations for the methodology that they use. For example, they use the American Hospital Association data for closures, but usually it tends to be within a single year. And in our detailed look at the data, we do find that 11% of hospitals have inconsistencies in obstetric unit status just with these data when you look across years instead of a single year.

The March of Dimes measure also doesn't comprehensively include family physicians who provide obstetric care and they have done a lot of work to try to add family physicians and try to identify which ones are providing obstetric services and not. But that data has limitations and it's not routinely collected and available. They also use a measure that includes obstetricians and gynecologists as providers of obstetric care, but many OBGYNs do not actually do maternity and childbirth services. So again, there are limitations of that measure.

Also, some other cited measures are from Chartist group that uses AHA data and the Center for Healthcare Quality and Payment Reform, which uses the CMS provider of services file. But again, from our analysis, we validated our measure against a sample of rural hospitals that currently had or had recently closed obstetric service to see how accurate or inaccurate some of these different measures are. We found that using only the AHA data only captures 71% of actual closures and incorrectly identifies quite a few closures that weren't actually closures using only the CMS provider of services file only captures 61% of true closures and they are an average of two years off on the timing of when those closures occurred. We also found that 10% of hospitals with obstetric unit closures did not have any indication of that closure in the data and we were able to identify these hospitals during our review of new sources and hospital websites.

So, again, using just the data alone is not going to actually capture the reality of what's happening on the ground. Again, I mentioned earlier that we do deal with mergers and acquisitions. Most of these measures do not take that into account and we have found that if you ignore mergers you would capture 14% fewer hospitals with current obstetric services, but also 19% additional hospitals look like they have closures when they don't actually have that. So our methodology that we use, in the validation process, we found that it captured 93% of true obstetric unit closures. We did have a few incorrectly identified ones, but only a handful six over a eight-year period and they were an average of only 0.3 years off on timing. Next slide. So we recently updated our data. So

we have measured obstetric unit closures between 2010 and 2022, which is the most recently available data from these data sources. And we wanted to look at specifically within rural counties and distinguishing between micropolitan and non-core rural counties what the status is of obstetric unit closures. Next slide.

So as we all know in the United States, access to maternity care in rural counties has continued to decline. In 20 10, 40 9% of rural counties had hospital-based obstetric services, but by 2022, that proportion has dropped to 41%. Next slide. And then again, when separating among rural counties between micropolitan and non-core, we see that the greatest declines in the lowest levels of access occur in rural non-core counties, which by 2022, only 25% had hospital-based obstetric services. Next slide. So well rare. We did see some counties that gained hospital-based obstetric services, but over this twelve-year period, there were only three micropolitan and 13 rural non-core counties that gained obstetric services, but those were really offset by a large number of losses in those counties as well. And again, we see that rural non-core counties continue to be much less likely to have and more likely to lose hospital-based obstetric services than both urban and rural micropolitan counties. Next slide.

So the data that I just presented was at the county level, but we also wanted to look at what was happening at the hospital level and how at the hospital level this information might differ between rural and urban areas. So, again, this is a little bit flipped. Before I was talking about counties that had access to obstetric services, now I'm talking about hospitals without obstetric services. So we found that each year there was a net loss of obstetric services at US hospitals. Between 2010 and 2022, there were 537 hospitals that lost obstetric services and rural hospitals were really overrepresented here where 238 rural hospitals lost obstetric services versus 299 urban hospitals. Again, we mentioned gains earlier, we found that there were 112 urban hospitals that gained OB, but only 26 rural hospitals did during this time period. Next slide.

So we also wanted to look at across states where the majority of these losses are occurring. So these maps show the percent of hospitals that loss obstetric services from 2010 through 2022. The larger map on the left is across the United States for all counties within those states, and we do see substantial variation states with the largest percentage loss in hospitals providing obstetric care included Iowa, West Virginia, D.C, Rhode Island, and Pennsylvania. Now the maps on the right show within those states the differences for rural hospitals and for urban hospitals. And again, we here see that there are great rural urban divides in this and that the losses in rural hospitals are where there are again great disparities in that next slide.

