SURGO HEALTH

Predictable, Place-Based, and Preventable: What the Updated Maternal Vulnerability Index Tells Us

Using data for action in maternal health amid a shifting landscape

For more information or to access the data, please contact mvi@surgohealth.com.

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Organizations Currently Using the MVI

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Executive Summary

In 2024, 665 women died from pregnancy-related causes in the United States, with persistent disparities by race/ethnicity and urban/rural classifications.[1] Poor maternal health outcomes are concentrated where overlapping challenges such as economic disadvantage, environmental stressors, and barriers to quality healthcare make these outcomes more likely. Inaction has severe consequences, costing lives and imposing substantial economic costs.[2–4] ***The 2025 Maternal Vulnerability Index (MVI) provides a critical lens into this moment***, supporting decision-makers and practitioners across government, healthcare, and philanthropy to understand *where and why* maternal vulnerability persists and how to respond.

The MVI was built on a powerful premise: maternal risk is not random. It is predictable, place-based, and preventable. By mapping these patterns, the MVI reveals not just where vulnerability exists, but why it persists, and highlights where interventions can have the greatest impact. Originally released in 2021, the MVI is a national tool that examines community-level risk factors specific to maternal health, enabling the precise identification of ***where and why*** women are most vulnerable to adverse outcomes through a scoring system of 0–100. It has been included in more than 25 peer-reviewed publications, with 9 examining its relationship to outcomes, including maternal mortality, severe maternal morbidity, and preterm birth.

Despite improvements to maternal mortality rates from the COVID-era peak, structural conditions driving maternal vulnerability remain, with a disproportionate burden on Black and American Indian/Alaska Native (AI/AN) women. At the same time, the policy and healthcare environment has changed significantly, with shifts in abortion access and health insurance coverage. New laws enacted through the One Big Beautiful Bill Act of 2025 (OBBBA) are projected to increase the uninsured population by 6 million people,[5] with significant implications for women of reproductive age who rely on Medicaid during the perinatal period. More than 100 rural hospitals have closed since 2015,[6] and over 130 rural labor and delivery (L&D) units have closed since 2020,[7] with more at risk of closure due to changes in Medicaid and Affordable Care Act funding. Further, the Pregnancy Risk Assessment Monitoring System (PRAMS), a key maternal health surveillance program, faces an uncertain future with congressional funding secured only until September 2026.[8]

This evolving policy environment and healthcare landscape calls for targeted and timely action. **Along with the updated 2025 MVI dataset, Surgo Health has conducted an analysis of the 2025 MVI and identified three key findings.**

* Although Surgo Health uses the term 'women' here and in our materials, we recognize that not everyone who carries a pregnancy refers to themselves this way, and we respect the diversity of all birthing people.

Key Findings

1 **High-vulnerability communities require tailored, local solutions.** Louisiana and Texas are the most vulnerable states in the country, yet the MVI's thematic scores show that vulnerability is driven by different factors in each state. The pattern holds across geographic levels: effective interventions within states, counties, or ZIP codes must be place-based, informed by local drivers rather than uniform approaches.

2 **Drivers of vulnerability concentrate differently across communities.** While fewer women of reproductive age (WRA) live in counties with high MVI scores overall, Black and Hispanic/Latina women are disproportionately represented in these geographies. However, this pattern varies substantially by theme. At the county level, for example:

- "Very High" Reproductive Healthcare vulnerability is concentrated in rural, majority-White counties;
- "Very High" Physical Health vulnerability is concentrated in counties with larger Black and American Indian/Alaska Native populations; and
- "Very High" General Healthcare vulnerability is concentrated in counties with large Hispanic/Latina populations.

Understanding both the drivers of vulnerability and the communities most exposed to them is necessary to design solutions that reach the women who need them most.

Index Scoring

The Maternal Vulnerability Index scores all U.S. geographies on a scale of 0-100, where a higher score reflects greater vulnerability relative to other geographies. For this report, scores have been grouped into categories:

- Very High (80-100)
- High (60-79)
- Moderate (40-59)
- Low (20-39)
- Very Low (0-19)

3 **State rankings mask within-state vulnerability.** Eighteen states contain counties with both "Very High" and "Very Low" risk. Ranking states by outcomes or vulnerability overlooks significant within-state variation, hiding communities that require urgent, targeted action. Government agencies, health systems, and funders should look beyond the state level to most effectively allocate resources to communities most in need.

Together, these findings highlight that maternal risk in the U.S. is not random; it is *predictable, place-based,* and *preventable.*

Implications

Without targeted, place-based interventions that address the drivers of maternal vulnerability, maternal health inequities will persist or widen as policy changes are implemented and healthcare access continues to shift. Furthermore, there is a significant need for measures that promote, support, and protect maternal health given that federal and state policies have clear cascading effects on communities. The sections that follow show where vulnerability is greatest, who bears the greatest burden, and how stakeholders across government, healthcare, and philanthropy can respond.

HEALTH SYSTEMS: Identify the key non-clinical drivers of maternal risk in your patient population, develop and implement patient support programs, and integrate the MVI into risk stratification.

PHILANTHROPY: Fund interventions in high-need geographies and support community-based organizations responding to local needs.

GOVERNMENT & STATE AGENCIES: Allocate funding based on need, expand and protect rural healthcare access, develop affordable insurance coverage options, and grow the health workforce.

POLICYMAKERS & ADVOCATES: Develop and advance policies that address the needs of communities.

What is Maternal Vulnerability?

The MVI was created to understand the factors associated with maternal morbidity and mortality in the United States through a health equity lens. The term “maternal vulnerability” is used to understand the social, economic, and environmental exposures that increase health risk during the perinatal period. In other words, maternal vulnerability examines community-level factors and how they relate to ***risk of poor maternal outcomes*** during pregnancy, delivery, and postpartum.

Purpose

Our initial report in 2021 introduced the MVI, focusing on the geography of maternal vulnerability, how MVI themes clarify its drivers, and the racial disparities in maternal vulnerability across the United States.[9]

This report highlights the *current* geographic distribution of vulnerability, examines the drivers of maternal vulnerability among women of reproductive age (WRA)‡, and outlines actions for stakeholders across the ecosystem.

‡For this report, women of reproductive age (WRA) refers to females ages 15–44.
Note: Surgo Health does not recommend using the MVI for comparisons across time periods (e.g., comparing the 2021 and 2025 MVIs). Please see **Annex B** for more information on the methodology.

Introduction

The Maternal Vulnerability Index & Why It Matters

Compared to other high-income countries, the United States continues to perform worse on maternal morbidity and mortality measures. In a time of shifting public health priorities and a changing healthcare landscape, targeted action informed by timely intelligence is critical to improve maternal health and to support women's well-being and strong families and communities.

Pregnancy-related mortality* peaked in 2021, with more than 1,220 deaths across the United States and a pregnancy-related mortality ratio (PRMR) of 33.2 per 100,000 live births.[1] In 2024, the most recent data available, the PRMR was 18.4, with 665 women dying of pregnancy-related causes.[1] Despite this post-COVID decrease, significant racial disparities persist. The PRMR for American Indian and Alaska Native (AI/AN) women is more than 4 times that of non-Hispanic White women, and the PRMR of Black women is more than 3.3 times that of non-Hispanic White women.[1]

A wide range of factors contribute to adverse pregnancy outcomes. To understand the many upstream factors contributing to poor maternal health, Surgo Health developed the ***Maternal Vulnerability Index (MVI)***: a novel dataset providing a hyperlocal, holistic view of the social, contextual, and behavioral factors that influence maternal health outcomes across the U.S. The MVI has been validated against multiple critical health outcomes, including **maternal mortality,[10] severe maternal morbidity,[11] infant mortality,[12] preterm birth,[10,13] low birthweight,[10] and stillbirth.[14]** A summary of the evidence to date appears in **Annex A**. By identifying and addressing the many factors that contribute to maternal vulnerability, we can improve birth outcomes for mothers, children, and families.

* The Pregnancy Mortality Surveillance System (PMSS) defines a pregnancy-related death as a death during or within 1 year of the end of pregnancy from any cause related to or aggravated by the pregnancy.[15]

About the Index

Operationalizes the root causes of adverse maternal health outcomes, including the social determinants of health, to drive precise action for maternal health.

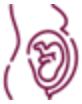
Assigns all U.S. geographies a percentile score (0–100), where a higher score indicates greater vulnerability to adverse outcomes *relative* to other U.S. geographies at the same level. See **Annex B** for more information on methodology.

Captures key drivers of maternal vulnerability through six themes, as outlined below.

Available at the state, county, ZIP code tabulation area (ZCTA), and census tract levels, each featuring an independent national rank derived from their source data.

Overview of the Drivers of Maternal Vulnerability

MVI Themes



Reproductive Healthcare: Access to and availability of reproductive and maternal healthcare services. Limited access increases the risk of delayed care, preventable complications, and reduced autonomy in managing reproductive health.[16]

Physical Health: Overall burden of chronic disease and general physical health challenges in a community. Poorer baseline health increases the likelihood of pregnancy complications and makes maternal outcomes more fragile.[17]

Mental Health & Substance Use: Mental health status, emotional support, and behavioral health risks within a community. Higher levels of stress, poor mental health, and substance use increase vulnerability during pregnancy and the postpartum period.[18]

General Healthcare: Access to routine, preventive, and general medical care. Limited healthcare access, including barriers caused by inadequate health insurance coverage, delays early intervention and reduces ongoing management of health needs before and during pregnancy.[19]

Socioeconomic Determinants: Social and economic conditions that shape stability, opportunity, and daily life. Socioeconomic disadvantage heightens chronic stress and limits resources needed to support a healthy pregnancy.[20]

Physical Environment: Safety, stability, and environmental conditions of the surrounding community. Unsafe or resource-poor environments increase stress and create barriers to essential services that support maternal health.[21]

Understanding Risk to

Address the Why

The MVI enables organizations and practitioners to:

1. **Identify high-risk communities:** Pinpoint areas where women are most vulnerable to poor maternal outcomes, enabling **strategic resource allocation**

   Case Example: *Vitamin Angels used the MVI to identify ZIP codes that would most benefit from maternal nutrition interventions to allocate funding and implement programming.*

2. **Stratify risk:** Understand the context in which mothers live to **better understand their risk profile** and address the clinical and non-clinical factors contributing to adverse pregnancy outcomes

   Case Example: *Ochsner Health uses the MVI for its data-informed patient care strategy to understand the range of social risk factors women experience in their communities. To optimize use in clinical workflows, integrating MVI data into electronic health records could enrich risk profiles beyond clinical indicators. For more localized health systems, granular indicators that show relative vulnerability within their catchment area hold the highest utility.*

3. **Guide precise interventions:** Inform **tailored program and policy** design to address the root causes of poor outcomes, including preventive care and engagement interventions

   Case Example: *Duke University's Margolis Institute for Health Policy is using the MVI to inform an implementation plan to improve the health and well-being of expectant parents and young children in North Carolina.*

4. **Conduct deep research:** Incorporate data beyond clinical indicators to examine **the social, contextual, and behavioral factors influencing maternal health outcomes**

   Case Example: *Salazar et al. used the MVI alongside birth data to show that counties with very high MVI scores had significantly higher odds of preterm birth, with physical health and mental health themes remaining significant predictors even after adjusting for individual-level factors.*[13]

Maternal Vulnerability Index

2025 Data Findings & Policy Context

Vulnerability at the State Level

More than 19.6 million (30%) women of reproductive age (WRA) live in the 11 states with the highest MVI scores in the country.[22] These states are concentrated in the South and Southwest, where the maternal mortality ratio (MMR) was 32.5, higher than the national MMR of 23.5 during the same period (2019–2023).[23] By comparison, the 10 states with the lowest MVI scores are concentrated in the Northeast and across the Midwest and West. While these states have a lower average MMR (20.1),[23] they comprise about 5.7 million WRA, or 9% of all WRA in the U.S.[22] **To improve maternal health in the United States, a concentrated effort is needed in states with the highest risk.**

Five states with the ***highest MVI scores*** (starting with the highest):

1. ***Louisiana*** *(LA)*
2. ***Texas*** *(TX)*
3. ***Mississippi*** *(MS)*
4. ***Alabama*** *(AL)*
5. ***Nevada*** *(NV)*

Five states with the ***lowest MVI scores*** (starting with the lowest):

51. Vermont *(VT)*
50. New Hampshire *(NH)*
49. Maine *(ME)*
48. Minnesota *(MN)*
47. Hawaii *(HI)*

The full list of 2025 state rankings can be found in **Annex C**.

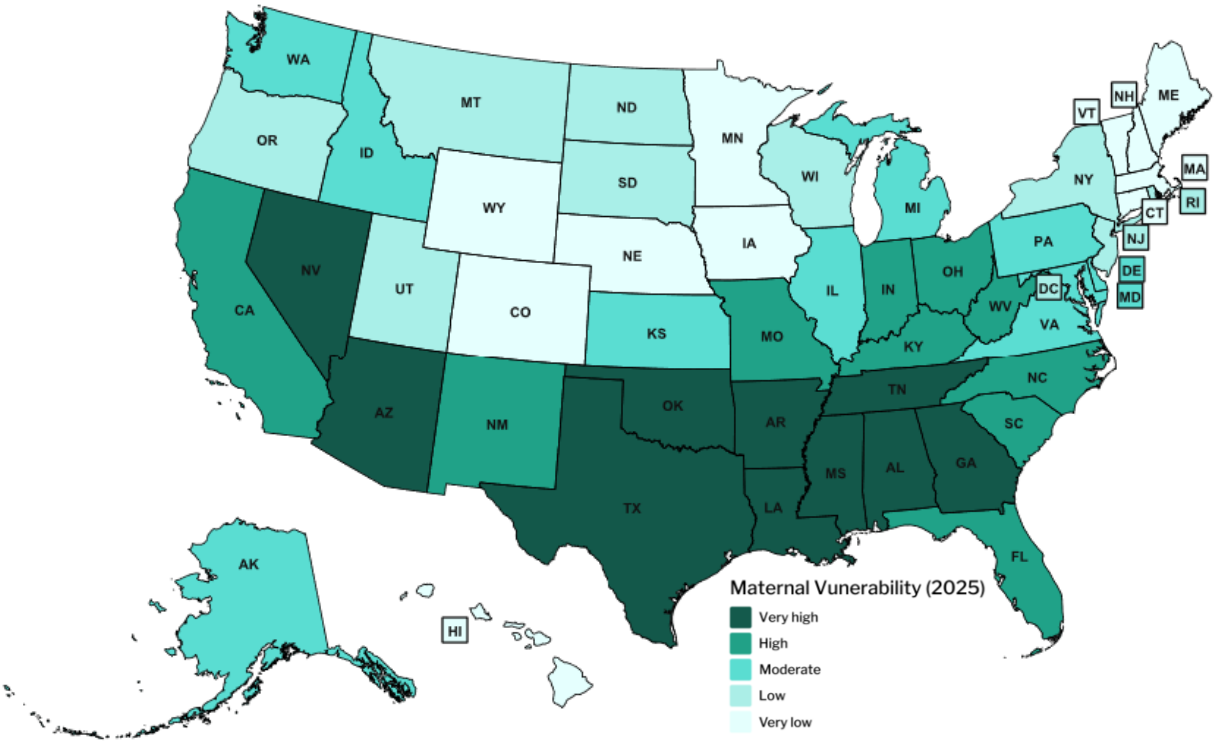


Figure 1. A map of maternal vulnerability by state, as measured by the Maternal Vulnerability Index and categorized by quintile (0–19, 20–39, 40–59, 60–79, and 80–100). *States scoring above the 80th percentile fall into the "Very High" vulnerability category.*

Drivers of Vulnerability Vary Across States

Maternal vulnerability is driven by different factors across states with similar MVI scores. Figure 2 shows MVI theme scores for the 11 states in the "Very High" vulnerability category. As with the overall MVI score, higher scores in a thematic area indicate higher vulnerability.

