Evaluation of the Rural Maternity and Obstetrics Management Strategies Program: First Annual Report

April 2021

HRSA
Health Resources & Services Administration

The Evaluation of the Rural Maternity and Obstetrics Management Strategies Program: First Annual Report was produced for the U.S. Department of Health and Human Services (HHS), Health Resources and Services Administration (HRSA), Federal Office of Rural Health Policy (FORHP) under contract number 5R60219D00016 to Mission Analytics Group, Inc.

This publication lists non-federal resources in order to provide additional information to consumers. The views and content in these resources have not been formally approved by HHS or HRSA. Reference in this document to any specific resources, tools, products, process, service, manufacturer or company does not constitute its endorsement or recommendation by the U.S. government, including the Department of Health and Human Services (HHS).

Suggested citation: U.S. Department of Health and Human Services, Health Resources and Services Administration, Federal Office of Rural Health Policy, *Evaluation of the Rural Maternity and Obstetrics Management Strategies Program: First Annual Report*. Rockville, Maryland: U.S. Department of Health and Human Services, 2021.

Table of Contents

Report Tables ii
Report Figures iv
Executive Summary v
A. The RMOMS Service Areas, Networks, and Services v
B. Lessons Learned during the Planning Year x
C. Next Steps for the Evaluation xi
I. Introduction 1
A. Understanding the Rural Maternal Health Landscape 1
B. The RMOMS Program and Evaluation 3
C. Roadmap to this Report 5
II. Data Sources 6
A. Quantitative Awardee Data: PIMS and Patient-Level Data 6
B. Awardee Qualitative Data 8
C. Secondary Data 9
III. Bootheel Perinatal Network—Missouri 11
A. About the Area 11
B. State and Regional Maternal Health Landscape 13
C. BPN Network Characteristics 16
D. Description of Maternal/Clinical Population 23
E. Sustainability 26
IV. Rural Obstetric and Maternal Services Program—New Mexico 27
A. About the Area 27
B. State and Regional Maternal Health Landscape 28
C. ROAMS Network Characteristics 32
D. Description of Maternal/Clinical Population 42
E. Sustainability 47
V. TX-RMOMS—Texas 48
A. About the Area 48
B. State and Regional Maternal Health Landscape 49
C. TX-RMOMS Network Characteristics 52
D. Description of Target and Maternal/Clinical Populations 58
E. Sustainability 60
VI. Overview of the RMOMS Program in the Baseline Period 61
A. Policy and Regional Context 61
B. RMOMS Networks 63
C. Awardee Models and Goals 64
D. Baseline Data for Women Served by Awardees 67
VII. Lessons Learned from the Planning Year 70
A. Lessons Learned from the Planning Year 70
B. Early Evidence of Impact and Considerations for Awardees 72
C. Next Steps 73

References 74
Appendix: Research Questions 80

Report Tables

Table 1: Bootheel Area Population Demographics, 2018 11
Table 2: Prenatal and Delivery Measures in the Bootheel, 2016–2018 13
Table 3: Infant Health Outcomes in the Bootheel, 2016–2018 14
Table 4: Pregnancy-Associated Deaths and SMM in Missouri, 2017 15
Table 5: Demographic Characteristics of High-Risk Women Served by RMOMS Partners in the Baseline Period Prior to Implementation, 2020 (n = 106) 24
Table 6: Infant Health Outcomes in the Baseline Period Prior to Implementation, 2020 25
Table 7: ROAMS Service Area Population Demographics, 2018 27
Table 8: Prenatal and Delivery Measures in New Mexico, 2016–2018 29
Table 9: Infant Health Outcomes in New Mexico, 2016–2018 29
Table 10: Pregnancy-Associated Deaths in New Mexico, 2015–2017 (n = 58) 30
Table 11: Summary of Progress on ROAMS Network Strategies, April 2021 40
Table 12: ROAMS Maternal/Clinical Population in the Baseline Period Prior to Implementation 43
Table 13: Demographic Characteristics of Women Served by ROAMS in the Baseline Period Prior to Implementation (Total Population, n = 467) 43
Table 14: Prenatal Health Care Utilization for Pregnancies by High-Risk Status in the Baseline Period Prior to Implementation (Pregnancy Population, n = 466) 44
Table 15: Postpartum Care Utilization in the Baseline Period Prior to Implementation (Postpartum Population, n = 264) 44
Table 16: Infant Health Outcomes for Deliveries in the Baseline Period Prior to Implementation (Infant Population, n = 268) 45
Table 17: Delivery Method by Prior Delivery Status in the Baseline Period Prior to Implementation (Delivery Population, n = 264) 45
Table 18: SMM for Deliveries in the Baseline Period Prior to Implementation (Delivery Population, n = 264) 46
Table 19: Racial Disparities in Pregnancy in the Baseline Period Prior to Implementation (Pregnancy Population, n = 466) 46
Table 20: Substance Use Among Deliveries at Miners Colfax Medical Center (Subset of Delivery Population, n = 83) in the Baseline Period Prior to Implementation 47
Table 21: TX-RMOMS Service Area Population Demographics, 2018 48
Table 22: Prenatal and Delivery Measures in TX-RMOMS Service Area, 2016–2018 50
Table 23: Infant Health Outcomes in TX-RMOMS Service Area, 2016–2018 50
Table 24: Disparities in Maternal Deaths in Texas, 2013 51
Table 25: Demographic Characteristics of TX-RMOMS Women Served in the Baseline Period Prior to Implementation (n = 1,644) 59
Table 26: Maternal Health Outcomes in the Baseline Period Prior to Implementation (n = 1,230) 60
Table 27: Comparison of Awardee Policy and Regional Context Prior to Implementation 61
Table 28: National Data on Maternal and Infant Health Outcomes in the RMOMS Awardee Counties Prior to Implementation 62
Table 29: Awardee Network Overview as of 2021 63

Table 30: Summary Comparison of Maternal/Clinical Populations in the Baseline Period Prior to Implementation 68
Table 31: Infant Health Outcomes among the RMOMS Delivery Populations in the Baseline Period Prior to Implementation..... 69
Table 32: Prenatal and Postpartum Care Utilization at RMOMS Awardee Network Providers in the Baseline Period Prior to Implementation 69

Report Figures

Figure 1: RMOMS Population Types 7
Figure 2: Racial Disparities in Infant Birth Outcomes in Missouri, 2017–2019 14
Figure 3: Percent of Women Receiving Level-Appropriate Care for High-Risk Births in Missouri, 2014–2018 16
Figure 4: Location of BPN Network Partners 16
Figure 5: Phases of BPN's System Care Coordination Component 20
Figure 6: Prenatal Care Utilization for High-Risk Women as Defined by Number of Prenatal Visits in the Baseline Period Prior to Implementation, 2020 (n = 83) 25
Figure 7: Maternal Labor/Delivery and Postpartum Outcomes in the Baseline Period Prior to Implementation 26
Figure 8: Racial Disparities in Infant Health Outcomes in New Mexico, 2017-2019 30
Figure 9: Location of ROAMS Network Partners 32
Figure 10: Racial Disparities in Infant Birth Outcomes in Texas, 2016-2018 51
Figure 11: Location of TX-RMOMS Network Partners 52
Figure 12: TX-RMOMS Service Expansion Model 66
Figure 13: Service Expansion Model in ROAMS 67

EXECUTIVE SUMMARY

The Rural Maternity and Obstetrics Management Strategies (RMOMS) program was launched in 2019 to improve maternal health in rural areas as part of the Department of Health and Human Services' (HHS) Improving Maternal Health in America initiative. The program, which is funded by the Health Resources and Services Administration (HRSA) through the Federal Office of Rural Health Policy (FORHP) and the Maternal and Child Health Bureau (MCHB), uses network models to increase access to maternal and obstetrics care in rural communities and to improve health outcomes for mothers and infants.