So here again, the last one was the percent of hospitals that lost obstetric services, but we also wanted to look at how many hospitals were without OB. So either they lost obstetric services during this time or they may have lost it before 2010 or just never provided obstetric services for whatever reason that might be. So the states with the highest percentage of the hospitals that did not have OB in 2022 included North Dakota, Oklahoma, West Virginia, Louisiana and

South Dakota. And again, you can see from the maps on the right that there are great rural and urban differences among hospitals that lacked obstetric services throughout this entire period. And I'll turn it back over to Dr. Kozhimannil for the rest of our presentation. Thank you.

Katy Kozhimanni...: Okay, I'm unmuted but my camera's not back on yet. I'm trying. Hi, thanks, Julia. I'm also trying to answer questions that are happening in the chat as we're going through and so I want to speak to a few questions that have come in. There was a great question about midwives and how midwives are counted. In the analysis that we do, we don't look at specific providers but rather on characteristics of hospitals. Midwives are very important providers of maternity care and rural communities and I'm not sure how that is handled in the March of Dimes data, but that's something that Julia May know. I also want to thank Dr. Miller for pointing out the error in the description that we used of the data that his group has done and it's never our intention to misrepresent anything. We used the available information that we could find and so we're very happy to learn more about different methodologies that folks are doing.

We're doing our best to present the best available knowledge that we have. And finally, the question about whether these closures are due to a unit versus the hospital closing entirely. I think that we are able to distinguish those things and that's something that we will be looking at in the future, especially as we start to look at financial predictors of closures. It is not uncommon for a hospital to close a unit when it's in financial trouble and then sometimes if financial troubles continue, the entire hospital will close. And I'll talk a little bit more about that when I talk about reasons for closures in just a moment. So thank you. Thank you for all your questions that are coming in and also for helping us learn from you and making sure that we are being accurate and clear in the ways that we are presenting this information that's very important to us.

What happens when rural communities lose obstetric services? This question, I am so proud that we are doing this research because this question originally came from a group of grandmas in a rural, mostly black community in Alabama who were seeing what was happening around them and asked, and it's a deeply important research question with ties to the communities themselves and what they're seeing around them and trying to ask whether that's part of a pattern or if it can be empirically shown what those effects are. They knew that these grandmas knew the right questions to ask grandmas often do, and the answers to those questions have changed our nation's understanding of maternity care access and outcomes.

In 2017, we published a landmark study comparing rural counties that lost hospital-based obstetric care to those that continued providing this care. We looked separately at rural counties based on whether or not they were adjacent to urban counties and the effects were concentrated in non-urban adjacent rural counties, so rural counties that were more remote or not directly next to an urban area. Key findings from this analysis showed that after losing obstetric services, rural counties that were non-adjacent to urban areas had higher rates

of preterm birth, out of hospital birth, and births in hospitals without obstetric units. In the years following service loss. In rural counties that were next to urban areas, there was also an increase in births that were happening in hospital emergency rooms or in hospitals without obstetrics.

But this declined over time in those counties. This is important, preterm birth is a leading cause of infant mortality and infant mortality as we know is elevated in rural communities compared to urban areas. As a result of these closures, many birthing people now have to drive even longer distances to birth and data from Canada and emerging data in the U.S. really show an important connection between travel distance and maternal and infant morbidity. I did mention just now that one of the consequences of losing obstetric services was an increase in births in hospitals without obstetrics units. These often happen in hospital emergency rooms.

We did a study in 2020 that examined the capacity for emergency obstetric care at rural hospitals that do not have obstetric services, and this was based on a random sample of hospitals without obstetric service from the universe of hospitals within the American Hospital Association survey. We got a 48% response rate and I was so grateful for the generosity of those hospitals because we were surveying rural emergency rooms during the time of the height of the COVID-nineteen pandemic, but they were incredibly clear with us about what was going on. We used the World Health Organization criteria around emergency obstetric care access. This is used in communities all over around the world to indicate whether or not you have the capacity to care for an obstetric emergency.

I'm going to talk a little bit about the results here in just a moment. So in this survey we found that a majority of these rural hospitals were located 30 or more miles from a hospital with obstetric services. So these were more isolated hospitals. About a third of these hospital emergency rooms reported having a birth in their emergency room within the past year and/or a close call or delay in urgent transport for that pregnant patient. So these are... About one third, I'm sorry, of all of the rural hospital emergency rooms that did have a birth said that that birth one in three of those births that were happening were a close call or were challenging from a transportation perspective and caused concern in those facilities.