For example, the top three drivers of maternal vulnerability in Louisiana (LA) are physical environment, physical health, and mental health & substance use. In Texas (TX), by contrast, maternal vulnerability is driven by reproductive healthcare, physical environment, and general healthcare. **To improve maternal health outcomes, place-based interventions are needed to address the specific drivers within each state.**

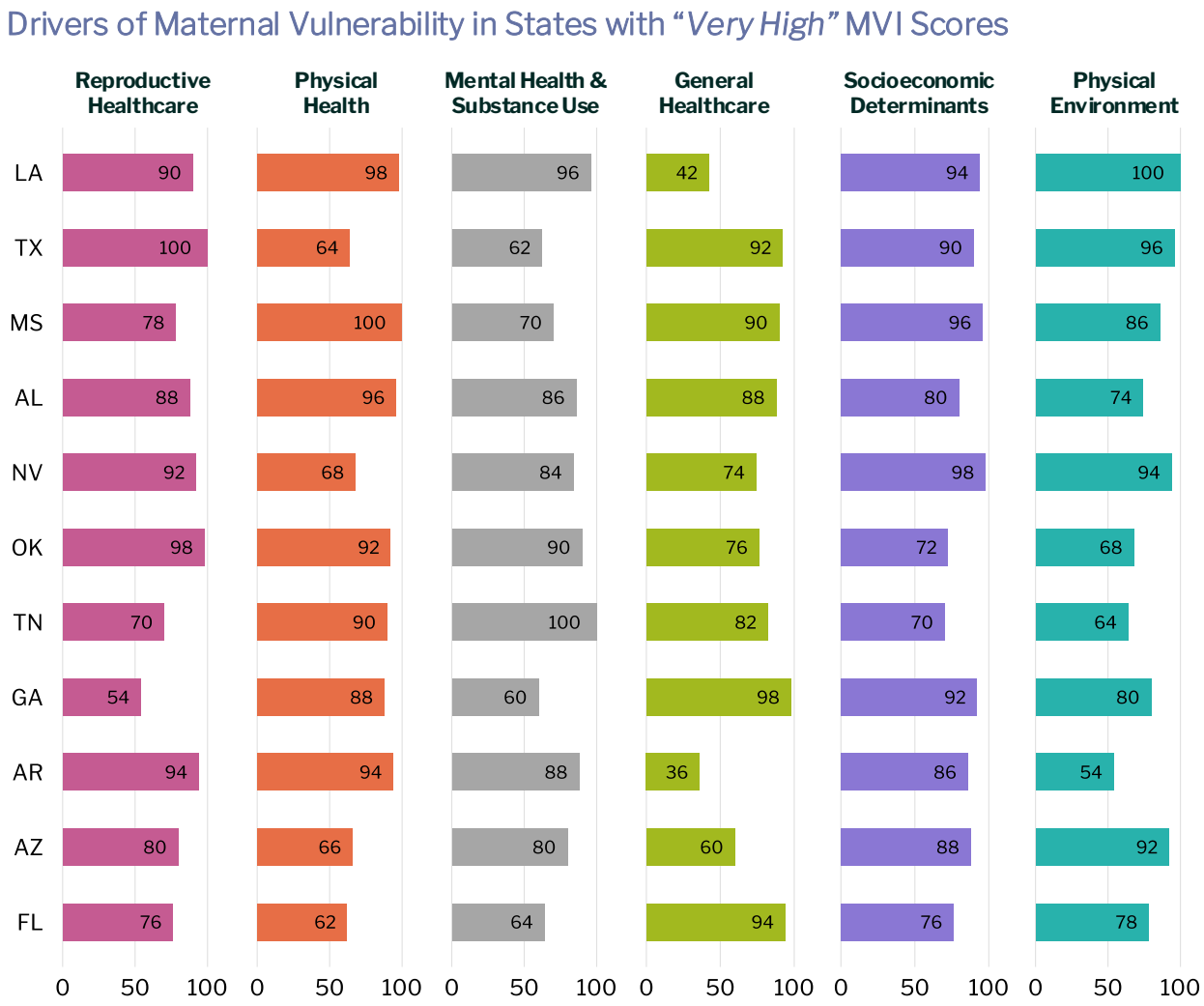


Figure 2. MVI theme scores for each of the 11 states with "Very High" MVI scores, highlighting the primary drivers of vulnerability by state.

Medicaid Expansion and Maternal Vulnerability

Geographic patterns of vulnerability are shaped and reinforced by policy, with clear evidence from Medicaid expansion status. Medicaid is integral to maternal health in the United States. More than 16 million WRA (nearly 1 in 4) are covered by Medicaid[24] and more than 40% of all U.S. births were financed by the program in 2023.[25] Passed in 2010, the Affordable Care Act (ACA) offers states enhanced federal funding to expand Medicaid coverage. As of January 2026, 41 states have adopted Medicaid expansion, including 12 states that also enacted 'trigger laws' to end the expansion or require mitigation in the event of reduced federal funding.[26]

On average, maternal vulnerability is higher in non-expansion states and in states with 'trigger laws' compared to states that have adopted and implemented Medicaid expansion without trigger laws. Only five of the 11 states (46%) with "Very High" MVI scores have adopted Medicaid expansion, while 9 of the 10 states (90%) with "Very Low" MVI scores have adopted and implemented Medicaid expansion. However, new laws enacted through the One Big Beautiful Bill Act (OBBBA) of 2025 will change eligibility criteria, and the uninsured population is projected to increase by more than 6 million people.[5] The impact on WRA who rely on Medicaid during the perinatal period will become clear as states implement OBBBA provisions.

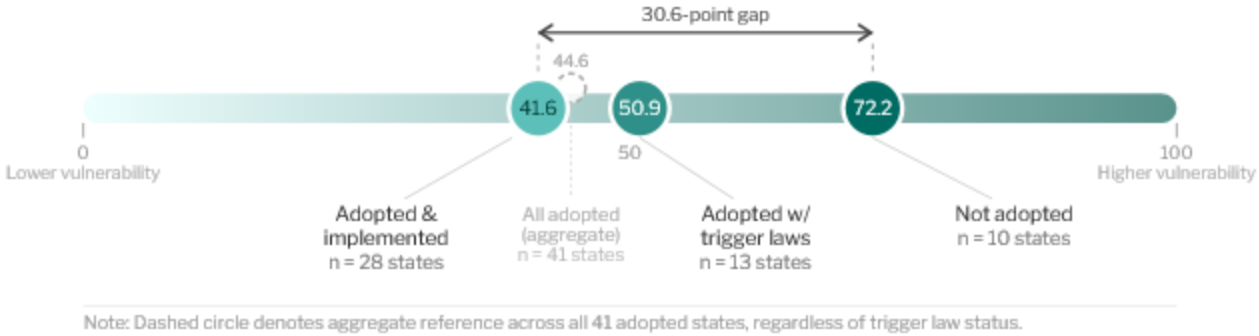


Figure 3. Average state-level MVI score based on Medicaid expansion status.[+]
States without Medicaid expansion have higher average MVI scores.

Postpartum coverage extensions provide Medicaid coverage for up to 12 months after birth and are critical given that 63% of maternal deaths occur after birth[27] and the extended coverage period supports continuity of care for follow-up after childbirth, management of chronic conditions, and access to mental healthcare. Arkansas remains the only state[^] that has not enacted Medicaid's postpartum coverage extension.[28]

[+] N= 51, including Washington, DC.
[^] On March 18, 2026, Wisconsin's governor signed a law extending Medicaid coverage to one year postpartum, effective July 1, 2026.[29]

Ultimately, states that have not yet implemented Medicaid expansion via the ACA can still do so. **Prioritizing coverage in the perinatal period would increase access to care and reduce the risk of maternal morbidity and mortality but will require states to make difficult budgetary decisions based on their priorities.**

Vulnerability in Context: How Medicaid Cuts Could Affect Rural Access

Nearly every state could see rural hospital closures as Medicaid cuts are implemented, with 46 of 50 states included on a list of at-risk rural hospitals from the U.S. Senate in 2025.[30] Of the states with "Very High" MVI scores, there are **104 rural hospitals at risk** of closure.[30] Across the states with "Very Low" MVI scores, there are only 24 rural hospitals at risk of closure.[30] Utilizing different criteria (i.e., not specific to changes in Medicaid), the Center for Healthcare Quality & Payment Reform identified 308 rural hospitals at risk of closure in states with "Very High" MVI scores, and 82 rural hospitals at risk in states with "Very Low" MVI scores.[6]

Currently, fewer than half (41%) of rural hospitals in the U.S. offer labor and delivery (L&D) services,[7] which is a major barrier to care in these regions. Due to financial strain, and likely amplified by the forthcoming Medicaid cuts, there are **35 rural L&D units at risk** of closure in 2026 across states with "Very High" MVI scores.[7,Δ] Comparatively, in states with "Very Low" MVI scores, there are 12 rural L&D units at risk of closure.[7]

In states with "Very High" Reproductive Healthcare scores (Theme 1), 135 rural hospitals[30] and 35 rural L&D units[7] are at risk of closure. In states with "Very High" General Healthcare scores (Theme 4), 64 rural hospitals[30] and 29 rural L&D units are at risk of closure.[7] These are counties that can *least afford to lose access to care.*

As many as **308** rural hospitals at risk of closure in 2026.[7]

133 rural labor & delivery units have closed since 2020.[7]

The looming threat to rural hospitals and rural L&D units demonstrates one of the risks to maternal health amid federal Medicaid cuts. The closure of hospitals and

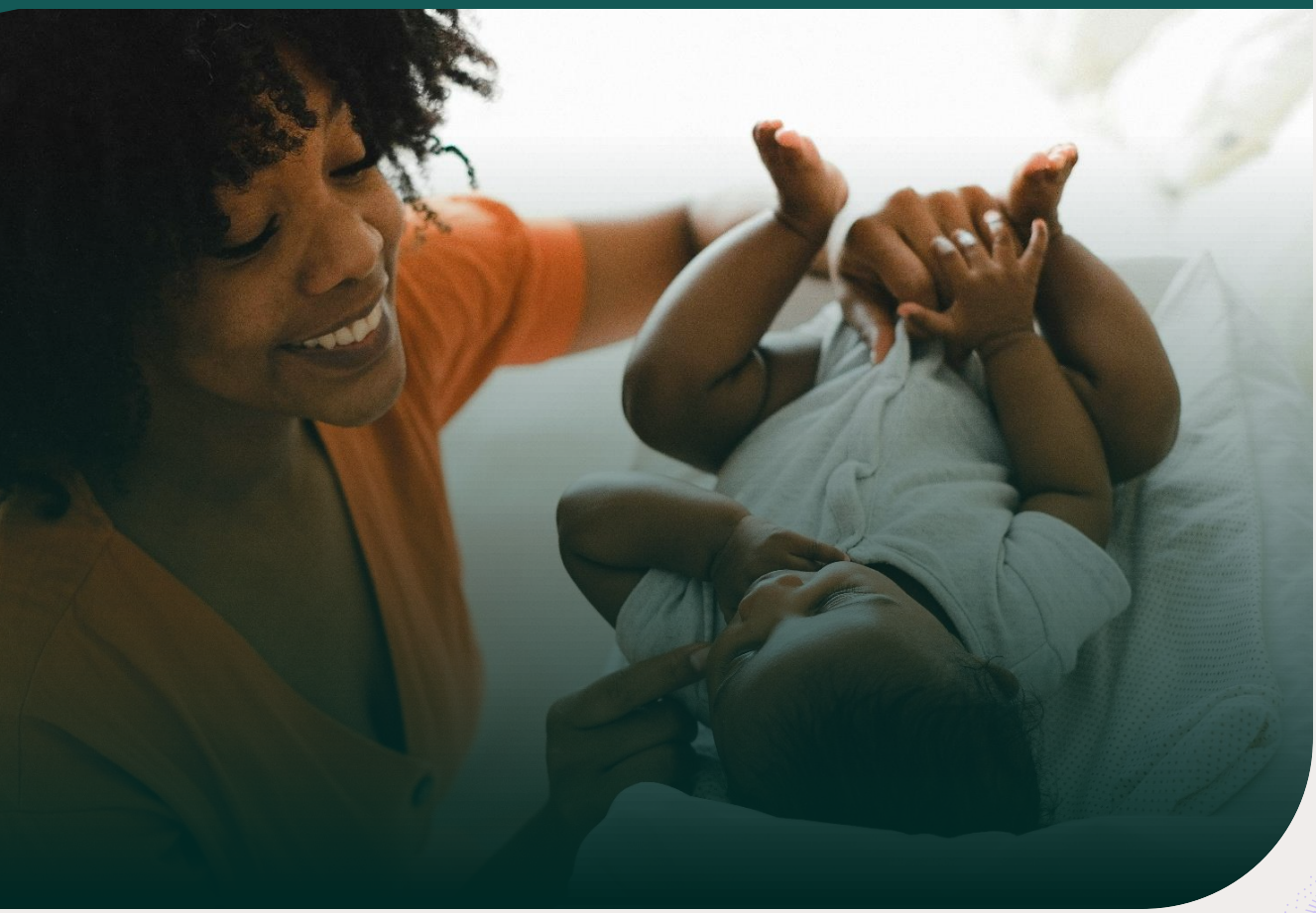
Δ Three of the eleven states with "Very High" MVI scores (Arizona, Florida, and Nevada) have zero rural L&D units at risk of closure in 2026. Texas has the most (13) rural L&D units at risk of closure in 2026.

critical services reduces access to healthcare and amplifies additional barriers such as transportation challenges, as distances to healthcare services increase.