Three networks were funded through September 2023 to implement the RMOMS program: the Missouri Bootheel Perinatal Network (BPN), the New Mexico Rural Obstetrics Access and Maternal Services (ROAMS) Network, and the Texas-RMOMS Comprehensive Maternal Care Network (TX-RMOMS). Their models address the four focus areas of the RMOMS program: 1) aggregation of low-volume rural hospital obstetric services; 2) a network approach to coordinate and improve maternal health care from preconception to postpartum; 3) telehealth services to increase access to care in rural areas; and 4) payment structures that promote financial sustainability for access to high-quality maternal care.

FORHP contracted Mission Analytics Group, Inc. to conduct an independent evaluation of the RMOMS program. The evaluation will document the awardees' models, assess each network's impact on access to care and maternal health outcomes, and identify lessons learned to support future replication of the models. The mixed-methods evaluation draws on qualitative data, including awardee interviews and documentation, and quantitative data, including data provided through HRSA's Performance Improvement Measurement System (PIMS), patient-level data submitted by awardees, and secondary data that provide context for the program.

This first Annual Report follows the awardees' planning year (2019-2020) ahead of full implementation in 2020-2021. It also examines baseline data on maternal and neonatal outcomes in the awardee service areas prior to program implementation. This summary first provides an overview of the RMOMS awardees and their planned approaches to the program. It then turns to the early lessons learned and next steps for the evaluation.

A. The RMOMS Service Areas, Networks, and Services

RMOMS Service Areas Face High Rates of Poverty and Low Use of Prenatal Care

The three RMOMS service areas—the southeastern "Bootheel" of Missouri, northeastern New Mexico, and southwest Texas—face common challenges for women and mothers. In all three areas, 35–39 percent of households have incomes below the poverty line.[1] All three service areas are worse than national averages for rates of inadequate prenatal care and rates of preterm birth and low birthweight vary significantly across the three awardees.[2]

At the same time, the three awardees also reflect the diversity of rural experiences in the United States. The BPN service area in Missouri has a higher population density than the other two service areas, while in the ROAMS service area, 9,400 women of childbearing age spread over almost 14,000 square miles and an extensive mountain range. The population majorities in both

the ROAMS and TX-RMOMS service areas are Hispanic. The population majority in BPN's service area is White but also has a large share of individuals who are Black.[1] Medicaid covers 71 percent of births in New Mexico, which has a relatively high income threshold for pregnant women. In Missouri, 38 percent of births are Medicaid-covered, compared to 53 percent of births in Texas.[3] New Mexico is a Medicaid expansion state; Texas is not. Missouri recently voted to expand Medicaid in a 2020 ballot referendum.

The RMOMS Awardees Use Different Network Approaches, although Hospitals Are the Lead Agencies for All Three

Hospitals or hospital systems serve as the lead agencies for the RMOMS networks; for two of the three awardees, the lead hospitals are outside the RMOMS service area. TX-RMOMS is led by University Health (UH), a large hospital system in metropolitan San Antonio. BPN is led by Saint Francis Medical Center, a tertiary center with 300 beds located just north of the southeast Missouri service area. Only ROAMS is led by a hospital within its service area; Holy Cross Medical Center is a Critical Access Hospital (CAH) with 25 beds based in Taos, New Mexico.

The network approaches are as follows:

- **TX-RMOMS:** The TX-RMOMS network includes UH and two rural health systems as the only formal partners. This network mimics a hub-and-spoke model, where UH, a large urban hospital system, receives patient referrals for advanced specialty care from Uvalde Memorial Hospital and Val Verde Regional Medical Center while supporting the rural hospitals on capacity-building efforts.
- **ROAMS:** In the ROAMS model, patient care is provided by smaller networks of providers within the larger network. These smaller networks coordinate with each other on capacity building, advocacy, and marketing. The three participating hospitals in ROAMS are CAHs and only two offer labor and delivery services. However, the network has a robust set of support services partners and an active university partner to support data and evaluation activities.
- **BPN:** All providers in BPN's network share patient referrals and provide support and expertise. The network includes: three hospital-based systems that offer prenatal, labor and delivery, and postpartum services; a large Federally Qualified Health Center (FQHC) network of medical, dental, and school-based clinics; six county health departments; two home visitation programs; a technical assistance partner; and three behavioral health agencies.

Awardees Tailored RMOMS Services to Local Needs and Focused on Care Coordination, Telehealth Services, Expanded Access, and Provider Capacity Building

Patient navigation and/or care coordination are central to all RMOMS network models. Each awardee has also developed at least one telehealth strategy to improve access to care, particularly for women with high-risk pregnancies and/or transportation barriers. TX-RMOMS and ROAMS are working to expand the availability of clinical services, while BPN's network already integrates a wide range of service providers. All three have also rolled out or are planning capacity-building efforts with local providers. These efforts are summarized below.

Care Coordination: The awardees have adopted structured patient navigation/care coordination models. The BPN model is perhaps the most robust care coordination model among the three awardees. However, it is currently limited to women who are referred to maternal-fetal medicine (MFM) services for high-risk pregnancies, which reflects the phased approach BPN developed to improve implementation and successful data collection. Spanning the entire continuum of care, the program has a structured patient flow, including standardized risk assessments, navigation of insurance and transportation options, and referrals to home visitation services. It will be expanded to include additional high-risk women in future implementation years. ROAMS also uses a formal patient navigation structure based on an existing framework developed by the Pathways Community HUB Institute. The Pathways model incorporates reimbursable patient navigation services, thus increasing the long-term sustainability of the initiative. ROAMS patient navigators will collaborate across clinical sites to improve referrals to underutilized social supports in the community, such as lactation consultation and home visiting. TX-RMOMS has a Perinatal Patient Navigator who liaises between local care teams and the UH-affiliated MFM specialist and also uses care coordinators based in the participating rural clinics to assist patients with appointments, manage insurance issues, and provide patient education and support.

Care Coordination Models

BPN: Internally developed, highly structured

ROAMS: External model, tailored to local setting

TX-RMOMS: Internal model with focus on referrals to UH

"The model and strategy that we selected for our program is to implement patient navigation, and through that, improve continuity of care for all women from preconception through the duration of their pregnancy and postpartum care."
– TX-RMOMS Leadership

Telehealth: The COVID-19 pandemic has hastened the adoption of telehealth nationally, but the pandemic created challenges to launching telehealth for the RMOMS awardees, especially in coordinating across network sites without the benefit of in-person site visits. ROAMS has made the most progress in structuring its telehealth intervention, which will enable women who have no nearby access to services to participate in regular prenatal visits via telehealth. ROAMS' plan includes an expansion of clinic telehealth capacity for prenatal visits, home telehealth kits for pregnant women, telehealth MFM services, and Grand Rounds and provider training opportunities. In TX-RMOMS, the lead agency will serve as the telehealth hub for high-risk pregnancies. MFM providers employed at UH will provide telehealth appointments to women living in the rural service regions. TX-RMOMS is working to resolve issues with network connectivity and security between clinical sites to launch this component in the first RMOMS implementation year. BPN is using a different approach to telehealth. The network will use a county health department as the "hosting site" for telehealth, bringing women to the health department clinic to connect from there with an obstetrician-gynecologist (OB/GYN) or specialist provider. BPN has made progress in educating providers, but

Shared Telehealth Goals

- Reduce geographic barriers to prenatal and postpartum care
- Promote access to specialists for high-risk pregnancies
- Improve on unexpected COVID-19 telehealth progress

the network is still in the planning phase in terms of contracts and equipment purchases.