On top of that, about 80% of our respondents reported the need for additional training or resources in order to handle emergency birth situations. Emergency birth training has been incorporated into rural emergency certification programs more recently, like comprehensive advanced life support, which now includes obstetric training. It's important to think about the ways that rural hospitals without obstetric care and rural communities are addressing. Those training needs to support folks that give birth in hospitals or in settings where there aren't access to obstetric care.

The people who know best about decision-making about rural obstetric units are those who are actually making the decisions every day. I cannot tell you how many times since the beginning of this work that I have been asked about basically what is the minimum number of births that a rural hospital can have to safely and effectively operate a unit. And that's not a question for a researcher to answer. I can run a regression and give you a number, but that number is not... It only reflects an average across very diverse communities that are dealing with totally different situations. And so we conducted a survey among rural hospital administrators, rural upset obstetric unit administrators with the goal of better understanding their beliefs about clinical safety, financial viability, and community need in operating care.

Some of these hospitals had closed their obstetric units between 2018 and 2021 when we did the survey and also show some of those results. Next just now, but then I'll come back to these results again later in a moment. This 2021 survey showed that communities that lost hospital-based obstetric care, which is the yellow bars, also had less access to evidence-based maternal support services that improve maternal health outcomes, including childbirth education classes, doula and midwifery care, and breastfeeding and postpartum support programs. These are important losses that can come alongside the inpatient obstetric services when those are gone from a community.

I'm doing a tour to force of some of our research, so forgive me, I'm jumping and I'm going to try to ground each of them so that you can see how the evidence builds up and how we've asked this question in different ways over time. While many hospitals close their obstetric units, some do remain open and it's no surprise to anyone here that lower volume facilities in rural areas struggle with poor outcomes. They struggle with lack of access to resources and with workforce and with clinical skills. Last year I published research that showing this, we examined the relationship between obstetric volume and severe maternal morbidity and rural and urban US hospitals and we assessed whether those relationships differed for low-risk or high-risk patients. This analysis used linked to vital statistics and patient hospital discharge data from four states. They're listed here from 2004 to 2020, so we had a lot of data.

We also used birth volume categories based on a quartile distribution. So we basically took the data and cut it in fourths to look across the continuum of different volumes and we did different volume thresholds for rural and urban hospitals because they have wildly different volume distributions. In urban hospitals the lowest volume category is 10 births to 500 births, and that's almost all of the categories in rural hospitals. In rural hospitals, we looked at hospitals that were lower volume, which was 10 to 110 births, medium volume 111 to 240 births what we called medium high 241 to 460 births a year, and high greater than 460 births a year. There is nothing magical about these numbers. They were literally just so that we could cut the distribution of the data because there's no clear evidence-based way of looking at volume thresholds.

Here are the results of the analysis in this cross-sectional. So that study of more than 11 million births, the risks of severe maternal morbidity was elevated for lower and higher risk obstetric patients who gave birth in lower volume rural hospitals compared with similar patients who gave birth at rural hospitals with more than 460 annual births. There was no significant volume outcome relationships detected among urban hospitals even when we looked carefully at those urban hospitals with fewer than 500 births a year. So you can see here I'm highlighting the differences for rural counties in the risk ratio of severe maternal morbidity. Increased risk of severe maternal morbidity occurred at both lower and higher risk patients. This is a chart that shows both the higher risk patients, so on the left we see the annual birth volume categories. Then in the middle, the higher risk patients, so these are folks with one or more risk factor for severe maternal morbidity and the low risk patients are on the right.

And it was interesting to see that there were notable discrepancies here, but among hospital in urban counties, there was no difference In rural counties, we did see differences, which I'm highlighting here. These are the risk differences by volume for higher risk patients, and these are the risk differences for lower risk patients. There was a slightly higher magnitude of increased risk for lower risk patients in lower volume rural facilities. And I want to say very clearly the meaning of these findings is clear to us. These findings show structural risks for rural residents giving birth in the lowest volume rural hospitals, the least resourced hospitals, and often the least resourced communities, they imply a need for tailored resources and quality improvement support for small volume rural facilities. That is what this indicates.