The $50 billion Rural Health Transformation Program (RHTP) offers **an opportunity to strengthen rural maternal healthcare** but requires prioritization of the perinatal period as states develop their RHTP initiatives. To see the greatest impact for rural areas in need, the Centers for Medicare & Medicaid Services (CMS), the federal agency overseeing the RHTP program, **must prioritize geographies and populations with the greatest vulnerability and need.**

State Spotlight: Louisiana

Louisiana, the state with the highest maternal vulnerability score in the country, is particularly concerning. **Thirty-three (33) rural hospitals are at risk of closure**.[30] Of those, 88% (29) are in a parish with a "Very High" MVI score, including a hospital in the state's most vulnerable parish, Avoyelles.[30] More than 185,000 WRA live in a parish with at least one rural hospital at risk of closure.[22]



Vulnerability at the County Level

Zooming in on smaller geographic units, such as counties, ZIP codes, and census tracts, enables practitioners and researchers to identify places of highest need, which can be obscured when data are examined at broader geographic levels. **Annex D** details the counties with the highest and lowest MVI scores in each U.S. state.

In 2025, **nearly 6 million WRA lived in the most vulnerable counties**[22] (highest MVI quintile), **where 22% identify as Black**[31] **and 32% identify as Hispanic/Latina**.[32] The most vulnerable counties are spread across 26 states, with 7 states having more than 50% of their counties scoring in the highest MVI quintile (i.e., a "Very High" MVI score).

Comparatively, in the least vulnerable counties (lowest MVI quintile) there are **more than 13.9 million WRA**,[22] with approximately 13% identifying as Hispanic/Latina,[32] 10% identifying as Asian,[33] and **only 6.8% identifying as Black**.[31]

The least vulnerable counties are spread across 41 states, with 12 states having at least 50% of their counties scoring in the lowest MVI quintile (i.e., a "Very Low" MVI score).

If risk were spread evenly across all communities, we would expect to see Black and Hispanic/Latina WRA represented in each vulnerability quintile in proportion with their national population shares (14% and 22%, respectively). Instead, we see an overrepresentation in counties with "Very High" MVI scores and an under-representation in counties with "Very Low" MVI scores. **This demonstrates how risk is unevenly distributed across racial/ethnic groups.**

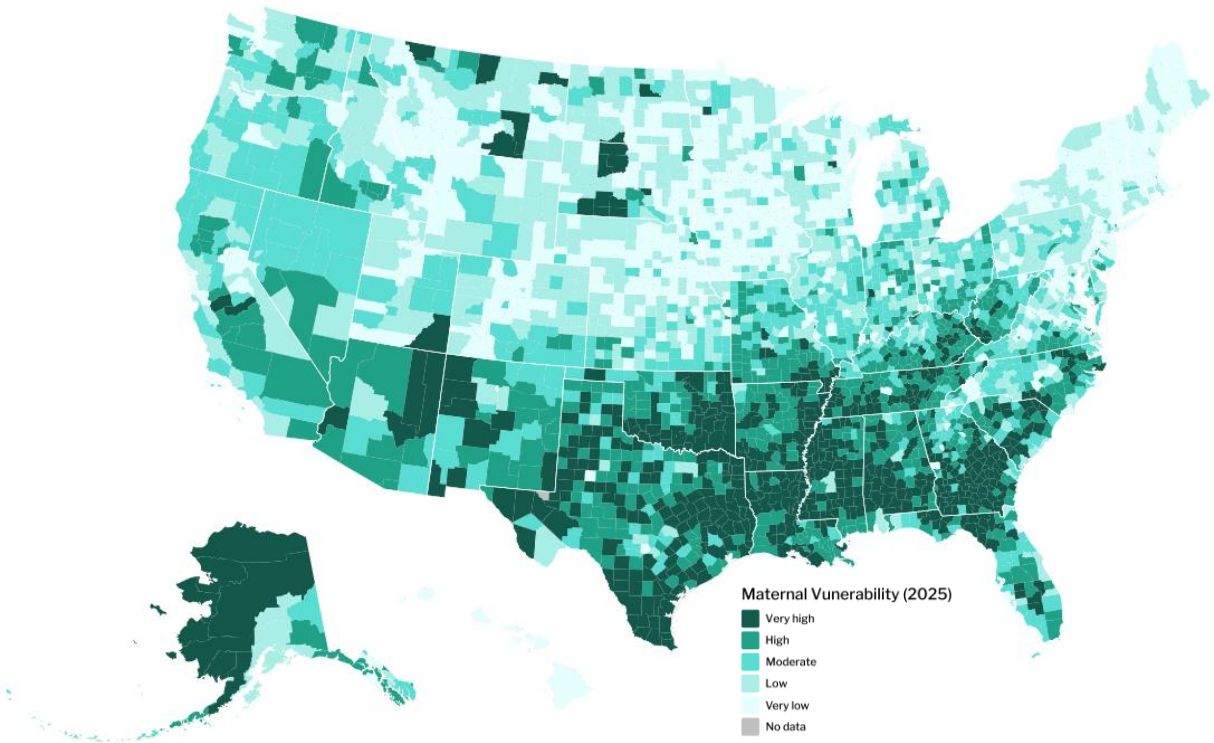


Figure 4. A map of maternal vulnerability by county, as measured by the Maternal Vulnerability Index.

Examining Disparities in Vulnerability

Figure 5 includes the 18 states containing counties in both the highest and lowest MVI quintiles and shows the percentage of counties in each of those categories. In states *where more counties fall into the "Very Low" category*, we see pockets of need and vulnerability. By contrast, in states *where more counties fall into the "Very High" category,* we see pockets of advantage and greater access to resources.

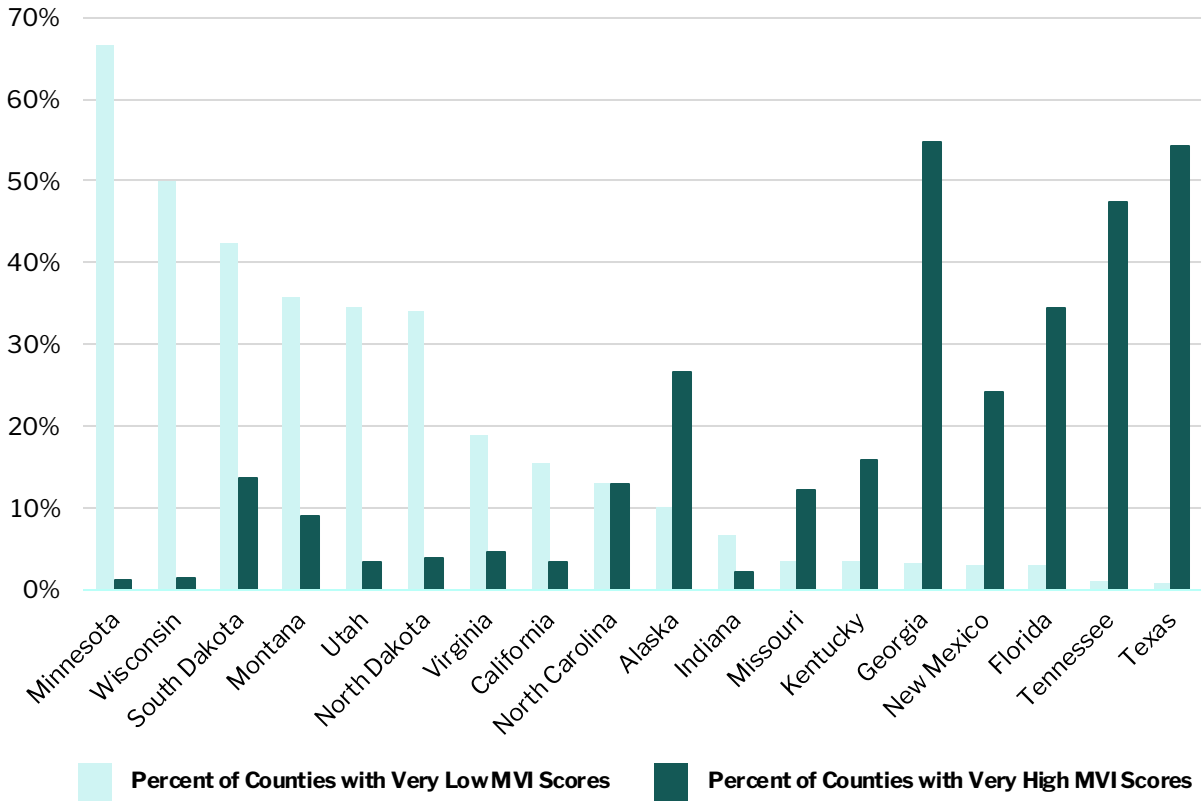
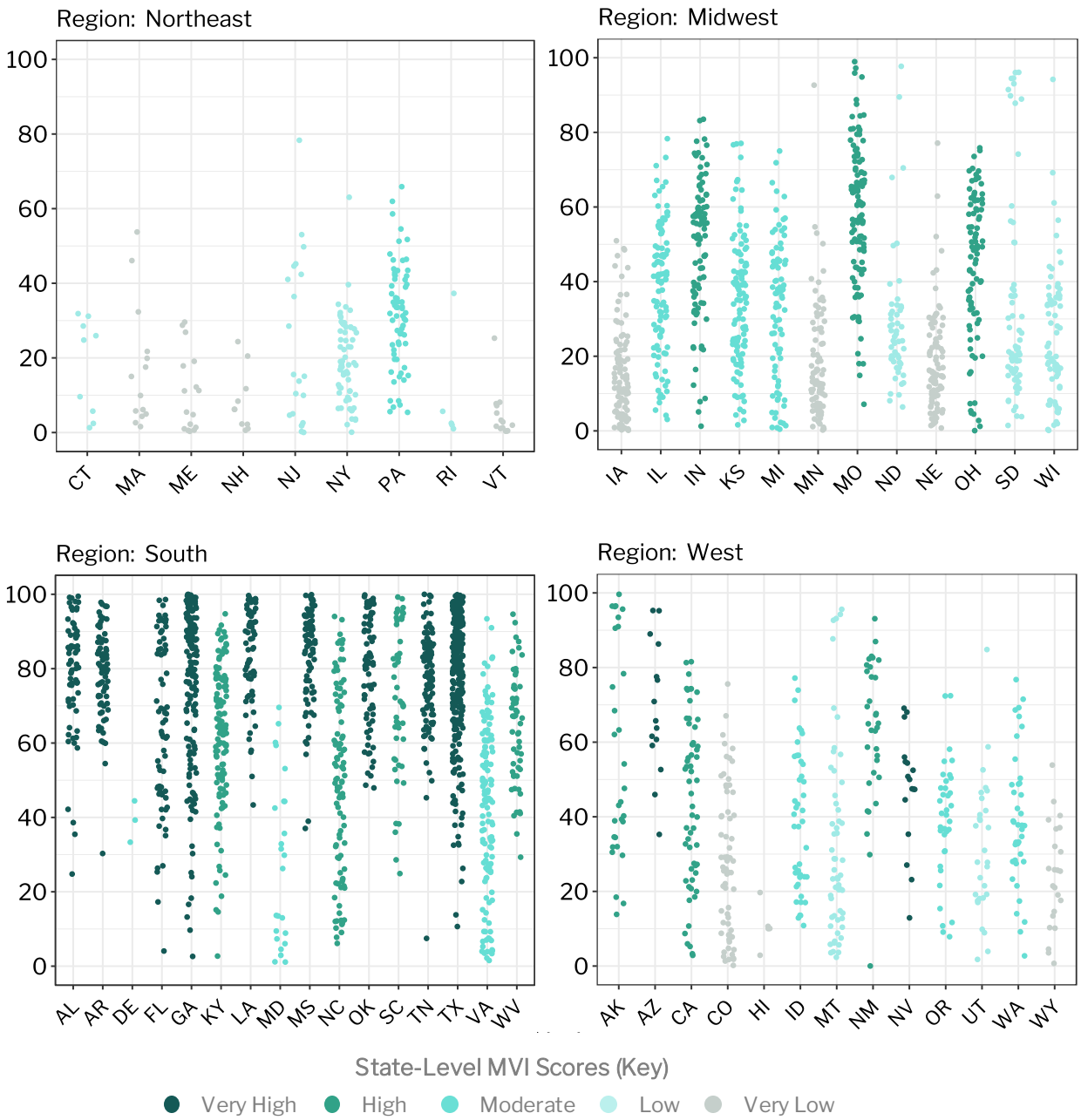


Figure 5. Percentage of counties within a given state that score "Very High" and "Very Low" on the Maternal Vulnerability Index. *Minnesota and Wisconsin demonstrate states with pockets of significant need, whereas Tennessee and Texas demonstrate states with widespread vulnerability and pockets of greater access to resources.*

The distribution of county-level MVI scores within a state highlights disparities. In Figure 6 (next page), each dot represents the MVI score of one county, with all counties from the same state aligned on the same vertical axis. The color of the dots corresponds to the MVI score quintile of a given state. States are grouped by region for regional comparison. States with greater variability (i.e., range or spread, as shown by the dots below) in MVI scores have larger disparities across counties. **Action to address maternal vulnerability should prioritize highly vulnerable counties to reduce within-state inequity.**

Figure 6. Distribution of county-level MVI scores per state, grouped by U.S. region.
County-level MVI scores vary widely within states, particularly in the South and in states with large AI/AN populations, signaling extreme within-state disparities.