Service expansion: TX-RMOMS is filling service gaps by hiring more clinical staff at network sites and establishing additional partnerships to keep women in the network for care. At one of the rural hospitals, TX-RMOMS hired a new full-time OB/GYN and a prenatal case manager. In the other part of the network's service area, a partner clinic that does not offer prenatal care established a formal partnership and data-sharing agreement with a local private practice so that women can receive prenatal care locally. The clinic will use a case manager and a behavioral health consultant to support this relationship and manage clinical data. ROAMS is also embarking on a significant expansion of prenatal care. The network will extend services through two new prenatal clinics: one located near the network's lead agency and one in a remote area far from existing services. Clinical staff from the ROAMS hospitals will staff the two new clinic sites using a combination of in-person clinic days and telehealth. Like TX-RMOMS, ROAMS' staffing approach effectively keeps the expanded prenatal care services "in-network."

> "I am really excited about [the ROAMS program]…I wish I'd had this my entire career to be able to do this type of medicine."
> – ROAMS Clinician

RMOMS Awardees Submitted Baseline Data for Different Populations

Data from women served by the RMOMS networks during the September 2019 to August 2020 planning year (the baseline period) provide a pre-RMOMS intervention baseline to monitor the effects of the RMOMS interventions over time. However, because each awardee has a unique network model, the baseline populations differ across the awardees. ROAMS had the broadest scope for reporting and provided data on all women who received pregnancy, delivery, and/or postpartum care through the network in the year prior to RMOMS implementation. BPN reported baseline data just for the women who were referred to MFM services at Saint Francis Medical Center to match the population they will serve in the initial months of implementation. TX-RMOMS included women who received maternal care at the network's two rural hospitals.

These differences in reporting are reflected in the tables below, which present selected measures from the baseline patient-level data. Most women served by network participants in the year prior to RMOMS implementation were between the ages of 21 and 35, although about one in six of BPN's high-risk group was older than 35. ROAMS had the highest percentage of Medicaid-insured women (71%) compared to 64 percent in BPN and 39 percent in TX-RMOMS. Only TX-RMOMS had a notable share of uninsured women (24%) in the baseline period.

Table ES-1: Maternal/Clinical Populations Reported in the Baseline Period Prior to Implementation

Characteristic	BPN	ROAMS	TX-RMOMS
Women who…	Received an MFM referral at Saint Francis	Received maternal health services from network partners	Received maternal health services at the two rural hospitals
Total reported (n)	106	467	1,644
Age in years			
20 or younger	--	17%	13%
21–25	28%	26%	32%
26–30	34%	29%	29%
31–35	20%	17%	17%
36–39	16%	11%	6%
40 or older	--	--	2%
Missing	2%	0%	0%
Health insurance status			
Medicaid	64%	71%	39%
Private insurance	36%	28%	22%
No insurance/uninsured	0%	0%	24%
Unknown	0%	<1%	15%

Source: Patient-level data submitted by the awardees in December 2020 and January 2021. The baseline period was September 1, 2019 to August 31, 2020.

The baseline data also captured infant health outcomes and key prenatal and postpartum care metrics for women who delivered during the baseline period prior to RMOMS implementation. Consistent with its high-risk population for reporting (those referred for MFM care), BPN had high shares of deliveries with low birthweight (29%) and preterm birth (25%) as well as longer maternal hospital stays. ROAMS' baseline data align with the rates found in national data for its service area.[2] Among the ROAMS delivery population in the year before RMOMS, 11 percent of deliveries experienced preterm birth and a similar share had low birthweight infants. TX-RMOMS had the largest number of deliveries during the baseline period, but experienced reporting challenges at participating clinical sites that affected the prenatal and postpartum visit data submitted by the network. Data on infant health outcomes and prenatal and postpartum care utilization are incomplete as a result and are not included in the table below.

Table ES-2: Infant Health Outcomes and Prenatal/Postpartum Care Utilization Among the Delivery Populations in RMOMS Service Areas in the Baseline Period Prior to Implementation

Metric	BPN	ROAMS	TX-RMOMS
Total who delivered (n)	87	264	1,230
Infant health outcomes			
Low birthweight	30%	13%	6%
Preterm birth	25%	11%	15%
Prenatal and postpartum care utilization			
Prenatal visit(s) in first trimester	71%	64%	NA
Hospital stay of fewer than 5 days	89%	98%	99%
Postpartum visit within 12 weeks of delivery	80%	76%	NA

Notes: For TX-RMOMS, gestational age information was missing for 52 percent of the deliveries, and birthweight was missing for 39 percent of the deliveries. Preterm birth is before 37 weeks gestation. Low birthweight is less than 2,500 grams. Source: patient-level data submitted by the awardees in December 2020 and January 2021. The baseline period was September 1, 2019 to August 31, 2020.

B. Lessons Learned during the Planning Year

This Annual Report is the first step in a larger evaluation to assess the impact of the RMOMS network models on health care access and outcomes. Below we present some lessons learned from the planning year.

- **Strong leadership promoted network engagement**: Leaders leveraged their familiarity with the provider landscape and local maternal health challenges to drive progress. BPN and ROAMS also built on longstanding personal and professional relationships with network partners. The awardee lead for TX-RMOMS was not local, but leveraged its role in providing specialty care to other hospitals in the area to promote the growth of the network.

- **Awardees emphasized collaboration as a strategy to increase service utilization**: Some partners expressed initial concerns about losing market share due to network efforts, but leaders assuaged these concerns by emphasizing the goal of promoting the services currently available. This collaboration required effective communication through formal workgroups, as well as ongoing ad hoc communication. Awardees had initially planned to communicate through in-person meetings, but they effectively pivoted to virtual meetings with the onset of COVID-19.

> "[Partners] are really staying at the table because they are seeing the value in using the resources more efficiently instead of throwing in another resource that ultimately is going to cause them to have more competition."
> – BPN Leadership

- **Network composition fluctuated during the planning year**: BPN and ROAMS both lost hospitals from the network. These systems were headquartered outside of the service areas and lacked local engagement. In ROAMS, this shift opened an opportunity for a

new partnership with the state's flagship university to assist in data and evaluation efforts. TX-RMOMS did not lose any network partners, but its leadership has identified important providers in the area that must be included in the network to ensure continuity of care for local mothers.