However, there's always a chance for research findings be misinterpreted or misused. I recently received a call from a reporter in Vermont. They were covering a recent report that was commissioned by the state health system regulators that recommends radical transformation to their hospital system. They noted the study that I just spoke about. It was referenced in the report to determine the health of obstetric departments there, and they used the threshold of 240 births a year that we used in this analysis. They reached out because a local physician, their hospital had fewer than 240 births a year and it was being recommended as a place to close. They asked, do you think it's fair to use the 240 volume threshold to determine whether or not a hospital should be sustained in Vermont?

I was really alarmed that our work was being used in this way and I responded noting that our research was intended to describe clinical outcomes in different volumes, different birth volume settings, but should not be used to justify policy recommendations for closure of obstetric units based on birth volume. In the study we said this explicitly, these are the words we said, "Rather than implying a policy strategy of consolidation and closure, these findings and the available evidence suggest a need for tailored quality improvement resources for rural hospitals, greater investment in rural clinician training and establishment of referral or transfer networks for rural hospitals to improve obstetric patient safety."

This dynamic is not helpful and I really want our work to be accurate and to help rural people in places and not be used as justification for policies to cut off resources to rural people in places. So why do rural hospitals close their doors or why do they keep them open? In order to helpfully inform policy discussions and to create a positive dynamic? It's crucial for us, specifically us as researchers and all of us who care about rural people and places to understand why rural hospitals are making these decisions. Again, I am going to go back to the rural hospital administrators, but our review of the literature that has been data that had been collected by others have shown that reasons for hospital obstetric unit closures broadly fall into three categories. And I will say I know this from data, but I also know it from before we conduct surveys with rural hospital administrators, we will send a letter to the CEO of the hospital and explain that we're going to call and why and what questions we're going to ask.

And I will get phone calls back from that. The CEOs of hospitals will call and say, oh, we're not going to be able to answer your questions because we had to close our unit. And then they will tell me about the heartbreaking choices that they've had to make to cut a service line that they know is important in their communities. So I want to be really clear, this is these are not easy decisions generally that are happening and rural hospitals are facing a lot of challenges. Rural clinicians are facing a lot of challenges. These include financial constraints.

There is a fixed cost to having equipment and people that are trained and ready to provide support for labor and delivery 24 hours a day, seven days a week. That is a high fixed cost. And revenue to cover those costs is variable and it depends on the number of people that give birth in your hospital. It also depends on who pays for those births because private health insurance programs pay about twice what Medicaid programs pay, and we know that more than half of all births in rural hospitals are paid by Medicaid. There are also workforce constraints and we've heard a lot about physician workforce shortages, but there are also shortages in nursing midwifery, in hospital administration and quality improvement and measurement.

There are so many aspects of workforce that are important to understand, whether it's ultrasonography, tech and all of that. We also have really valid patient safety concerns and no amount of resources can make it safe to give birth if the clinicians don't feel safe in delivering babies in their settings. Clinicians are worried about providing safe care in many rural communities and low birth volume does present important challenges in this regard that I want to acknowledge.

So I mentioned previously our 2021 survey. We asked hundreds of rural hospital administrators about their decisions about their obstetric service lines, and they told us that from both a financial and a safety perspective, that they need at least 200 births a year to keep their unit open in the current policy environment. And if you'll remember from the prior analysis the 240 birth threshold, that is the median, right? So many, many, many rural hospitals are operating below this threshold. In fact, in this analysis where we asked them to tell us what their

threshold was for viability one-third of those hospitals were operating units with fewer than 200 births a year. They gave us an answer, and this answer is an answer that's in response to the current policy incentives. Different policies may change the answers they give. In other words, change is possible. Also, let's focus on those subsets of respondents who kept OB open with fewer than 200 births a year.

33% of hospitals that responded said that they were keeping their hospitals open below a volume threshold that they felt was the minimum for safety and financial viability. We asked them why when they are losing money and worried about patient safety, and they said, "Because our communities need this care and there's nowhere else to go," I'm going to read a quote from one of these hospital administrators because I think it's important to bring their voices into the room. "Many of the people who live here are poor and do not have vehicles to go elsewhere. They would come up here to deliver babies even if we did not have an obstetrics unit. When we look at closure patterns, they reveal structural inequities along these axes." Financing workforce availability and resources and training. And this also points out to the fact that the grandmas in Alabama that we're asking some of these questions, they were exactly right that there are some differences in some communities are more affected than others.