Within-State Disparities Signal Deep Inequity

In this analysis, five states show the widest variation in county-level MVI scores, signaling deep internal disparities:

- Alaska
- South Dakota
- Montana
- North Carolina
- Florida

The top three states with the greatest county-level MVI disparities (i.e. Alaska, South Dakota, and Montana) are also ranked among the top five states with the largest Indigenous populations as a share of state population.[34] Through deeper analysis, we see that **counties with large AI/AN populations tend to have higher MVI scores, indicating a need to prioritize these communities to reduce local disparities and improve adverse outcomes.**

State Spotlight: Minnesota

Although Minnesota's 2025 state-level MVI score places it within the "Very Low" vulnerability group, the risk to mothers is not spread evenly across the state. While 58 of Minnesota's 87 counties (67%) have a "Very Low" MVI score, **Mahnomen County, Minnesota,** ranks among the 10% most vulnerable counties in the United States.

While Mahnomen County is a small, rural county with fewer than 1,000 WRA, its high vulnerability score demonstrates a need for additional resources, particularly for American Indian and Alaska Native (AI/AN) communities, which make up more than 40% of WRA in the county.[35]

A Tale of Two Cities: Kansas City

Using ZIP Code Data to Dive Deeper

Zooming in further still, ZIP code data reveals disparities previously invisible at the county level.

Kansas City is a large metropolitan area, administratively split between two states: Kansas City, Missouri (KCMO) and Kansas City, Kansas (KCK). At the state level, Missouri's population of WRA appears more vulnerable than Kansas', as reflected in their overall MVI scores (68 ["High"] vs. 46 ["Moderate"]).

The story begins to change when we look at the counties where Kansas City is located – Jackson County, MO, and Wyandotte County, KS. Wyandotte County, KS has a higher overall MVI score and higher theme scores for Physical Health, General Healthcare, Socioeconomic Determinants, and Physical Environment (4 of 6 themes) than Jackson County, MO.

Going Deeper

Analyzing the ZIP code tabulation area (ZCTA) data for Kansas City continues to clarify the story.† Figure 7 shows a map of maternal vulnerability by ZCTA in Kansas City, with darker shades indicating higher MVI scores (i.e., greater maternal risk). Across Kansas City's ZCTAs, the average MVI score falls within the "Moderate" vulnerability group, but there is substantial variation within the city and across state lines. In KCK, 58% of ZCTAs have "High" or "Very High" MVI scores, compared to 46% of ZCTAs in KCMO, with visible disparities across ZCTAs.

While KCMO has a significantly larger population (approximately 116,000 WRA compared to 32,000 WRA in KCK),[22] Black and Hispanic/Latina WRA make up a larger share of the population in KCK (57% of WRA compared to 37% of WRA in KCMO[31,32]).

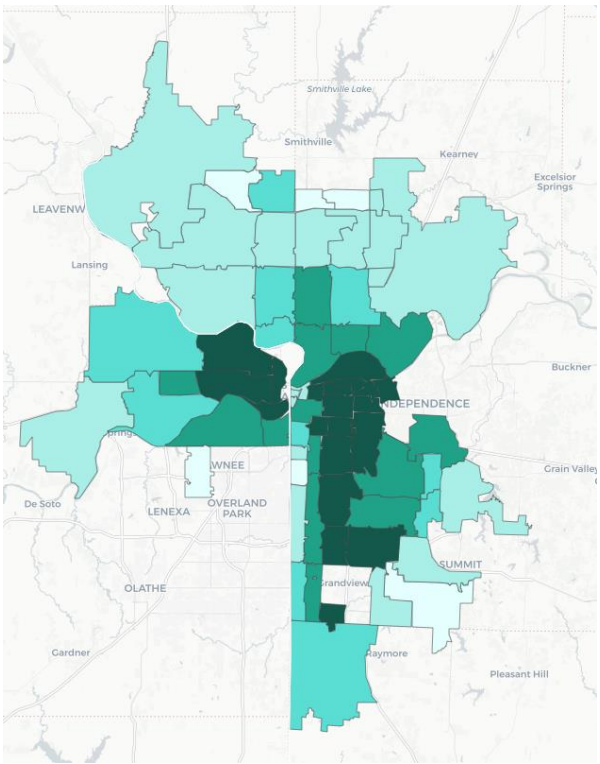


Figure 7. A map of maternal vulnerability by ZCTA, as measured by the Maternal Vulnerability Index.

† Included ZCTAs were based on the Census Bureau's relationship file for places and ZCTAs. The following ZCTAs were included in our analysis: 64012, 64053, 64055, 64064, 64068, 64079, 64081, 64082, 64101, 64102, 64105, 64106, 64108–64114, 64116–64120, 64123–64134, 64136–64139, 64145–64147, 64149–64158, 64161, 64163–64167, 66012, 66101–66106, 66109, 66111, 66112, 66115, 66118, 66160, and 66216.

Figure 8 shows the distribution of ZCTA-level MVI scores, including theme scores. Each dot represents one ZCTA. Compared to KCK, ZCTAs in KCMO have higher average Reproductive Healthcare and Mental Health & Substance Use theme scores, indicating higher vulnerability in these areas. State-level midwifery regulations can shape reproductive healthcare vulnerability by affecting access to care for WRA. While Kansas grants full autonomy, including prescriptive authority and practice independence, **Missouri limits certified nurse-midwives' practice authority**, which can decrease access and increase vulnerability.[36,37]

In KCK, socioeconomic disadvantage is a key driver of vulnerability, and higher uninsured rates, likely exacerbated by the **lack of Medicaid expansion in Kansas**,[26] also contribute to higher vulnerability.

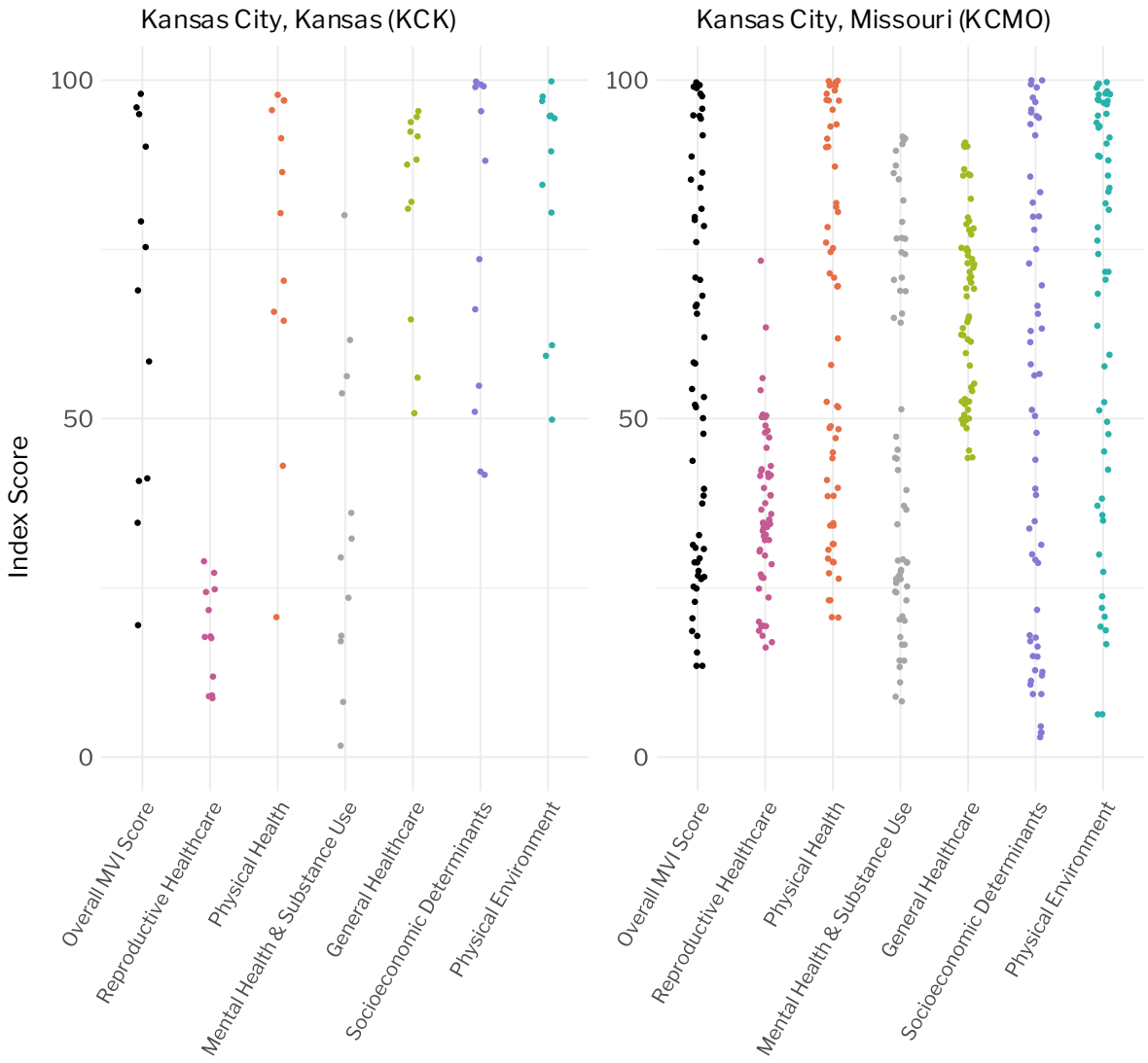
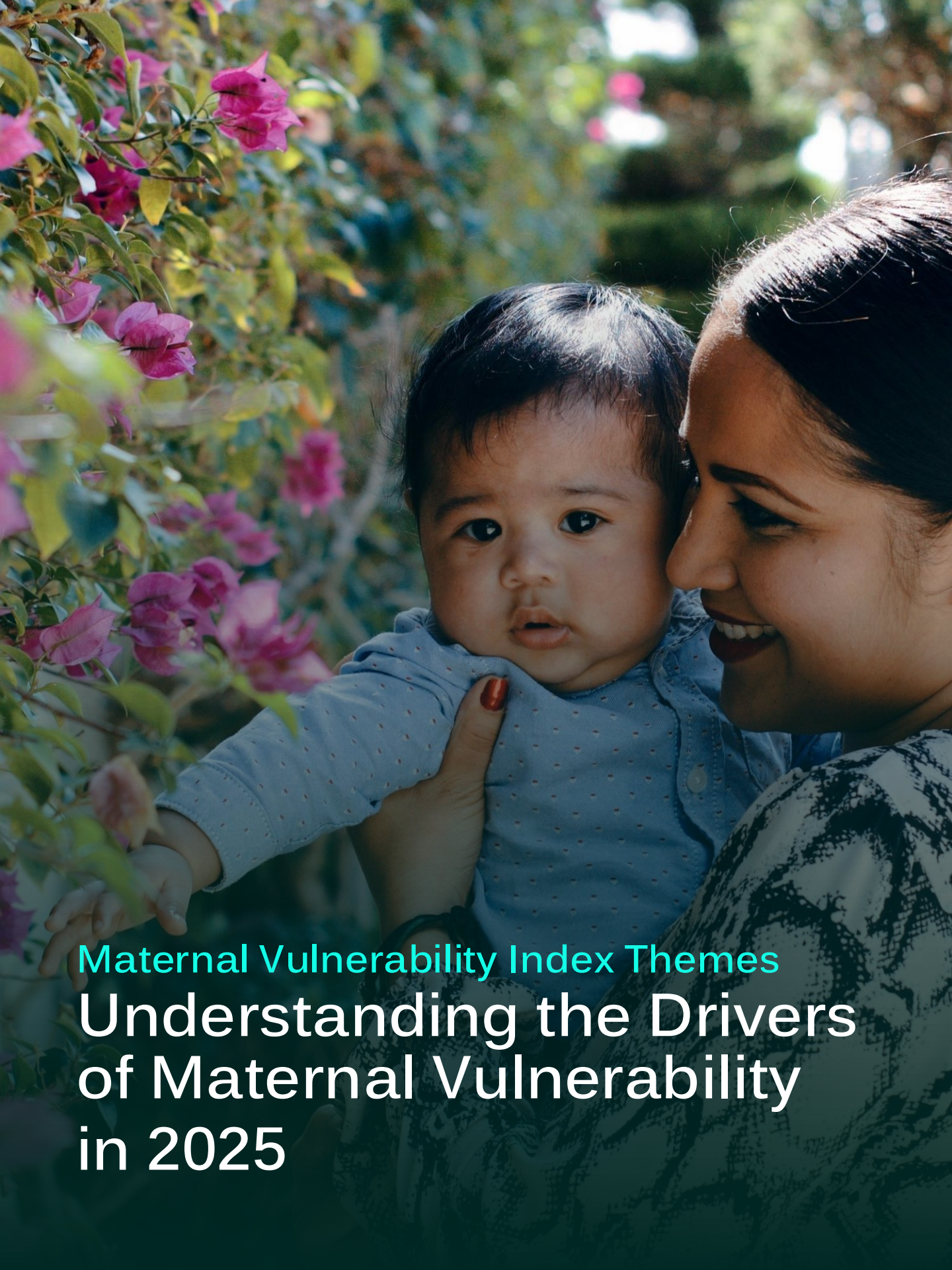


Figure 8. Distribution of ZCTA-level MVI scores for Kansas City, split by state (Kansas City, Kansas, and Kansas City, Missouri).



Maternal Vulnerability Index Themes

Understanding the Drivers of Maternal Vulnerability in 2025

State-Level Thematic Leaders and Laggers

The MVI's themes provide greater insight into the drivers of maternal vulnerability in each geography. **Thematic leaders** (best-ranked states) may serve as models for other geographies, offering lessons in best practices to reduce maternal vulnerability. On the other hand, **thematic laggers** (worst-ranked states) should prompt further investigation into these themes to identify opportunities to improve maternal vulnerability.

Other than New Hampshire, which occupies two leader positions (Themes 5 and 6), no state or state-equivalent appears more than once among the thematic leaders or laggers, showcasing the Index's thematic diversity and a distinct ecosystem of local barriers.