- **The RMOMS focus areas require networks to implement multiple initiatives at once**: The awardees are implementing direct service expansion, telehealth, and patient navigation at the same time. ROAMS has made the most initial progress on this joint implementation, likely from a combination of effective stakeholder input, an upfront focus on sustainability and measurement, and the use of external resources to support a major goal of patient navigation. BPN and TX-RMOMS have rolled out implementation in a more phased approach. BPN strategically launched the system care coordination strategy first with a small subset of women, while TX-RMOMS focused on hiring staff to bolster clinical capacity in advance of full implementation.
- **Awardees benefited from greater acceptance of telehealth**: COVID-19 slowed implementation, diverted time and resources, and limited in-person services and communication. However, telehealth increased dramatically during the pandemic. Awardees reported that both providers and patients became more open to virtual platforms and that there are now fewer reimbursement requirements and administrative hurdles. As a result, telehealth efforts have taken off faster than expected and awardees have identified areas where the RMOMS program can address gaps and support unique telehealth needs related to pregnancy.
- **Successes are already being realized**: Even though network impact was not a focus for this Annual Report, some examples of early successes emerged. TX-RMOMS reported that having the resources to bring on an OB/GYN and case manager increased satisfaction of women who chose the rural health clinic for their prenatal care. At BPN, the system care coordinator was finally able to connect women to desperately needed transportation services to make their MFM appointments. Finally, ROAMS notes that the network succeeded in establishing a partnership between two hospitals in the area that have unsuccessfully tried to partner in the past.

> "I think at a high level, we've achieved a remarkable amount, especially during COVID times…with the diverse networks that we have, I've been really impressed with people doing what it takes to move it forward. I'm astounded that we have accomplished as much as we have." – ROAMS Leadership

C. Next Steps for the Evaluation

The first year of the RMOMS program was a planning year. As awardees implement their models, the evaluation will follow the work of the awardees through interviews, patient-level data, and other data sources. Future rounds of the evaluation will rely more heavily on maternal access and outcomes metrics from the patient-level data, including maternal health indicators that were not feasible to capture during the baseline period. The next year of the evaluation will also deepen the focus on payer issues and sustainability. It will incorporate interviews with state

Medicaid officials to learn more about Medicaid's interaction with RMOMS and to explore possibilities for a future quantitative analysis of Medicaid claims data. Going forward, the evaluation will also delve more into the role and structure of rural health networks in maternal health care to understand how they impact implementation of the RMOMS program. These evaluation components will support HRSA in promoting the replication of effective rural maternal health models.

I. INTRODUCTION

In 2019, the Health Resources and Services Administration (HRSA) Federal Office of Rural Health Policy (FORHP) and Maternal and Child Health Bureau (MCHB) launched the Rural Maternity and Obstetrics Management Strategies (RMOMS) program to promote maternal health in rural areas. RMOMS funds three awardees in Missouri, New Mexico, and Texas to develop financially sustainable integrated network models to increase access to maternal and obstetrics care and improve maternal and neonatal health outcomes in rural communities. The program runs from September 1, 2019 to August 31, 2023.

FORHP contracted Mission Analytics Group, Inc. to conduct an independent evaluation of the RMOMS program. The evaluation will document the awardees' models, assess each network's impact on access to care and maternal health outcomes, and identify lessons learned to support future replication of the program. This first Annual Report serves as a baseline for the evaluation.

A. Understanding the Rural Maternal Health Landscape

The RMOMS program aims to address specific challenges in rural maternal health. All women of reproductive age should have access to high-quality, comprehensive prenatal and maternal care to ensure prompt treatment of health conditions and access to preventive and social services. The 28 million women of reproductive age living in the rural U.S. have long experienced significant social, health, and economic barriers. In recent years, accelerating rates of rural hospital and obstetric unit closures have threatened their limited access to maternal health care, a concerning trend in a country that already has the highest rate of maternal mortality among all high-income countries.[4,5]

Rural Areas Face Hospital Closures and Staffing Challenges

More than 100 rural hospitals have closed since 2010.[4] Financial and structural pressures on rural hospitals include low revenue, low patient volume, provider shortages, and high levels of uncompensated care, particularly in high-poverty areas with many uninsured patients.[4] Hospitals are at significant risk in the RMOMS awardee states. As of 2019, Texas has experienced the most rural hospital closures of any state.[6] Approximately a quarter of rural hospitals in Missouri and New Mexico are estimated to be at high financial risk.[7]

Many rural hospitals that remain open have discontinued obstetric services in response to low birth volumes, high malpractice insurance costs, and challenges staffing obstetric specialists.[4] In rural areas, Medicaid commonly covers more than half of all births, but Medicaid reimbursement rates for obstetric care can be lower than the cost of providing services.[8] Among 238 surveyed rural hospitals, 98 percent identified challenges in staffing their obstetric units.[9] In addition, only six percent of obstetrician-gynecologists (OB/GYNS) practice in rural areas.[10] Even with fully staffed obstetrics units, low birth volumes can prevent clinical staff from gaining enough experience to handle Caesarean sections (C-sections) or obstetric emergencies.[8]

With these overlapping challenges, nearly half of all rural counties have no hospitals with obstetric services available, and more than half of women living in rural areas must drive more

than 30 minutes to access prenatal, delivery, and postpartum care.[4] A 2020 study found that over a quarter of surveyed rural hospitals that do not offer obstetrics services handled occasional emergency room deliveries. However, these hospitals reported being unprepared to handle adverse outcomes and over 32 percent reported having experienced a "close call" with maternal death.[11]

Social Determinants of Health Pose Challenges in Rural Areas, Especially among Women of Color

These structural deficiencies in hospital and service access have a significant negative impact on an already vulnerable population. Women in rural areas often struggle with poor transportation options, lower health literacy and educational levels, unplanned pregnancies, and other social pressures.[4] Compared to urban populations, this population faces higher rates of housing insecurity, poverty, and food insecurity as well as lower life expectancy and higher mortality rates from all the leading causes of death.[12,13] Non-Hispanic Black and American Indian/Alaska Native individuals living in rural areas are likelier to self-rate as having worse health compared to non-Hispanic White rural residents.[14] Moreover, hospital closures, which can have significant negative impacts on often-struggling rural economies, are more likely to occur in low-income rural areas and rural areas with higher proportions of people of color.[8,15]

Women of reproductive age living in rural America face a disproportionate burden from substance use disorder (SUD) and mental illness.[16] The rate of opioid use among pregnant women has increased more rapidly in rural counties than in urban areas[17] and is associated with negative health outcomes, including preterm birth, low birthweight, and maternal mortality.[18] From 2006 to 2015, perinatal mood and anxiety disorders and serious mental illness among delivering women also increased dramatically.[19] Women with these conditions experience higher occurrences of severe maternal morbidity (SMM) and mortality, longer hospital stays, and higher costs associated with delivery.[19]

Stressful life events, such as economic distress and violence, also contribute to poor maternal health.[20] Intimate partner violence (IPV) during pregnancy is associated with negative maternal and infant health outcomes, including substance use, depression, and inconsistent prenatal care, and may affect up to 50 percent of women during pregnancy.[21] Beyond its direct health risks to pregnant women, the COVID-19 pandemic may contribute to maternal deaths due to suicide, IPV, and overdose.[22] Given their existing risks for SUD and mental illness, pregnant women living in rural communities may be more impacted than women residing in urban areas.[19,23]

Maternal Mortality and SMM Are an Increasing Threat to Women in Rural Areas

Maternal mortality and SMM disproportionately impact women of color and women living in rural areas.[20] According to the National Center for Health Statistics (NCHS), the U.S. had the highest rate of maternal mortality among high-income countries in 2018 at 17.4 deaths per 100,000 live births.[24,25] The NCHS found that rates of maternal mortality for non-Hispanic Black women were more than twice the rate for non-Hispanic White women and that rates increased with age.[25,26]