I also want to highlight that there are many, many, many, many rural communities. Some of you are on here. You're doing incredible work to support pregnant people for folks who give birth and for new parents. We have conducted a series of case studies in 2020 and 2021 around rural hospitals that are defying national trends. We wanted to know what made them special and what they were doing that was enabling them to provide this care in their communities. Rural folks are very crafty, lots of innovative, nimble, thoughtful, caring, innovative ways of doing work. We know that, and this is also an important part of the story to highlight. I've listed the sites that we've interviewed here. For the sake of time today, I'm just going to give a few high level insights, but the write-ups for all of them can be found on the gateway and on our website.

So I'm going to just give three overall recommendations and then I'll move into our summary recommendation number one. Several of the places that were listed here have built a successful obstetric unit and a strong regional reputation based on their philosophy of care. And their recruitment models are based on their mission rather than on using salary. So they have a really clear mission around the way that they envision birth and they recruit providers based on alignment with that mission. Secondly, developing strong relations with women, birthing people, grandmothers and families, and with community-based birth workers like midwives, childbirth educators, lactation consultants and doulas, local public health WIC programs or other county support programs including county-based supports for mental health, preventive care, nutrition support. Those relationships, those relationships with community outside of hospital are part of what enabled these brought more resources into the hospital to sustain maternity unit and a strong and positive and resourced environment.

And finally, they recommended including support that is important to birthing people, representing, including culture, spirituality, beliefs about family, and truly celebrating the momentous occasion of welcoming a new child into the world, becoming a parent and growing your family. Honoring the transformation of birth in the setting of birth is something that many rural hospitals do extremely well, especially when they understand and bring in the culture, spirituality and family traditions of the people that they take care of, and that was another strength that we saw that I wanted to elevate.

Also, here I am highlighting the publication I mentioned at the beginning. It's a practical implications brief that synthesizes current and high quality research on access to and quality of childbirth care in rural communities with a particular focus on the impact of obstetric unit closures. The intended audience is policymakers, rural community members and health systems making decisions about maternity care in rural settings. I know not all of you are going to read every peer-reviewed article behind a paywall, and I think it's really important that you have access to the latest research and information and that's what we're aiming to do here with our team. And I will describe these findings. Briefly I'm going to give a summary of research here, but again, all the details and citations are provided in the document, which you can get on the gateway or on our website.

First, I want to provide a summary and some of this will draw on what I've talked about, but this is the TLDR situation for this presentation. I want to provide a summary of what is known about clinical safety, low volume obstetric units and obstetric unit closures. Patients giving birth at rural hospitals with fewer than 460 births a year did face higher risks of severe maternal morbidity and mortality, especially at hospitals with fewer than 110 births a year annually. And that's important to know and to plan for. We've also found that the quality of care as measured by various, and I will say imperfect measures of quality of maternity care are they vary across rural hospitals and there's no clear volume outcome relationship with each different type of quality metric. And these include things like low risk cesarean, routine use of a episiotomy. There's a lot of variability across rural hospitals in some of those metrics.

There are important risks that are associated with closure of obstetric units. Closures are linked to increased emergency and out-of-hospital births, higher preterm birth rates and increased travel distances as well as patient mental health and anxiety. Greater travel distances to obstetric care are associated with worse maternal health outcomes and higher NICU admissions for those infants. Finally, rural counties without access to obstetric units have less access to evidence-based maternal health services and supports, including mental health services, lactation support, and other types of care. This creates a complex situation for folks who are charged with making decisions about this. I also want to say that when those risks of providing obstetric care in a rural community become too high for a hospital to bear anymore, when the hospital closes its obstetric unit, those risks do not go away. They stay in the community with the clinicians that remain there with the people, with the families that remain there.

So a hospital's decision that the risk is too high should always come with attention to the way that that risk transfers to community and understanding how to keep people safe in those places. Second, I just want to describe what's known about supporting birthing people and families in rural communities with lower volume obstetric units, recognizing some of the challenges currently associated with that within our current reimbursement and healthcare financing and organizational infrastructure. Clinical need is a clear motivator for rural hospitals to keep their obstetric units open. Many rural hospitals maintain low volume units to meet community needs. Despite enormous financial and staffing challenges.