Theme 1: Reproductive Healthcare
Leader: Washington, DC (DC) | Lagger: Texas (TX)
Why? Abortion access and provider density. Four rural L&D units have closed in TX since 2020.[7]

Theme 2: Physical Health
Leader: Vermont (VT) | Lagger: Mississippi (MS)
Why? Burden of chronic diseases, which require public health prevention initiatives and access to care for long-term management. VT's Chronic Care Initiative (VCCI) offers resources and team-based care to Medicaid enrollees.[38]

Theme 3: Mental Health & Substance Use
Leader: Nebraska (NE) | Lagger: Tennessee (TN)
Why? In addition to a significant increase in mental health providers,[39] NE has a unique regional behavioral health system which administers community-based care services.[40]

Theme 4: General Healthcare
Leader: Rhode Island (RI) | Lagger: Wyoming (WY)
Why? Access in a large, rural state is a challenge, further compounded by a lack of insurance coverage. While RI expanded Medicaid, WY has not.[26]

Theme 5: Socioeconomic Determinants
Leader: New Hampshire (NH) | Lagger: New Mexico (NM)
Why? Overlapping disadvantages including low educational attainment, poverty, and historical underinvestment in Native American and Hispanic/Latino communities.[41]

Theme 6: Physical Environment
Leader: New Hampshire (NH) | Lagger: Louisiana (LA)
Why? Low crime rates, clean air, and access to nature and infrastructure support health and well-being in NH.[42]

Limited access to reproductive healthcare is a critical driver of maternal vulnerability in the South and rural communities.

Of the 1.6 million WRA living in counties with "Very High" Reproductive Healthcare scores,[22] nearly 72% identify as White,[43] 11% identify as Black,[31] and 17% identify as Hispanic/Latina.[32] AI/AN women are also disproportionately represented in these high-vulnerability counties,[35] demonstrating persistent gaps in access to reproductive healthcare for these communities.

While WRA in counties with "Very High" reproductive healthcare vulnerability account for only 3% of the total WRA population,[22] they **reflect the challenges rural communities face in accessing critical services**, including prenatal and L&D services.

Example Actions to Improve Reproductive Healthcare

- **End abortion bans and harsh restrictions.** Since *Dobbs v. Jackson* (2022), some states have implemented complete abortion bans or significant restrictions based on gestational age (i.e., six weeks). These laws significantly impact maternal health outcomes.[44]
- **Address workforce shortages.** State policymakers can develop provider incentive programs, including for OB/GYNs, to serve rural and other high-need communities. States can provide full practice authority to certified nurse-midwives and invest in remote monitoring and AI ultrasound to fill provider gaps.

For guidance on how your organization can act on these findings, see page 38.

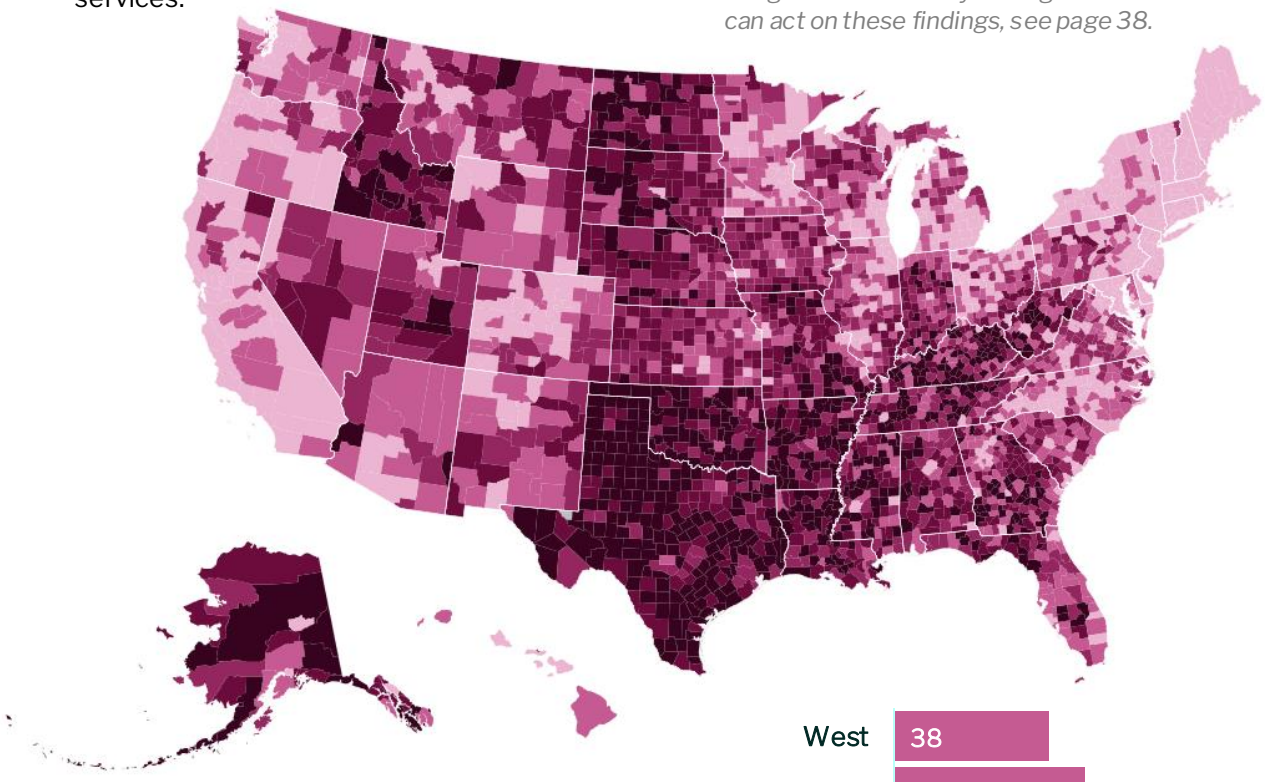


Figure 9. Average reproductive healthcare vulnerability score by region (see **Annex E**); and map of vulnerability due to reproductive healthcare where darker shades correspond to higher theme scores.

Theme 2: Physical Health at the County Level

Physical health challenges and the burden of chronic disease are not evenly distributed across the country.

Of the 6.3 million WRA living in counties with "Very High" scores,[22] over 31% are Black[31] and 2.5% are AI/AN.[35] **Both groups are overrepresented in these counties** and underrepresented in counties with "Very Low" scores, highlighting disparities for these communities.

Physical health status prior to pregnancy is an important determinant of maternal and neonatal outcomes, highlighting the importance of addressing these drivers before pregnancy.[45]

Example Actions to Improve Physical Health

- **Invest in adolescent & preconception health.** State health departments, community organizations, schools, and health systems can invest in preventive care, including health education and nutrition programs before pregnancy to prevent the onset of chronic disease.
- **Address the root causes of poor physical health.** Philanthropy, state governments, community organizations, and health systems can invest in public health programs, such as improving access to healthy foods, access to affordable treatments for health conditions, and building infrastructure to support healthy lifestyles.

For guidance on how your organization can act on these findings, see page 38.

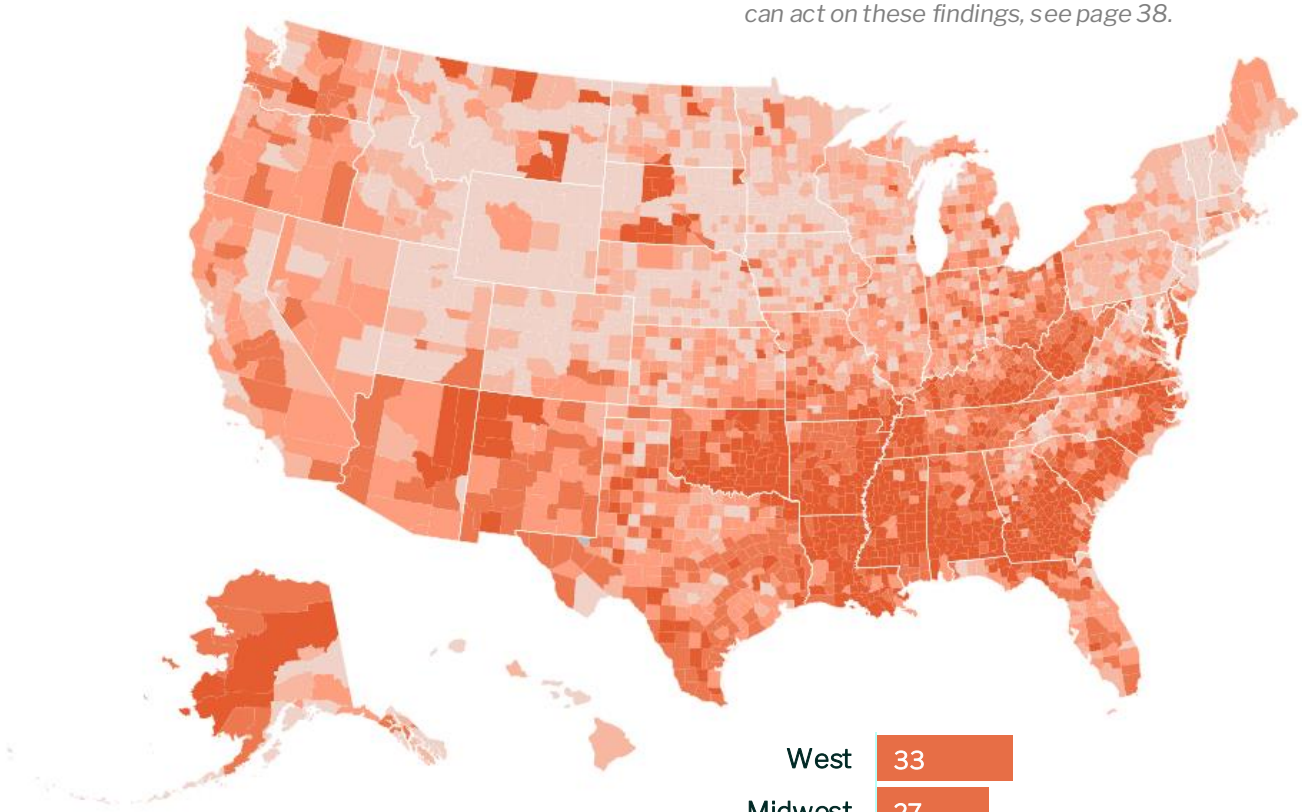


Figure 10. Average physical health vulnerability score by region (see **Annex E**); and map of vulnerability due to physical health where darker shades correspond to higher theme scores.

Theme 3: Mental Health & Substance Use at the County Level

Mental health & substance use challenges are a widespread but often underrecognized driver of maternal vulnerability, disproportionately affecting Black and AI/AN communities.

Over 6.7 million WRA live in counties with "Very High" scores in this theme, while over 7.2 million WRA live in counties with "Very Low" scores.[22] While White WRA are distributed almost evenly in "Very High" and "Very Low" counties for this theme,[43] **2.1 times as many Black WRA and 2.5 times as many AI/AN WRA live in counties with "Very High" scores** than in counties with "Very Low" scores.[31,35]

Example Actions to Improve Mental Health & Substance Use

- **Increase access to mental health and substance use treatment.** States can pursue interstate compacts to address provider shortages and expand telehealth, while payers can improve reimbursement for treatment services and expand provider networks.
- **Invest in supportive community spaces.** Good mental health is supported by strong, trusted relationships. Philanthropy and community-based organizations can invest in building inclusive community spaces that foster social cohesion and connection.

For guidance on how your organization can act on these findings, see page 38.

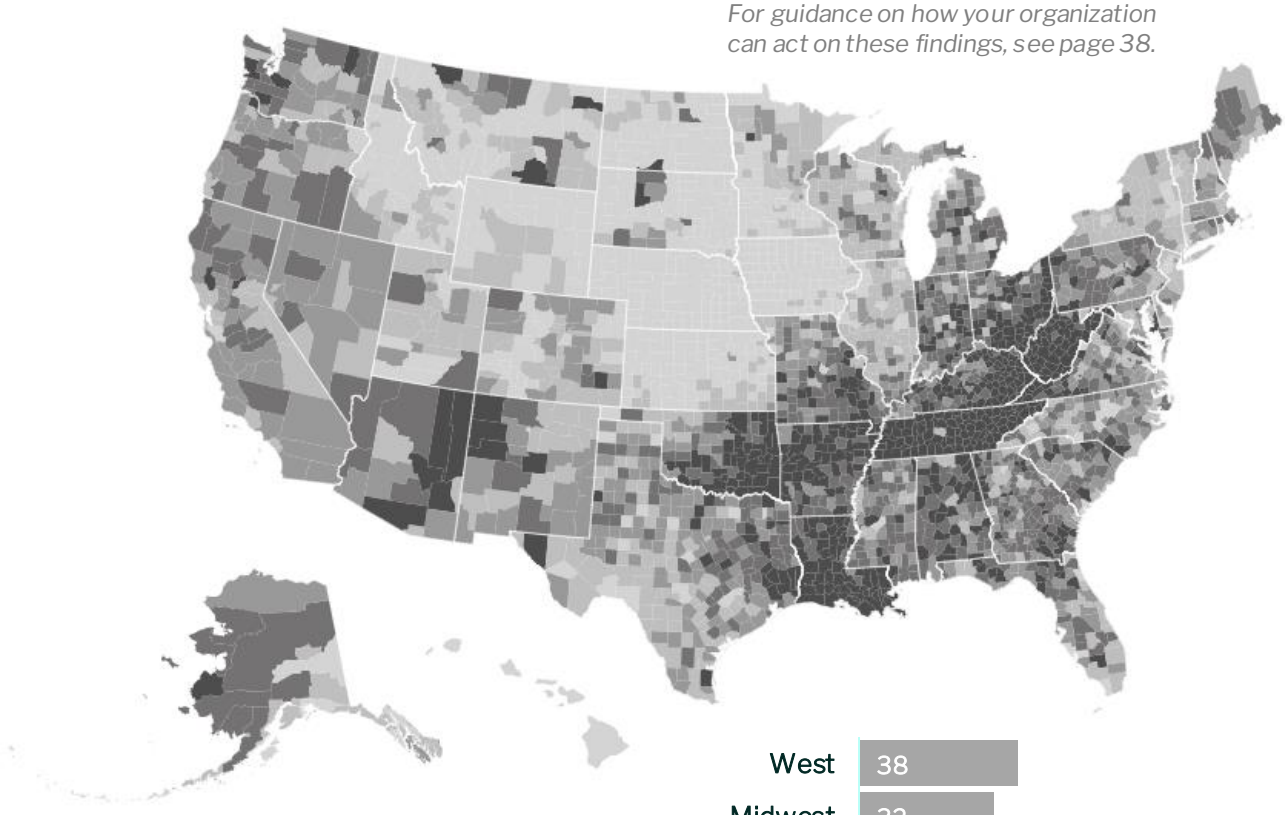


Figure 11. Average mental health & substance use vulnerability score by region (see **Annex E**); and map of vulnerability due to mental health & substance use where darker shades correspond to higher theme scores.