Nationwide, there were over 50,000 cases of SMM in 2018, including hemorrhage, eclampsia, and other serious complications requiring hospitalization.[20] Data from the Healthcare Cost and

Utilization Project (HCUP) indicated that the rate of SMM was 1.8 percent of all delivery hospitalizations in 2018. In the census regions that include Texas, Missouri, and New Mexico, the SMM rate was higher in rural hospitals than in urban hospitals.[27] Another study found that SMM and mortality increased for both rural and urban populations between 2007 and 2015, but women living in rural areas had a nine percent greater probability of experiencing SMM or maternal mortality.[12] A 2021 report from the Government Accountability Office found that between 2011-2016, pregnancy-related deaths per 100,000 live births were higher in rural areas compared to metropolitan areas.[28]

The 2020 Department of Health and Human Services (HHS) Action Plan to Improve Maternal Health in America noted the risks of SMM and mortality to rural women and how these outcomes can emerge at any stage during the pregnancy continuum.[20] For example, women lacking access to prenatal care are three to four times likelier to die from pregnancy-related causes, while women in labor who face lengthy journeys to the nearest hospital with obstetric services are likelier to have births unattended by an obstetric professional. More than one-third of maternal deaths occur in the postpartum period when many rural women have no accessible source of ongoing care.[29] Effective health services for rural women must therefore address the entire continuum of care, including regular care for women of reproductive age and comprehensive services during pregnancy.

B. The RMOMS Program and Evaluation

The RMOMS program sits within a larger HHS framework to address maternal health. In 2020, HHS announced its target goal of reducing the maternal mortality rate by 50 percent in five years. To achieve this goal, HHS seeks to reduce maternal deaths, address specific factors contributing to maternal morbidity and mortality, and address disparities by race and metropolitan status.[30] The RMOMS program is included in the HHS Action Plan to Improve Maternal Health in America and is funded through FORHP and MCHB.

The RMOMS program uses network models to increase access to maternal and obstetrics care in rural communities and to improve health outcomes. The program has four focus areas: 1) rural hospital obstetric service aggregation to support low-volume services; 2) a network approach to coordinate and improve the continuum of maternal health care from preconception to postpartum; 3) the use of telehealth services to increase access to care in rural areas; and 4) payment structures that promote financial sustainability and sustain access to high-quality care in the long run.

The three RMOMS awardees are as follows:

1. **Missouri Bootheel Perinatal Network (BPN)**: BPN aims to improve maternal and infant health in Dunklin, Mississippi, New Madrid, Pemiscot, Scott, and Stoddard counties in the southeastern Bootheel region of Missouri.
2. **New Mexico Rural Obstetrics Access and Maternal Services (ROAMS)**: The ROAMS network aims to provide integrated maternal health care and services to women living in Colfax, Taos, Union, Mora, and Harding counties in northeastern New Mexico.

3. **Texas-RMOMS Comprehensive Maternal Care Network (TX-RMOMS)**: The TX-RMOMS network aims to improve access to comprehensive, integrated obstetrics services for women residing in Val Verde, Uvalde, Edwards, Real, Kinney, and Zavala counties in southwest Texas.

All three awardees receive technical assistance support from the Maternal Health Learning and Innovation Center.

The evaluation will ultimately address research questions in four major areas:

1. **Network Approach to Coordinating Care**: The RMOMS approach involves the collaboration of multiple partners to provide comprehensive and coordinated maternal health care across the care continuum.

   To support the potential future replication of these network models, the evaluation documents network characteristics, partners, leadership, and coordination approaches. As implementation rolls out, the evaluation will incorporate "lessons learned" regarding internal and external facilitators, barriers, and strategies to overcome those barriers.

2. **Delivery and Access to Preconception, Pregnancy, Labor and Delivery, and Postpartum Services**: The RMOMS program aims to improve access to services across the maternal care continuum for rural women.

   Starting from the baseline (pre-implementation) patterns documented in this first report, the evaluation will track changes in clinical and support service utilization at each stage in the continuum with a special focus on developing an understanding of the role telehealth plays in increasing access to care. It will also capture how the implementation roll-out differs from the awardees' planned courses of action (if at all).

3. **Maternal and Neonatal Outcomes**: The RMOMS network activities are designed to improve maternal and infant health outcomes.

   The evaluation will compare the health outcomes of women prior to the intervention—the baseline period presented in this first Annual Report—to outcomes for women who participate in the intervention. The comparison will examine core outcomes (e.g., preterm birth), as well as changes in services and diagnoses. These may include reductions in services that represent acute care needs, such as blood transfusions during delivery and neonatal intensive care unit (NICU) stays, and in non-acute medical conditions (e.g., diagnosis of SUD). The evaluation will also include a special focus on understanding how networks impact the provision of care and outcomes for women with high-risk pregnancies. This first Annual Report focuses on establishing baseline outcomes and characteristics for women served by RMOMS networks prior to implementation.

4. **Financial Sustainability and Viability**: To be sustainable, the RMOMS models should generate savings for payers, including Medicaid, and be financially viable for network partners.

   This first Annual Report documents awardee activities that may be associated with cost savings, such as collaborating with Medicaid to consider payment reform or promoting

greater Medicaid enrollment among previously uninsured women. Over time, the evaluation will assess the cost savings generated from a reduction in high-cost services as awardees initiate care and diagnose issues earlier in pregnancy and provide more comprehensive access to preventive care and treatment.

The full list of Research Questions is included in the Appendix.

C. Roadmap to this Report

This first Annual Report for the RMOMS evaluation focuses on the baseline/planning year, September 1, 2019 to August 31, 2020. During this period, the three RMOMS awardees designed and planned their RMOMS network models in preparation for a formal implementation start date of September 1, 2020. They also provided data that serve as the pre-implementation baseline.

This Annual Report evaluates the awardees' early progress, highlights key successes and challenges, and provides considerations for awardees as they begin program implementation. It includes tailored analyses of each awardee's unique model, but also draws overall conclusions to inform the future scalability and replicability of the RMOMS program.

The Annual Report begins with a chapter on data sources, including the primary data collected from awardees and secondary sources used to describe the awardees' maternal health and policy contexts. Next, it presents the evaluation findings for each awardee in three separate chapters. Each chapter addresses the awardee's health care landscape, network composition, model of care, and patient population. The subsequent chapter summarizes and compares the findings across all awardees. The final chapter presents considerations for awardees as they advance into the implementation years and describes next steps for the evaluation.

II. DATA SOURCES

This mixed-methods evaluation includes both process and impact components to assess how network models may advance national efforts to improve rural maternal health. The process evaluation aims to understand the design and function of the networks, how new service delivery models are rolled out, and the facilitators and barriers to implementation. The impact evaluation will assess how network models improve access to essential prenatal, postpartum, and support services and the impact on maternal and infant health outcomes. Together, quantitative and qualitative data paint a portrait of the individual awardees and the program overall.

This first Annual Report is designed to provide a baseline understanding of awardees' models and patient health outcomes through the analysis of data from multiple primary and secondary data sources. Because the RMOMS program is new, this report focuses more on the process evaluation, especially the initial implementation of awardee models. Future reports will build on these process evaluation findings, but also provide a greater emphasis on maternal health care access, outcomes, and financial sustainability.