There are a number of clinical support strategies. Perinatal quality collaboratives have shown an incredible potential for supporting rural hospitals and rural hospital networks. They facilitate knowledge sharing, safety protocol implementation, training, data review for rural hospitals. I think there's a collectivist atmosphere that can be incredibly helpful when you're facing low volumes. Telehealth infrastructure can be helpful on investment in telemedicine. And I want to say very clearly, particularly provider-to-provider telemedicine support. That supports facilities without subspecialty care and that the focus on telehealth has often been broad and has focused a lot on infrastructure for provider-patient interactions.

And I think in obstetrics what we have seen has shown the real importance of provider-to-provider telemedicine support, especially in communities with low volume obstetric units. And regional partnerships, networks of specialists at larger hospitals assisting rural clinicians in managing higher risk births. And this often requires financial incentives to ensure that both of the participating hospitals have an incentive to provide high quality care and that they're able to communicate with one another.

Financial support strategies. I want to elevate a strategies that Dr. Miller has been emphasizing very importantly and very well, which is standby payments. Let us figure out a way to cover the fixed costs of the capacity that is needed for rural hospitals to continue to operate standby payments as well as potential low volume payment adjustments can help ease financial strain on rural hospitals and sustain obstetric services. Another strategy is in thinking about the differential in payment between Medicaid and private insurers, which disadvantages rural communities with a higher proportion of low-income residents who have Medicaid coverage, which again, if you're relying on revenues with every patient that comes through the door, if some patients have higher revenues attached to them and then others, that creates inequities within a system and severe financial constraints within hospitals that serve lower-income folks.

Finally, I want to highlight what is known about the best ways to support birthing people and families in rural communities that do not have obstetric care. Not all rural communities have obstetric care. Many, many of the hospitals that have closed or closed their obstetric units will not be reopening or at least

not in the near future. So what can be done first? Training and preparedness simulation training for emergency births, for clinical folks, for EMS, for first responders in communities. These are important investments that can help support our communities, encourage their safety. Telemedicine, as I mentioned, telehealth to link rural emergency staff with specialists during obstetrics and neonatal emergencies can be helpful. That can also be facilitated by regional partnerships.

As previously mentioned, investing in other maternal infant health services, prenatal care, perinatal mental health care, breastfeeding, doulas, nurse home visits. There are many ways outside of inpatient hospital services and we see that those services are reduced without a hospital to support that, but there are. That is an important need that remains in that community and financial support. Financial support for non-obstetric facilities to manage pregnancy complications, targeted financing to support emergency obstetric training and equipment for these non-obstetric facilities and to manage emergent births when they occur.

With that, I want you to know that almost everything that Julia and I have presented today is available on our website. It's listed on the right of the screen here in addition to, and the Gateway has research that we have done as well as great research done by the other rural health research centers on maternal and infant health and on a wide range of important rural health topics. I am so grateful to each of you. I know we went through a lot today. I'm so grateful to each of you for being here, being invested in and caring about rural communities and birth in rural places. And now I think we have time for some questions. Is that right, Per?

Per Ostmo: E do have a couple minutes for questions. Katy, I'm going to let you and Julia browse the Q&A quickly. I want to acknowledge there was some back and forth about March of Dimes. Thank you so much. For those of you who commented about March of Dimes, I'm going to post the URL for March of Dimes in the chat. If you need to learn more about their mission, vision, and values and what they do, please check out March of Dimes. The recording slide deck and transcript for webinar should be available by Monday, if not this week, Friday. And I'm going to hand it over to Katy and Julia. There's a lot of questions. I'll let you triage them.

Katy Kozhimanni...: Fantastic. I want to just say one point on the March of Dimes, which is a wonderful organization that I've worked with for a really long time and they have been working on their data and working on doing it, and all of these measures that people are doing on maternity care access are useful. It's sometimes a matter of communication about what they are actually capturing and making sure we are using language that is accurate. Everyone who is putting resources, time and effort, this is hard to do and people do it because they care. So I don't mean in any way to disparage any of the good and important work that is being done, but people are capturing things in different ways and some data sources allow you to do that more quickly, but they may

not be as comprehensive. And so just understanding those trade-offs. Again, I haven't seen all the questions yet. So, Julia, I'm going to let you highlight if there are any questions that are coming through, but I appreciate the opportunity to say that and shout out to our colleagues at March of Dimes who are awesome.