Theme 4: General Healthcare at the County Level

Access to routine healthcare services remains uneven across the United States, with Hispanic/Latina women disproportionately impacted.

While more than 16.8 million WRA live in counties with "Very Low" scores, nearly 9.4 million WRA live in counties with "Very High" scores in this theme.[22] Of the WRA living in counties with "Very High" scores in this theme, 37% identify as Hispanic/Latina,[32] indicating that these women and communities face disproportionate challenges accessing healthcare services.

Example Actions to Improve General Healthcare

- **Support rural hospitals.** State agencies and philanthropy can support the financial health of rural hospitals, including L&D units, to prevent their closure and maintain local access to care.
- **Improve health insurance coverage.** State legislatures can expand Medicaid coverage to include all pregnant women regardless of income or provide affordable insurance options for those who are ineligible.

For guidance on how your organization can act on these findings, see page 38.

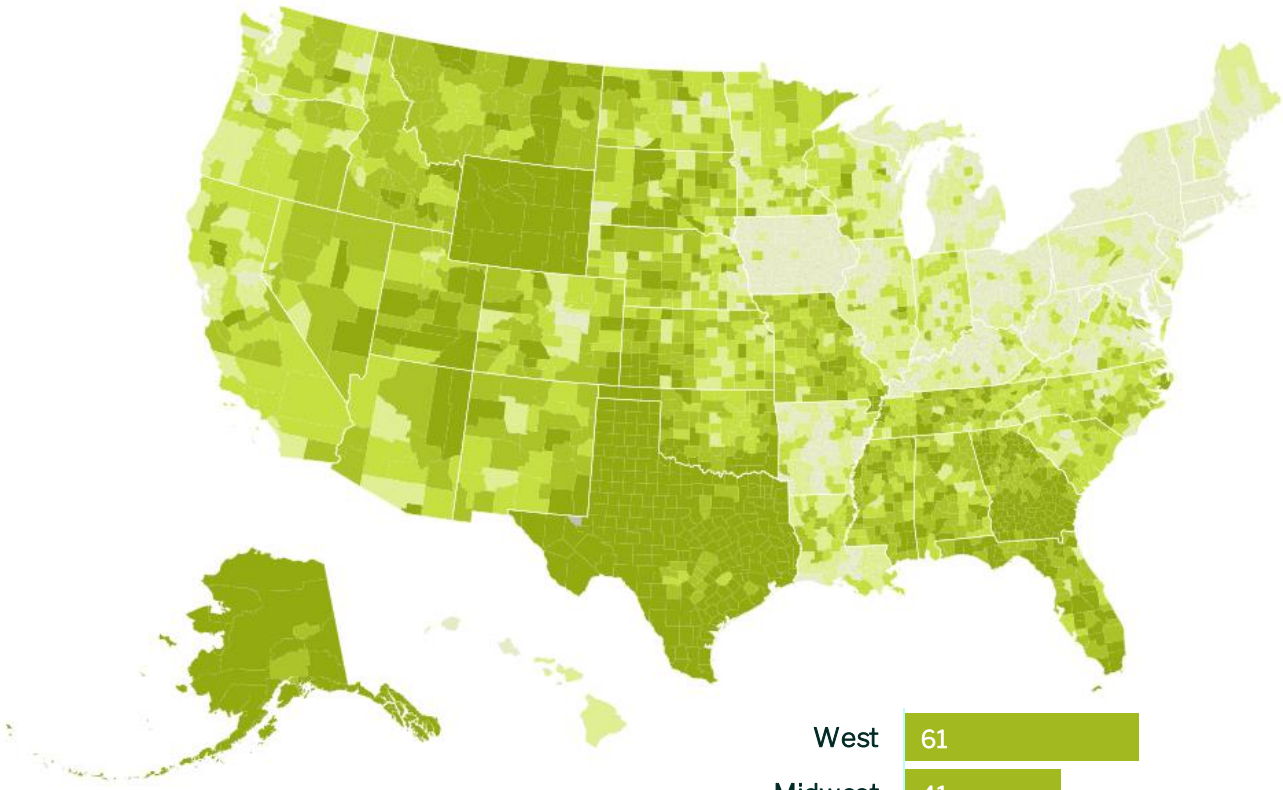


Figure 12. Average general healthcare vulnerability score by region (see **Annex E**); and map of vulnerability due to general healthcare where darker shades correspond to higher theme scores.

Theme 5: Socioeconomic Determinants at the County Level

Socioeconomic disadvantage is a widespread and foundational driver of maternal vulnerability, shaping the conditions that influence health and access to care across communities.

Three times as many WRA live in counties with "Very High" socioeconomic vulnerability (14.5 million) as in counties with "Very Low" scores in this theme (4.8 million).[22]

In counties with *the lowest socioeconomic vulnerability,* over 82% of WRA are White,[43] while less than 7% identify as Hispanic/Latina,[32] approximately 4% identify as Asian,[33] and less than 4% identify as Black,[31] mirroring how structural inequities affect health.

Example Actions to Improve Socioeconomic Determinants

- **Provide financial support during pregnancy (and postpartum).** Philanthropic and government organizations can support cash transfer programs, such as RxKids and the Bridge Project, to support income and basic needs during the perinatal period.
- **Invest in education and employment programs.** State agencies, educational institutions, and private companies can upskill workers to meet the needs of employers through affordable educational and vocational programs, and support job placement.

For guidance on how your organization can act on these findings, see page 38.

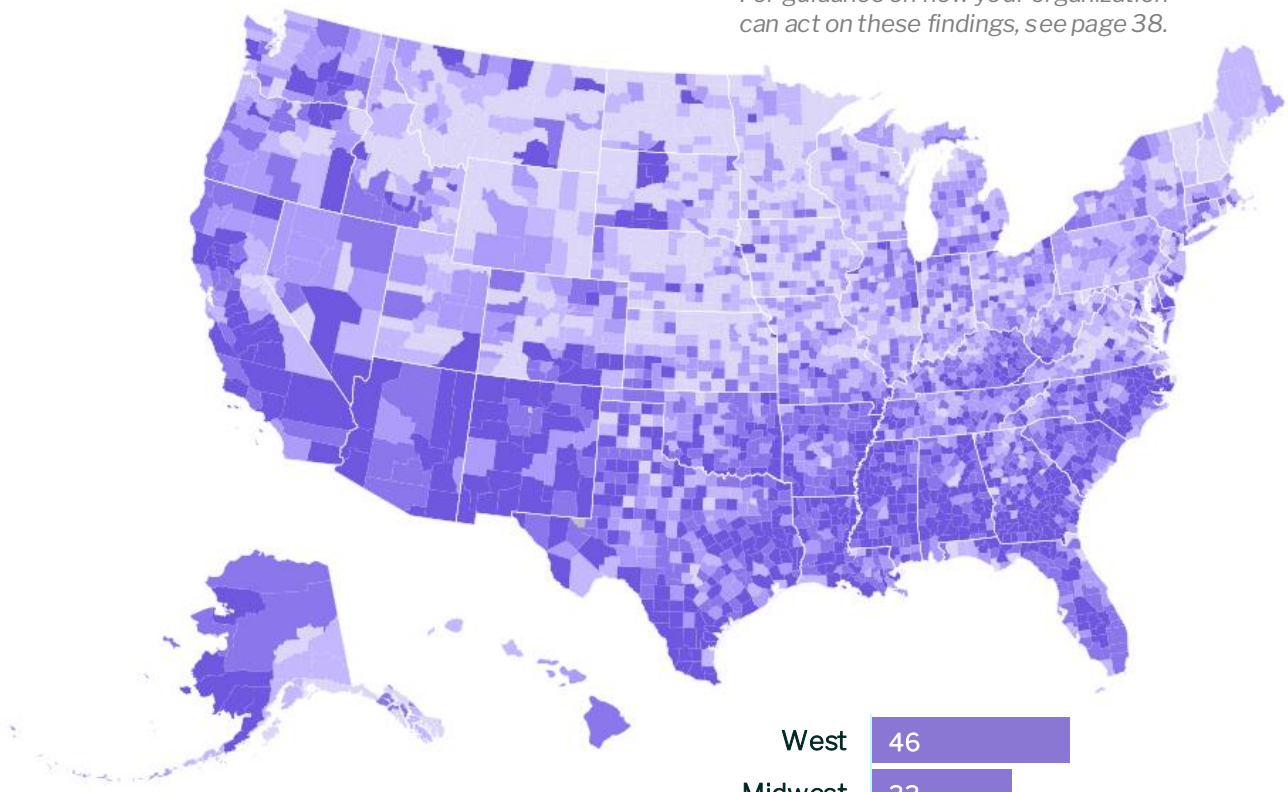


Figure 13. Average socioeconomic determinants vulnerability score by region (see **Annex E**); and map of vulnerability due to socioeconomic determinants where darker shades correspond to higher theme scores.

Theme 6: Physical Environment at the County Level

The physical environment is one of the most widespread drivers of maternal vulnerability, with nearly *one-third of WRA* living in counties with high vulnerability in this theme.

More than 21.7 million (33%) WRA live in counties with "Very High" scores in this theme, while approximately 7.6 million (12%) WRA live in counties with "Very Low" scores,[22] likely reflecting the environmental challenges of dense urban areas.

The built environment, including the neighborhoods where we live, has well-documented impacts on health outcomes.[46,47] Addressing the range of factors in the physical environment that contribute to poor health outcomes is not only critical to improve birth outcomes, but to improve health throughout the life course.

Example Actions to Improve Physical Environment

- **Increase access to safe and affordable housing and transportation.** State agencies can prioritize public investment in affordable housing and expanded transit networks.
- **Reduce pollution and improve air quality.** National and state governments can protect air quality standards and incentivize pollution reduction from corporations.

For guidance on how your organization can act on these findings, see page 38.

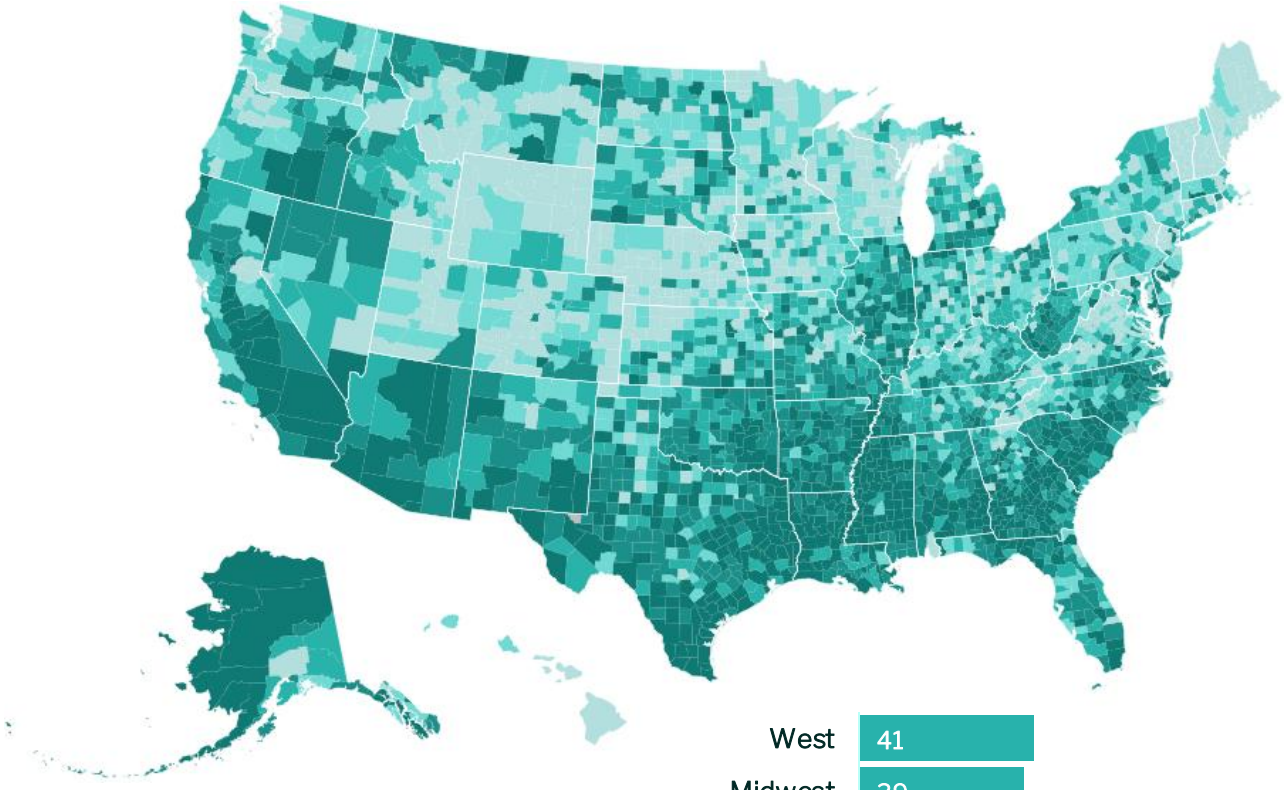


Figure 14. Average physical environment vulnerability score by region (see **Annex E**); and map of vulnerability due to physical environment where darker shades correspond to higher theme scores.

Maternal Vulnerability Index

Examining County Profiles to Understand Risk in Context

Understanding Drivers of Vulnerability at the County Level

The MVI provides a deeper understanding of the unique vulnerability profiles of a given geographic unit (state, county, ZIP code, or census tract) compared to all other geographic units of the same level in the U.S. The examples below present a selection of counties from across the United States and demonstrate the **unique vulnerabilities communities in these counties face.** Counties have been grouped by key features such as region, urbanicity, or demographics.