The evaluation draws on quantitative patient data, qualitative data, and secondary data. We briefly review these sources below. The Appendix contains the full list of research questions guiding these data sources.

A. Quantitative Awardee Data: PIMS and Patient-Level Data

Awardees submit two types of quantitative data related to maternal health populations. Performance Improvement Measurement System (PIMS) data include aggregate counts submitted by the awardees to HRSA's Electronic Handbooks (EHBs). Awardees also submit de-identified[i] patient-level data on patient demographics, risk factors, service use, and outcomes directly to the evaluation team. This first report provides descriptive findings from the patient-level data source for the baseline period prior to implementation (September 1, 2019 – August 31, 2020). This period corresponds to the awardees' planning year and serves as the baseline for future comparisons.

Performance Improvement Measurement System (PIMS) Data

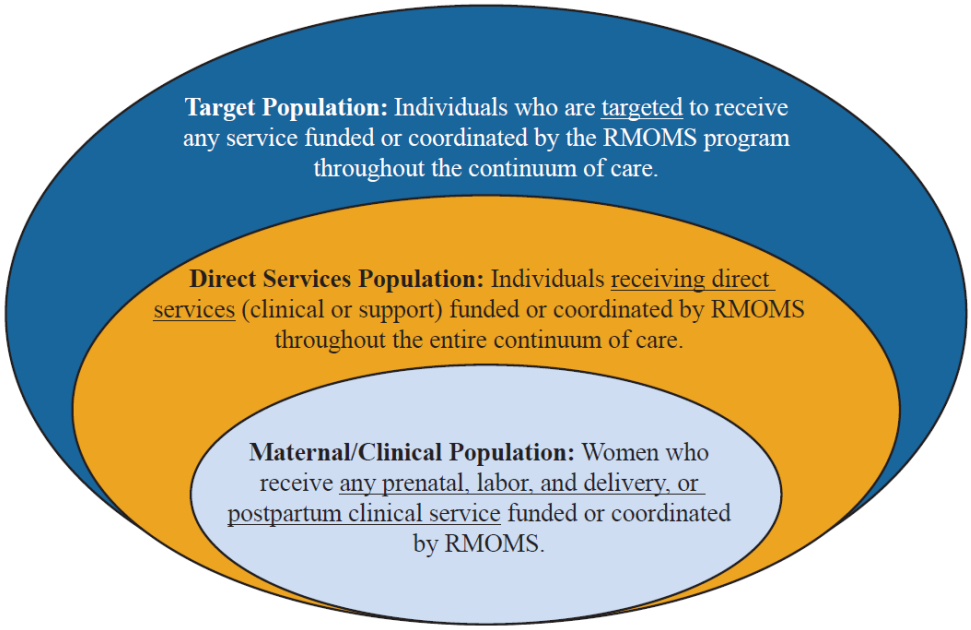
As part of award oversight, awardees submit annual aggregate quantitative metrics on awardee network composition, women served, and network sustainability into HRSA's integrated PIMS system. PIMS reporting takes a broad definition of the population served. It captures the **target population** of women and families living in the service area that awardees intend to reach with their clinical and support services (Figure 1). Selected PIMS metrics focus on the **direct services population**, which includes individuals who receive any direct service funded or coordinated by the RMOMS program, including both clinical and support services. These data will be incorporated into future evaluation reports.

[i] All patient-level data in this report were de-identified prior to transmission to the evaluation team. No Personal Health Information or Personally Identifiable Information will be collected for the evaluation.

Patient-Level Data

For the evaluation, awardees submit de-identified patient-level data to track utilization and health outcomes for women served by the RMOMS program. These data include the following: information on patient demographics; prenatal, delivery, and postpartum service utilization; health outcomes for both mothers and infants; and patient navigation contacts. As shown in Figure 1, the patient-level data cover only the **maternal/clinical population**. This is a subset of women in the direct services population who receive a prenatal, labor and delivery, or postpartum clinical service funded or coordinated by the RMOMS program. Unlike the direct services population, the maternal/clinical population specifically focuses on women who are receiving clinical care related to pregnancy from a network participant. Awardees have the option to further refine this population to focus on women in particular risk groups. These data are the focus of this Annual Report.

Figure 1: RMOMS Population Types



This Annual Report provides descriptive statistics to highlight the major characteristics and health challenges facing women served by the RMOMS program during the planning year (prior to implementation). Awardees are expected to submit patient-level data every six months; over time, the evaluation will compare health care utilization and outcomes for women in the baseline period to those of RMOMS participants over the three-year program. Future reports will map the patient-level data to Medicaid fee schedule data to track changes in high-cost services, programmatic cost savings, and the overall financial sustainability of the RMOMS network models. In addition, future evaluation activities will include interviews with state Medicaid officials to learn more about Medicaid's interaction with RMOMS networks and to explore possibilities for a future quantitative analysis of Medicaid claims data.

Challenges with Quantitative Data

There are several challenges and caveats to consider regarding these quantitative data sources. First, RMOMS awardees have reported challenges collecting patient-level data that may affect

both the data quality and completeness. These challenges include technical issues with reporting from electronic health records (EHRs), staff time for reporting, and data elements that may not be routinely available. The evaluation team works closely with the awardees and technical assistance provider to support data collection. Second, the data do not allow for "gold standard" pre-post comparisons between RMOMS participants and a similar group of women who do not participate in RMOMS. There is no randomization in participation, and RMOMS awardees will serve close to all women in their immediate regions. Third, the RMOMS populations may change over time as awardees expand the scope of their programs, particularly for BPN. Where feasible, the evaluation will account for changes over time in target population characteristics, but this may be hampered by small sample sizes.

Small sample sizes will be an issue for analyses more broadly. Sites may have as few as 250 women in the maternal/clinical population, and some key outcomes are rare events, including maternal mortality and SMM. The small sample size limits statistical power to draw inferences about the impact of the RMOMS models. Moreover, data suppression may be required when fewer than 10 events or individuals are observed.

B. Awardee Qualitative Data

Qualitative data are essential to support and contextualize the evaluation's quantitative findings for the three uniquely positioned awardees. We draw on interviews and documentation reviews for crucial information on each awardee's regional context, approach, and strategies in handling maternal health challenges, such as high-risk pregnancies or rare maternal health outcomes.

Interviews

This report includes data from two sets of phone interviews: an initial round of interviews with awardee leadership in June 2020 and a second round of interviews with awardee leadership, clinicians, and staff in January 2021. The June 2020 interviews focused on establishing a baseline understanding of each awardee's network model and structure. The January 2021 interviews discussed progress, challenges, and implementation strategies covering the entire baseline period. The January 2021 interviews also gave awardees an opportunity to share initial findings from the first several months of their first implementation year with input from leadership, clinicians, data managers, and patient navigators.

The evaluation team will conduct additional rounds of phone interviews with awardee leadership, clinicians, and staff in future evaluation years. In 2022, the team will conduct site visits that will allow for a deeper look at awardee program operations and impacts, particularly in the clinical setting. The evaluation team will also interview state Medicaid program officials in 2021 to learn more about the interaction of Medicaid with the RMOMS networks and to assess the feasibility of conducting a future data analysis using Medicaid claims data.