Julia Interrant...: Yes. Yes. And I just want to echo that too, that again, there's no perfect measure, I think, which is the point of saying it's hard, it's challenging. There's no great measure, and we're constantly refining even the methods that we use to try to make it better to get more accurate information out. Okay, so there's a question here. It says, how do OB providers play a role in the relationship between severe maternal morbidity and mortality and delivery hospital? Should OB provider or practices be considered as a mediating factor?

Katy Kozhimanni...: I just saw this question as well, and I think it's a really important one. I think the patterns that we are seeing, so first I want to give so much credit to obstetric providers in rural communities and everywhere, like supporting people during birth is difficult and it's made exceptionally difficult by some of the systemic problems and barriers in our healthcare system and in society broadly outside of healthcare that bring folks in to pregnancy and into clinical care during pregnancy with a lot of socio-clinical socio-demographic risk factors that they face in their lives outside of clinical settings and then are brought there. And obviously clinicians have an important role to play in the quality of care, but many, many of the risk factors for severe maternal morbidity and mortality are risk factors that are not clinical. And I want to highlight that most of the preventable obstetric care emergencies of the maternal morbidity and mortality happens from one week after delivery throughout the postpartum year.

And that's not a time when clinicians see a lot of people. And that's a problem with the way we do postpartum care in this country. So I just want to say this is an enormous problem. What is within the scope of clinicians and understanding what role they can play, part of that is getting information back to clinicians so that they understand their own patterns of care. Clinicians are trained to treat each patient as an individual and each case individually, but they are operating within circumstances and with heuristics that may include things like what they were trained on was appropriate clinical practice when at that time that has since changed or implicit bias, which is something that we all have and that comes out in our work, especially when we're pressed for time and resources. And so for clinicians to be able to get information about their own practice patterns and compare that to others is really valuable.

It's something that can be done within healthcare delivery systems that I think is really important. From your specific question about the mediating role of providers in the relationship between low volume units and severe maternal morbidity and mortality. First, I would say it's incredibly difficult to figure out to attribute a birth to a particular clinician because shifts change during childbirth, and many people operate in groups where the person who's there, who's the delivery physician may not have been, or delivery clinician, excuse me. There are plenty of non-clinicians who deliver babies. And I want to be clear when I

say that. So the person who's delivering the baby may not have been the person who saw them during prenatal care. And so which person is the one who should be controlled for along that way? So it's a really complex, very good question and something that we think a lot about, and I invite lots of people to think about it. So, thank you.

Per Ostmo: Thank you. Katy. We are just about out of time here.

Katy Kozhimanni...: Oh, no.

Per Ostmo: Maybe perhaps one more question. Julia, do you have any, one last question you can cue up for us?

Julia Interrant...: Yeah, there were a few questions. So I think making this overarching about the, is there clear evidence on the role and the proportion of births covered by Medicaid and OB unit closures? Like I mentioned, there was a few questions specifically around Medicaid covered births.

Katy Kozhimanni...: Yeah, Julia, do you want to respond to that? We're looking at this. We have a current project that Julia is leading on financial predictors of closures, and it's sometimes difficult to get these clear data, but yes, the answer is yes. Julia, do you have anything else?

Julia Interrant...: Yeah, just that, again, it gets tricky, right? Because we know that on average, Medicaid pays less for childbirth services than private insurance. But again, it's not always that straight, that clear cut because there's fee for service and there's also managed care organizations that those payment rates aren't as clearly visible. And obviously private insurance pays depending on which type of private insurance and insurer you're talking about too. So again, we are examining that, but it is not super clear Cut.

Per Ostmo: Well, thank you so much. I want to thank everyone for submitting questions. We had so many, and I'm afraid you weren't able to get to all of them, but we really appreciate the stakeholder engagement. Katy and Julia, thank you so much for being here. And I hope to see everyone at feature Gateway webinars. And don't forget, National Rural Health Day next Thursday. So enjoy everybody. Take care.

Julia Interrant...: Bye.