How to Read County Profiles

1. County Name & State
2. MVI Quintile Score
3. Icons of the county's top 3 drivers of maternal vulnerability
4. Bar chart of county's MVI theme scores
5. Key information about the county & its population

Bronx County has the **highest overall MVI score in New York State**, illustrating how socioeconomic disadvantage drives maternal vulnerability in a dense urban setting and can reinforce physical and mental health challenges.

5

Over 300,000 WRA live in the county,[22] 58% of whom identify as Hispanic/Latina[32] and 35% identify as Black.[31]

Challenges persist despite high rates of insurance coverage: among women ages 19–44, 54% are covered by Medicaid[48] and just 8% are uninsured.[49]

MVI Theme Icon & Color Key

Reproductive Healthcare

Physical Health

Mental Health & Substance Use

General Healthcare

Socioeconomic Determinants

Physical Environment

County Insights: Indigenous Communities

Counties with large AI/AN communities face **compounding structural challenges,** including limited healthcare access, socioeconomic disadvantage, and gaps in insurance coverage, that drive maternal risk even where policies aim to expand care.

Adair County, Oklahoma

"Very High" MVI Score

With the **highest overall MVI score in Oklahoma**, Adair illustrates how structural barriers to care and socioeconomic disadvantage drive maternal vulnerability for AI/AN communities.

- **More than 3,500** WRA live in Adair,[22] 45% of whom identify as AI/AN.[35]
- **Identified as a county with low access to care**[37] and one rural hospital at risk of closure in 2026.[30]
- **Insurance gaps** exacerbate risk: among women ages 19–44, 29% are uninsured.[49]

Big Horn County, Montana

"Very High" MVI Score

With the **highest overall MVI score in Montana**, Big Horn illustrates how structural barriers to care drive maternal vulnerability for Native American communities.

- **Over 2,400** WRA live in Big Horn,[22] with over 70% of WRA identifying as AI/AN[35] and much of the county lies within the Crow Reservation.
- **Experiences low access to care**,[37] with one rural hospital at risk of closure in 2026.[30]
- **Insurance gaps** exacerbate risk: 47% of women ages 19–44 have public insurance[50] and nearly 30% are uninsured.[49]

McKinley County, New Mexico

"Very High" MVI Score

With some of the **highest theme scores in New Mexico**, McKinley demonstrates how maternal vulnerability persists due to structural challenges, despite policies that expand access to care in New Mexico.

- **Nearly 15,000** WRA live in McKinley[22] with over 80% of WRA identifying as AI/AN.[35]
- **Statewide policies** granting midwives full practice authority[36] likely contribute to a lower Reproductive Healthcare theme score, but access to healthcare is still fragile with one rural hospital at risk of closure in 2026.[30]
- **Insurance gaps** reflect systemic barriers: among women ages 19–44, 64% are covered by Medicaid[48] and 20% are uninsured.[49]

MVI Theme Icon & Color Key

County Insights: The Rural South

Reproductive healthcare access is a core driver of vulnerability in these counties, despite varied access to general healthcare and insurance coverage.

Crawford County, Arkansas

"High" MVI Score

While other Arkansas counties have higher overall MVI scores, Crawford County illustrates a rural archetype†, where vulnerability is driven **by gaps in reproductive healthcare and mental health services** despite low vulnerability in the General Healthcare theme.

> Counties with this archetype have **a need for specialized reproductive and mental healthcare services.**
>
> **Insurance gaps** limit access: among women ages 19–44, 28% are covered by public health insurance[50] and 13% are uninsured.[49]
>
> **With forthcoming changes to Medicaid**, increases in the uninsured population could exacerbate maternal vulnerability.

East Carroll Parish, Louisiana

"Very High" MVI Score

East Carroll Parish has the **highest Physical Health theme score in Louisiana**. The March of Dimes identified East Carroll Parish as a **maternity care desert** in 2024.[37]

> **1,100** WRA live in this small, rural parish.[22]
>
> **Facing additional strains** to access to care with one hospital at risk of closure in 2026 due to Medicaid cuts.[30]
>
> **Public insurance** is critical to maternal health in this region: among women ages 19–44, 68% are covered by public health insurance.[50]

Starr County, Texas

"Very High" MVI Score

Starr County, a rural border community with the **nation's highest Socioeconomic Determinants score,** illustrates how extreme socioeconomic disadvantage and significant lack of healthcare access combine to drive acute maternal risk.

> **42% of women aged 19–44 are uninsured** — more than 4 in 10,[49] and just 18% are covered by public health insurance.[50] Forthcoming changes to Medicaid eligibility could push maternal vulnerability still higher.
>
> While over **13,000** WRA live in Starr,[22] **access to care** is limited[37] and geography further limits access to alternatives.

MVI Theme Icon & Color Key

† Other Arkansas counties with this archetype include Cleburne, Franklin, Hot Spring, Izard, Lonoke, Madison, Marion, Montgomery, Perry, Pike, and Prairie counties.

County Insights: Urban Environments

While reproductive healthcare access is a *relative strength* in these urban areas, maternal risk persists. Driven by socioeconomic disadvantage, environmental challenges, and poor mental and physical health, maternal risk disproportionately falls on Black women in these urban settings.

Philadelphia County, Pennsylvania

"High" MVI Score

Philadelphia has the **highest overall MVI score in Pennsylvania**, driven primarily by socioeconomic disadvantage, mental health challenges, and physical health, reflecting how these drivers impact one another in dense urban settings.

> **More than 370,000** WRA live in this large metropolitan city.[22]
>
> **Medicaid is essential for access to care**, 24% of women ages 19–44 are covered by Medicaid,[48] and 8% are uninsured.[49]

Shelby County, Tennessee

"Very High" MVI Score

Shelby County, which includes Memphis, demonstrates how **overlapping environmental and health challenges** compound racial inequity to drive maternal vulnerability in urban settings.

> **Over 190,000** WRA live in Shelby,[22] 57% of whom identify as Black.[31]
>
> **Access to care** is constrained by coverage gaps: 16% of women ages 19–44 are uninsured,[49] limiting their ability to manage the physical and mental health conditions that drive vulnerability in Shelby.

Wayne County, Michigan

"High" MVI Score

Wayne County, which includes Detroit, has Michigan's **highest overall MVI score** and the state's highest **Mental Health & Substance Use, Socioeconomic Determinants,** and **Physical Environment** theme scores, illustrating how maternal vulnerability manifests for low-income residents even where reproductive and general healthcare are relative strengths.

> **More than 350,000 WRA** live in Wayne County, nearly 40% of whom identify as Black.[22,31]
>
> **Reliance on public insurance is high:** Nearly 38% of women ages 19–44 are covered by Medicaid,[48] making Wayne County particularly exposed to coverage losses projected under OBBBA eligibility changes.

MVI Theme Icon & Color Key

County Insights: Western U.S.

In these Western counties, socioeconomic determinants intersect with environmental factors, including geography, to drive maternal vulnerability – a pattern that persists from rural Idaho to California's Central Valley.

Jerome County, Idaho

"High" MVI Score

Jerome County illustrates how agricultural communities with large **Hispanic/Latino populations face multiple structural barriers**, such as socioeconomic disadvantage, environmental burdens, and insurance gaps that drive maternal vulnerability despite Idaho's "Moderate" overall MVI score.

> **More than 4,700 WRA** live in Jerome,[22] 43% of whom identify as Hispanic/Latina;[32] these communities are disproportionately affected by structural barriers.
>
> **Insurance gaps are significant:** 26% of women ages 19–44 are uninsured,[49] while 24% are covered by public health insurance.[50]
>
> **Local health infrastructure is at risk,** with one rural hospital at risk of closure in 2026.[30]

Kern County, California

"Very High" MVI Score

Kern County closely reflects California's state-level pattern of vulnerability, with Physical Environment and Socioeconomic Determinants as key drivers. Yet the **pregnancy-related mortality ratio** in Kern County is higher than California's average.[51]

> **Approximately 187,000 WRA** live in the Bakersfield metropolitan area, 60% of whom identify as Hispanic/Latina.[22,32]
>
> **Despite relatively strong insurance coverage** compared to other high-vulnerability geographies, with 44% of women ages 19–44 covered by public health insurance,[50] and only 9% uninsured, maternal mortality remains elevated.[49]

Together, Jerome and Kern counties illustrate that vulnerability in the Western U.S. is not uniform in its causes but consistent in its consequences: socioeconomic disadvantage and environmental burdens produce maternal risk that state-level data obscures and that insurance coverage alone cannot resolve.

MVI Theme Icon & Color Key

Partner Spotlight: Powering Quality Improvement in Washington State Hospitals

Surgo Health partnered with OB-COAP to identify opportunities for quality improvement programming in member hospitals.

- Combined clinical data with the MVI to generate vulnerability profiles for member hospitals.
- OB-COAP identified that patients with high vulnerability were more likely to enter prenatal care late, offering a clear opportunity to improve services and reduce risk.
- Hospital-level vulnerability profiles enabled the identification of targeted interventions to improve maternal health outcomes based on the specific needs of patients.
- Beyond county-level data, the MVI enables better understanding of communities by going deeper – down to the ZIP code and census tract, enabling precision intervention design.

Actions to Address Maternal Vulnerability in Your Community

For targeted recommendations specific to the thematic drivers of maternal vulnerability in your community, see pages 25–30.

GOVERNMENT

ENACT: Federally, maintain funding for key programs (e.g., Title V Block Grants, Healthy Start, and MMRCs), including data infrastructure. At state and local levels, as jurisdiction allows, expand Medicaid coverage, midwifery practice authority, birth centers, and telehealth options, address housing and transportation barriers, and invest in community-based care and postpartum support. At all levels, provide training and scholarship funding to build a diverse maternal health workforce.

HEALTH SYSTEMS

PRIORITIZE: Expand obstetric & midwifery services, particularly in communities with high need, and develop patient support programs (e.g., transportation services, doula care, remote monitoring) that address key drivers of vulnerability for your patient populations. Integrate perinatal mental health screenings and ensure strong referral systems are in place.

PARTNER: Collaborate with community-based organizations and birth worker networks to expand care beyond clinical settings and reach patients with greater need.

PHILANTHROPY

INVEST: Support evidence-based and innovative approaches to address the drivers of poor maternal health.

PRIORITIZE: Focus philanthropic efforts on geographies and communities of highest need.

POLICYMAKERS & ADVOCATES

ADVOCATE: Support priority policies that improve insurance coverage, address workforce shortages, expand paid leave, and invest in supportive programs such as transportation, nutrition assistance, and cash transfers for the perinatal period.

PARTNER: Engage with affected communities to ensure advocacy efforts include lived experience and community voice.

PROGRAM IMPLEMENTERS

PRIORITIZE: Direct resources to communities with the greatest need and prioritize funding and interventions based on the local drivers of vulnerability.

PARTNER: Build relationships with health systems, government agencies, and community organizations to align resources and address the holistic needs of women and families.

Conclusion

The 2025 MVI data make clear that the maternal health crisis in the United States is neither inevitable nor intractable. The patterns are predictable, the geographies are identifiable, and the drivers are addressable—but only if stakeholders act with urgency and specificity.

The 2025 MVI reveals how policy change can compound risk in communities already facing high vulnerability. States with the highest vulnerability are disproportionately represented by non-expansion states; rural hospitals and L&D units are closing in the places that can least afford to lose them; and the projected loss of Medicaid coverage for more than 6 million people threatens to widen disparities that are already severe. At the same time, state-level rankings can obscure urgent local needs, including counties with large American Indian and Alaska Native communities that face some of the highest scores in the nation.

As highlighted throughout the report, Black, AI/AN, and Hispanic/Latina WRA are more concentrated in many high-vulnerability geographies. This is not coincidental but rather the effect of compounding structural inequities, including income, access to care, insurance coverage, and environmental conditions that shape maternal health long before pregnancy, delivery, or the postpartum period.

Multiple drivers of maternal vulnerability require multiple solutions. While socioeconomic determinants drive vulnerability in many geographies, access to care, mental and physical health status, and urban/rural context also play distinct roles across communities. Effective interventions, including policy solutions, must therefore match local needs and conditions rather than be applied uniformly.

The MVI provides a roadmap for targeted, equitable action. By focusing on the communities where maternal vulnerability is greatest and addressing its root causes with urgency, stakeholders can meaningfully improve maternal health outcomes, reduce inequities across communities, and support thriving families.

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Annex A: Summary of the Evidence

Research consistently shows that higher Maternal Vulnerability Index (MVI) scores are associated with increased risk of maternal mortality, severe maternal morbidity, preterm birth, low birthweight, stillbirth, and infant death, even after adjusting for individual-level factors. Several studies document dose-response relationships, meaning that risk increases incrementally as MVI scores rise, not only at the extremes. The Mental Health and Substance Use, Physical Health, and Socioeconomic Determinants themes are the most consistent drivers across outcomes. These findings underscore that where a person lives shapes their health outcomes in measurable, preventable ways. The MVI identifies the communities that need support most and provides an actionable framework for directing resources, policy, and clinical interventions accordingly.