Awardee Documentation

Awardee documentation also provides context and background for understanding their network models, strategic goals, major initiatives, and implementation challenges. These documents, which HRSA requires as part of each RMOMS awardee's contract award, include awardee applications, logic models and work plans, data collection summary reports, progress reports, and other verbal and written updates.

C. Secondary Data

To provide greater context, this report also draws on secondary data sources to understand each awardee's policy, economic, social, and maternal health care environment, particularly in the awardee baseline period. The team conducted quantitative analyses of publicly available and restricted access secondary datasets. As appropriate, the evaluation also draws on summary statistics and findings from external sources.

Analysis of Secondary Datasets

The evaluation team obtained and analyzed secondary data from the Healthcare Cost and Utilization Project (HCUP), the Area Health Resource File (AHRF), and the Centers for Disease Control and Prevention (CDC) National Center for Health Statistics (NCHS) National Vital Statistics System (NVSS):

- **HCUP (2018):** This source provided census division-level counts of delivery-related hospital admissions for specific International Classification of Diseases (ICD-10) codes, which the evaluation used to examine high-risk pregnancies and SMM. Data are at the census division level, although 2018 data are also available at the county level for New Mexico.
- **AHRF (2018–2019):** This source contains physician workforce data, data on facility characteristics, and data on county geography.
- **NVSS birth certificate data (2015–2018):** This individual-level data identifies births, maternal deaths, and fetal deaths at the county level, allowing the evaluation team to analyze rates of C-sections, preterm birth, low birthweight, prenatal care utilization, and certain maternal comorbidities in RMOMS counties for 2018 and earlier. More detailed information may be available for future reports using data directly from the states. Data directly from the states were not available in time for inclusion in this baseline report due to state data processing and COVID-19 delays.

Publicly Available Summary Statistics

Finally, this report uses summary statistics and information from publicly available secondary data sources to provide context about state maternal health metrics, the state Medicaid and policy landscape, and major state and national programs and funding streams pertaining to maternal and child health in each state. These data sources include the following:

- **American Community Survey (ACS) (2018):** This source provides demographic data for each awardee's county and/or state (depending on the metric). For small counties, five-year averages may be used instead of 2018 data.
- **Medicaid Adult and Child Core Set Measures (2019):** This source provides benchmark rates for key perinatal measures in the Medicaid Adult and Child Core Sets updated for 2019.
- **March of Dimes PeriStats (various years):** The March of Dimes PeriStats database synthesizes maternal health data from numerous sources. These data provide state-and

county-level (when available) rates for key maternal health metrics. County-level data are not available for all metrics and states.

- **Kaiser Family Foundation (2019–2020):** The Kaiser Family Foundation maintains tables and trackers on state Medicaid policy, such as the status of state Medicaid expansion and updates on state COVID-19 policies.

In addition to structured data from these sources, we also included findings from the following secondary sources: information from web sources from HRSA and other HHS agencies related to maternal health programs, funding sources, and grants (e.g., Title V); peer-reviewed literature on subjects such as maternal mortality; and publications from maternal health research centers, public health departments, and academic departments, including reports from state Maternal Mortality Review Committees (MMRCs).

III. BOOTHEEL PERINATAL NETWORK—MISSOURI

BPN, led by Saint Francis Medical Center, aims to connect an initial high-risk subset of pregnant women with medical providers and support services (both in-person and via telehealth) to improve maternal health outcomes. Below we describe the area context and maternal and child health landscape within the Missouri Bootheel region and progress BPN has made toward model implementation.

A. About the Area

The Bootheel, located in the southeast corner of Missouri, is composed of Dunklin, Mississippi, New Madrid, Pemiscot, Scott, and Stoddard counties. With a population of over 140,000 with 30,000 women of childbearing age, the Bootheel faces higher levels of poverty and unemployment and lower levels of educational attainment than the state overall, other rural counties, and urban counties (Table 1).[1] Residents of Bootheel counties are also likelier to be in "poor or fair health" and experience higher rates of obesity and smoking than the state overall.[31] People of color represent 18 percent of the Bootheel population compared to twenty percent in the whole state.[1]

Table 1: Bootheel Area Population Demographics, 2018

Metrics	RMOMS Counties	All Rural Counties	All Urban Counties	State
Household median income	$36,438	$42,351	$54,409	$46,125
Percent below 150% FPL	38%	30%	23%	28%
Percent with high school education or less	62%	56%	47%	53%
Unemployment rate	7%	6%	5%	5%
Percent of people less than 65 years old without insurance	13%	14%	11%	13%
Race/ethnicity				
White (non-Hispanic)	82%	90%	76%	80%
Black (non-Hispanic)	12%	3%	14%	11%
American Indian/Native Alaskan (non-Hispanic)	<1%	1%	<1%	<1%
Multiple or other (non-Hispanic)	2%	3%	5%	4%
Hispanic	3%	3%	4%	4%

Source: American Community Survey Data, United States Census Bureau, 2018.

State Policy and Funding Landscape

Medicaid Policy:

- *Name:* MO HealthNet

- *Births covered by Medicaid:* 38 percent (2017)[3]

- *Income requirement for pregnant women:* Less than 201 percent federal poverty level (FPL)[32]

- *Length of postpartum coverage:* 60 days post-delivery. In early 2020, MO HealthNet submitted a waiver application to the Centers for Medicare and Medicaid Services (CMS) to provide coverage for up to a year for postpartum women in need of substance use treatment services.[33]

- *Medicaid expansion:* In 2020, Missourians approved a ballot measure to expand Medicaid. Once implemented, this policy will provide an additional opportunity for health care coverage for postpartum women whose income is too high to qualify for Medicaid under current rules.

- *Medicaid Core Measures:* MO HealthNet performs better than the 2020 Healthy People Goal on the timely prenatal care measure (84% compared to a target of 78%), but falls short of the low birthweight target (11% compared to a target of 8%).[34]

Other Federal Grant Funding: HRSA MCHB provides grants, awards, and programs to Missouri, including $11.7 million in federal allocations from the Title V Federal-State Partnership and the Alliance for Innovation on Maternal (AIM) Health and Safety Initiative, through which Missouri is focusing on the Severe Hypertension in Pregnancy bundle.[35,36] Missouri plans to implement the Obstetric Care for Women with Opioid Use Disorder bundle in 2021.[37] HRSA FORHP funds multiple initiatives that target rural health in Missouri, including the Rural Health Network Development Program, the Small Health Care Provider Quality Improvement Program, and the Rural Health Network Development Planning Program. In November 2020, Missouri withdrew from participation in the CMS Maternal Opioid Misuse Model.

Broadband Access: While broadband access is more limited in RMOMS counties than in urban areas in Missouri, all RMOMS county residents are served by at least two broadband providers.[38]

> "If a woman does not have pregnancy Medicaid at the time, because some of our women will lose their Medicaid 60 days after they deliver, they no longer have medical coverage for mental health. They do have a system where you can pay a sliding scale fee. But for women who don't have money, $45, even for a counseling session, is more than they can afford."
> – BPN Network Partner

B. State and Regional Maternal Health Landscape

Women in the Bootheel region, particularly Black women, face numerous challenges in accessing high-quality maternal health services at all stages in the continuum of care. According to BPN staff, two major hospitals discontinued obstetrics services in 2014 and 2018, leaving many women in the region with no local services. These women either leave the state or travel more than an hour to receive services elsewhere in Missouri. The Bootheel also experiences worse infant and maternal health outcomes than women in the state and the nation overall.