Outcome	Finding
Maternal mortality (Valerio et al., 2023)[10]	In an ecological study of 13 million live births and 3,633 maternal deaths (2014–2018), residing in the highest MVI quartile county was associated with 43% higher odds of maternal mortality compared to the lowest quartile (adjusted odds ratio [aOR] 1.43, 95% CI 1.20–1.71), after adjusting for maternal age, educational attainment, and race/ethnicity.
Severe maternal morbidity (SMM) (Boghossian et al., 2025)[11]	In a retrospective cohort of 6,543,255 deliveries across five states (2008–2020), a dose-response association was observed between MVI quartile and severe maternal morbidity (SMM) within 42 days of delivery: quartile 2 adjusted relative risk [aRR] 1.03 (95% CI 0.95–1.11), quartile 3 aRR 1.12 (95% CI 1.03–1.23), quartile 4 aRR 1.27 (95% CI 1.14–1.41). No association was observed for SMM during the delivery hospitalization. Residing in the highest quartile for the General Healthcare (aRR 1.27, 95% CI 1.14–1.43), Physical Environment (aRR 1.33, 95% CI 1.22–1.46), Physical Health (aRR 1.23, 95% CI 1.12–1.35), Reproductive Healthcare (aRR 1.30, 95% CI 1.15–1.47), and Socioeconomic Determinants (aRR 1.19, 95% CI 1.02–1.39) themes were each independently associated with increased postpartum SMM risk.
Infant mortality (Murosko, 2025)[12]	In a national retrospective cohort of 11,456,232 singleton infants born at 22–44 weeks gestation (2012–2014), each 20-point increment in MVI score was associated with 6% higher odds of infant death (aOR 1.06, 95% CI 1.04–1.07), after adjusting for state, maternal, and infant covariates. Among MVI themes, the Mental Health and Substance Use theme showed the largest effect estimate (aOR 1.08, 95% CI 1.06–1.09).
Preterm birth (Valerio et al., 2023; Salazar et al., 2023)[10,13]	In a national cohort of 3,659,099 births (2018), residing in the highest MVI quintile county was associated with increased odds of preterm birth (PTB) in unadjusted (OR 1.50, 95% CI 1.45–1.56) and adjusted (OR 1.07, 95% CI 1.01–1.13) analyses. The association was strongest for extreme PTB (aOR 1.18, 95% CI 1.07–1.29). In adjusted models, the Physical Health, Mental Health and Substance Use, and General Healthcare themes remained independently associated with PTB overall; Physical Health and Socioeconomic Determinants themes were associated with extreme PTB specifically.[13] Separately, residing in the highest MVI quartile county was associated with 41% higher odds of PTB compared to the lowest quartile (aOR 1.41, 95% CI 1.39–1.43), adjusted for maternal age, educational attainment, and race/ethnicity.[10]
Low birthweight (Valerio et al., 2023) [10]	Residing in the highest MVI quartile county was associated with 39% higher odds of low birthweight compared to the lowest quartile (aOR 1.39, 95% CI 1.37–1.41), after adjusting for maternal age, educational attainment, and race/ethnicity.
Stillbirth (Kawakita et al., 2026)[14]	In a retrospective cohort study of deliveries at a five-hospital system (2012–2022), MVI quartiles 2 and 3 were associated with increased stillbirth risk compared to quartile 1 (relative risk [RR] 1.46, 95% CI 1.03–2.07 and RR 1.86, 95% CI 1.32–2.63, respectively), after adjusting for maternal age, BMI, parity, marital status, chronic hypertension, and pregestational diabetes. Among MVI themes, the Mental Health and Substance Use theme showed the strongest association with stillbirth across quartiles 2 through 4 (RR range 1.64–2.07). Overall MVI associations with stillbirth were characterized as modest; neighborhood deprivation (Area Deprivation Index) was a stronger independent predictor in this study.

Annex B: Methodology Summary

Overview & Conceptual Framework

The Maternal Vulnerability Index (MVI) is a composite, place-based index designed to quantify and compare upstream factors associated with vulnerability to poor maternal health outcomes across the United States. The MVI covers the 50 U.S. states and the District of Columbia, assigning a relative vulnerability score (0–100) to geographic units, where higher scores indicate greater vulnerability relative to other geographic units of the same level (for example, counties are compared with other counties).

The MVI was developed on the premise that maternal health outcomes are shaped by multiple systemic, structural, and community-level factors, rather than individual clinical risk alone. The framework draws on ecological frameworks, health equity principles, and the WHO's Social Determinants of Health framework. A multidisciplinary team at Surgo Health, including experts in epidemiology, public health, maternal health, and data science, developed the MVI in consultation with external subject-matter experts, including former CDC leaders.

Index Structure & Construction

The MVI consists of six thematic domains (themes) capturing key drivers of maternal outcomes:

1. Reproductive Healthcare
2. Physical Health
3. Mental Health & Substance Use
4. General Healthcare
5. Socioeconomic Determinants
6. Physical Environment

The index is calculated using an iterative percentile-ranking approach:

- Each indicator is assigned a direction (positive or negative association with vulnerability) and percentile-ranked (i.e., scored) across geographies.
- Indicator scores are aggregated into themes and re-ranked.
- Theme scores are combined and re-ranked to produce an overall MVI score (0–100).

This approach ensures comparability across geographies while preserving relative differences in vulnerability. A single weighting scheme is applied nationally for consistency, although the relative importance of themes may vary by geography.

Limitations

Several limitations should be considered:

- The MVI relies on nationally available datasets and may not capture all local drivers of maternal health.

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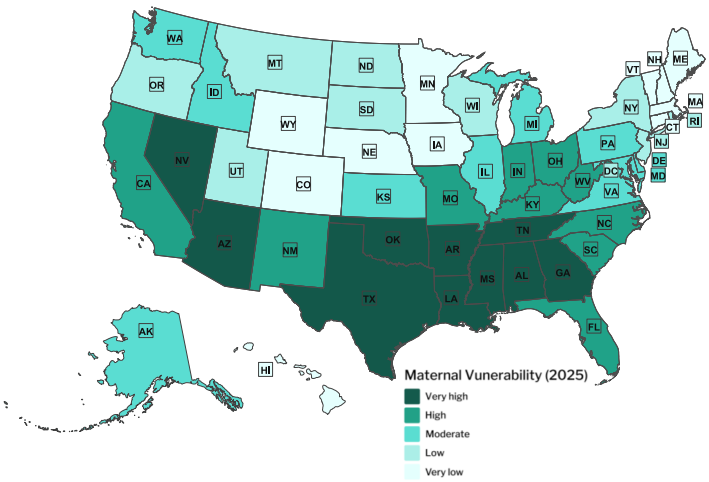
Limitations (cont.)

- While some state-level policies are included in the MVI, other state-specific policies and programs may not be fully reflected.
- A single weighting scheme is applied across all geographies, which may not reflect local variation in drivers.
- Geographic aggregation (e.g., county-level) may mask within-area inequities.
- The ranking methodology used by the MVI produces, by design, a snapshot in time; due to this choice, Surgo Health does not recommend comparing the MVI across years. A score change in one geography over time may reflect changes in other geographies rather than a true local change.

Annex C: 2025 MVI State Ranking

The list below is the full 2025 state-level rankings from highest to lowest MVI score (i.e., most vulnerable to least vulnerable), including Washington, DC.

Very High	1. Louisiana 2. Texas 3. Mississippi 4. Alabama 5. Nevada 6. Oklahoma 7. Tennessee 8. Georgia 9. Arkansas 10. Arizona 11. Florida
High	12. South Carolina 13. New Mexico 14. West Virginia 15. Indiana 16. Kentucky 17. Missouri 18. California 19. Ohio 20. North Carolina 21. Alaska
Moderate	22. Illinois 23. Delaware 24. Michigan 25. Pennsylvania 26. Maryland 27. Virginia 28. Kansas 29. Washington 30. Idaho 31. Oregon
Low	32. Wisconsin 33. South Dakota 34. Utah 35. District of Columbia 36. Rhode Island 37. North Dakota 38. New York 39. Montana 40. New Jersey 41. Connecticut
Very Low	42. Wyoming 43. Nebraska 44. Iowa 45. Colorado 46. Massachusetts 47. Hawaii 48. Minnesota 49. Maine 50. New Hampshire 51. Vermont



Annex D: Highest and Lowest County MVI Scores by State

The table below lists the counties (or their geographic equivalents) with the highest and lowest MVI scores within each state. The table is alphabetized by state, and the vulnerability group (quintile) is in parentheses.

	County or County-Equivalent Name	
State	**Highest MVI Score**	**Lowest MVI Score**
Alabama	Barbour (Very High)	Shelby (Low)
Alaska	Kusilvak Census Area (Very High)	Sitka City and Borough (Very Low)
Arizona	Navajo (Very High)	Yavapai (Low)
Arkansas	Lee (Very High)	Benton (Low)
California	Madera (Very High)	Placer (Very Low)
Colorado	Bent (High)	Douglas (Very Low)
Connecticut	Greater Bridgeport Planning Region (Low)	Lower Connecticut River Valley Planning Region (Very Low)
Delaware	Kent (Moderate)	Sussex (Low)
Florida	DeSoto (Very High)	St. Johns (Very Low)
Georgia	Atkinson (Very High)	Oconee (Very Low)
Hawaii	Hawaii (Very Low)	Kalawao (Very Low)
Idaho	Jerome (High)	Ada (Very Low)
Illinois	Alexander (High)	Clinton (Very Low)
Indiana	Crawford (Very High)	Hamilton (Very Low)
Iowa	Crawford (Moderate)	Winneshiek (Very Low)
Kansas	Wyandotte (High)	Johnson (Very Low)
Kentucky	Wolfe (Very High)	Oldham (Very Low)
Louisiana	Avoyelles Parish (Very High)	West Feliciana Parish (Moderate)
Maine	Washington (Low)	Lincoln (Very Low)
Maryland	Somerset (High)	Carroll (Very Low)
Massachusetts	Hampden (Moderate)	Norfolk (Very Low)
Michigan	Wayne (High)	Emmet (Very Low)
Minnesota	Mahnomen (Very High)	Carver (Very Low)
Mississippi	Tunica (Very High)	Madison (Low)
Missouri	Pemiscot (Very High)	St. Charles (Very Low)
Montana	Big Horn (Very High)	Jefferson (Very Low)
Nebraska	Thurston (High)	Washington (Very Low)

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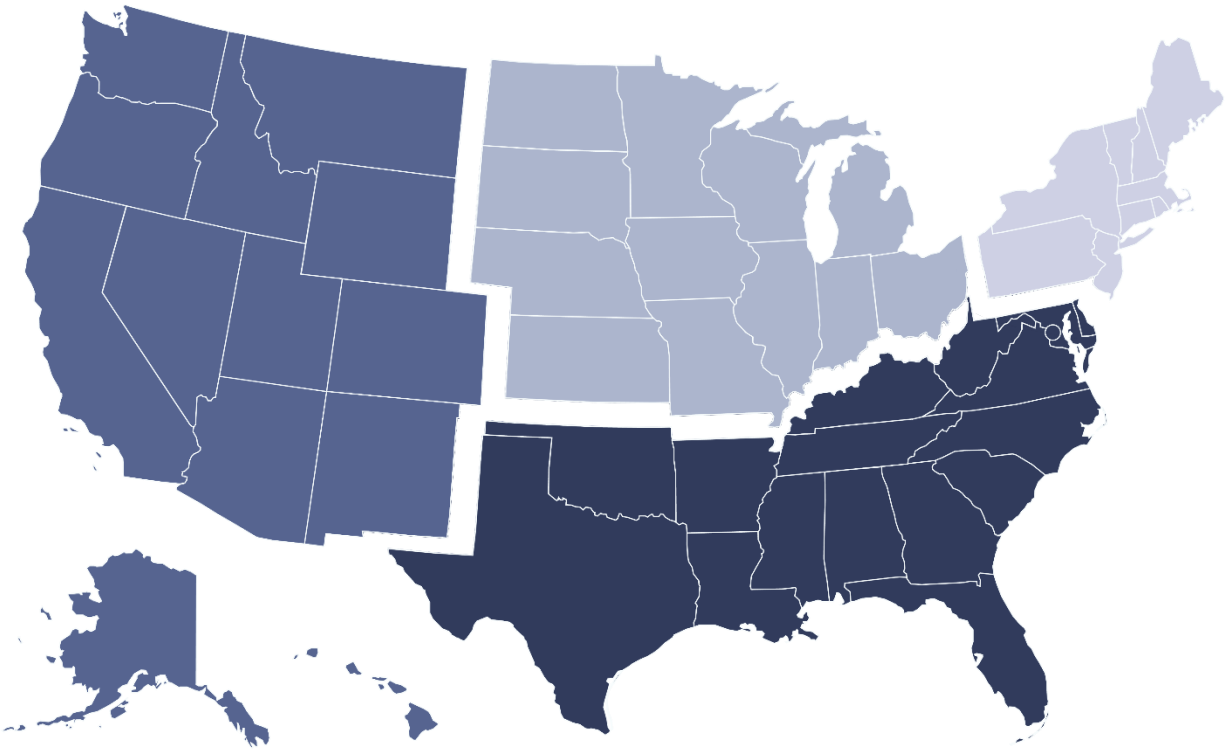
Annex D (continued)

State	County or County-Equivalent Name	
	Highest MVI Score	Lowest MVI Score
Nevada	Clark (High)	Douglas (Very Low)
New Hampshire	Coos (Low)	Rockingham (Very Low)
New Jersey	Cumberland (High)	Hunterdon (Very Low)
New Mexico	McKinley (Very High)	Los Alamos (Very Low)
New York	Bronx (High)	Saratoga (Very Low)
North Carolina	Robeson (Very High)	Dare (Very Low)
North Dakota	Sioux (Very High)	Steele (Very Low)
Ohio	Ashtabula (High)	Delaware (Very Low)
Oklahoma	Adair (Very High)	Alfalfa (Moderate)
Oregon	Malheur (High)	Clackamas (Very Low)
Pennsylvania	Philadelphia (High)	Chester (Very Low)
Rhode Island	Providence (Low)	Bristol (Very Low)
South Carolina	Allendale (Very High)	Beaufort (Low)
South Dakota	Oglala Lakota (Very High)	Union (Very Low)
Tennessee	Lake (Very High)	Williamson (Very Low)
Texas	Newton (Very High)	Borden (Very Low)
Utah	San Juan (Very High)	Summit (Very Low)
Vermont	Essex (Low)	Grand Isle (Very Low)
Virginia	Hopewell City (Very High)	Falls Church City (Very Low)
Washington	Adams (High)	San Juan (Very Low)
West Virginia	Clay (Very High)	Putnam (Low)
Wisconsin	Menominee (Very High)	Ozaukee (Very Low)
Wyoming	Fremont (Moderate)	Teton (Very Low)

Annex E: U.S. States by Region

The regions below are aligned with the U.S. Census Bureau's Regions.[52]



West

Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

Midwest

Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin

South

Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia

Northeast

Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont

Revealing the why. Accelerating the how.

Surgo Health is a Public Benefit Corporation building the world's most comprehensive and insightful AI-powered data platform to reveal the why behind people's behaviors. We uncover the unseen drivers of health—people's beliefs, barriers, and behaviors—and transform that intelligence into scalable products that enable healthcare organizations to drive impact, reduce costs, and advance inclusion. Grounded in a strong scientific and academic foundation, we approach our data with rigor, integrity, and precision—ensuring insights that are both credible and actionable. Our multidisciplinary team of behavioral scientists, data scientists, technologists, and health experts is dedicated to revealing the human side of healthcare and making it more personal, precise, and effective for everyone.

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