Maternal Access to Care

In its RMOMS application, BPN reported that women living in the six RMOMS counties struggle with lack of access to adequate and timely prenatal care, transportation, and appropriate facilities for delivery. Significant racial disparities exist in nearly all of the maternal health metrics reported by the network. NVSS data on health care utilization support BPN's findings (Table 2). Women living in the Bootheel report lower rates of adequate prenatal care, lower rates of timely initiation of prenatal care, and higher rates of C-sections than the state and national averages. In addition, C-section rates are almost double the target outlined in HHS's most recent Action Plan to Improve Maternal Health.[20]

> Over 75 percent of White women living in the Bootheel received prenatal care beginning in the first trimester compared to just 57 percent of Black women.
> – BPN Application

Table 2: Prenatal and Delivery Measures in the Bootheel, 2016–2018

Measure	RMOMS County Average	Statewide Average	National Average	Healthy People 2020 or HHS Action Plan Goal
First trimester prenatal care	68%	72%	75%	77.9%
Inadequate prenatal care	26%	22%	19%	NA
C-section rate	39%	30%	32%	19.4%

Notes: Inadequate prenatal care is pregnancy-related care beginning in the fifth month of pregnancy or later or less than 50 percent of the appropriate number of visits for an infant's gestational age. The C-section target for 2025 was identified from the HHS Action Plan to Improve Maternal Health in America. Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System Restricted Natality Data 2015–2018.

Mothers in the state of Missouri also struggle with a lack of access to adequate recovery time in the postpartum period, and there are disparities in access by race and ethnicity. About 30 percent of White mothers in the state have access to any paid maternity leave compared to just 20 percent of Black mothers.[37] While 89 percent of White mothers received a postpartum check-up after delivery in 2017, the rates dipped to 84 percent for both Black and Hispanic mothers.[39]

Infant Health Outcomes

BPN reported that women and families living in the service region experience worse infant health outcomes, including low birthweight, preterm birth, and infant mortality, compared to the rest of the state.[40] Women also struggle with high rates of smoking during pregnancy and low rates of treatment for mental illness and substance use, both of which have a negative impact on infant health outcomes.[40] These reports are supported in publicly available data on maternal

health in the Bootheel region and the state.[40] According to NVSS data (2015–2018), 39 percent of women in Bootheel counties smoked at least one cigarette during their pregnancy, compared to a national rate of 7 percent. Rates of preterm birth (birth at less than 37 weeks gestation) and low birthweight (less than 2,500 grams) in the Bootheel are similar to the state and national rates and higher than the Healthy People 2020 maximum targets (Table 3).

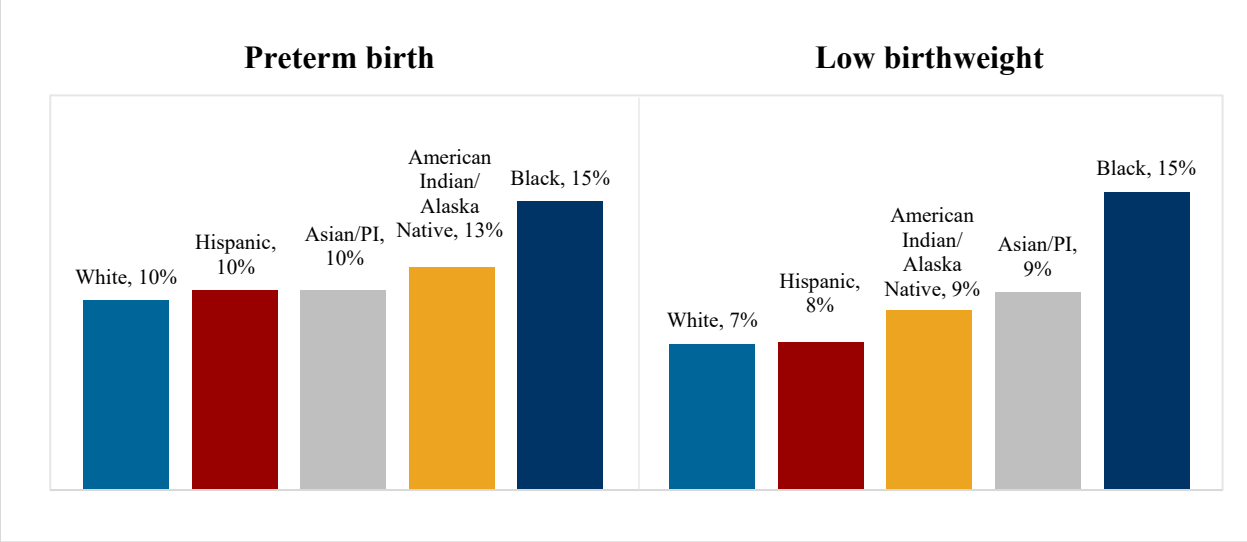
Table 3: Infant Health Outcomes in the Bootheel, 2016–2018

Measure	RMOMS County Average	Statewide Average	National Average	Healthy People 2020 Maximum Target
Preterm birth	13%	13%	12%	11.4%
Low birthweight	10%	9%	8%	7.8%
Abnormal condition	7%	12%	11%	NA

Notes: Preterm birth is before 37 weeks gestation. Low birthweight is less than 2,500 grams. Abnormal condition includes presence of seizures, lack of surfactant, need for antibiotics, or assisted ventilation. Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System Restricted Natality Data 2015–2018.

Significant racial disparities in infant health outcomes persist across Missouri. Rates of preterm birth and low birthweight statewide are highest among Black infants and lowest among White infants (Figure 2). Infant mortality is also substantially higher among Black infants, but highest among American Indian/Alaska Native infants.[41]

Figure 2: Racial Disparities in Infant Birth Outcomes in Missouri, 2017–2019



Notes: All race categories exclude Hispanics. County-level data by race/ethnicity are not available. Preterm birth is before 37 weeks gestation. Low birthweight is less than 2,500 grams. Source: National Center for Health Statistics, final natality data and period linked birth-infant death data. Retrieved December 1, 2020 from www.marchofdimes.org/peristats.

Severe Maternal Mortality and Morbidity

Missouri is one of 25 states that received funding from the CDC through the Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) Program, which supports agencies and organizations that manage state MMRCs to review maternal deaths.[42] Maternal mortality and morbidity are acute challenges in Missouri. The estimated rate of pregnancy-

related deaths in Missouri was 16 deaths per 100,000 live births in 2018,[ii] slightly lower than the national rate of 17.[25,43] According to the Missouri Pregnancy-Associated Mortality Review Board (PAMR), which conducts detailed investigations of maternal deaths in the state, 60 women died and 772 women suffered from SMM in 2017.[44] The rate of death was four times higher for Black women compared to White women (Table 4). Sixty-eight percent of the deaths were found to be pregnancy-associated, for an overall rate of 56 per 100,000 deaths.[44] The PAMR determined that over 80 percent of the pregnancy-associated deaths were preventable and there were substantial racial and urban/rural disparities in timely prenatal care, utilization of appropriate delivery care, and health outcomes.[44] Women with Medicaid insurance had five times the rate of deaths compared to women on private insurance.

Table 4: Pregnancy-Associated Deaths and SMM in Missouri, 2017

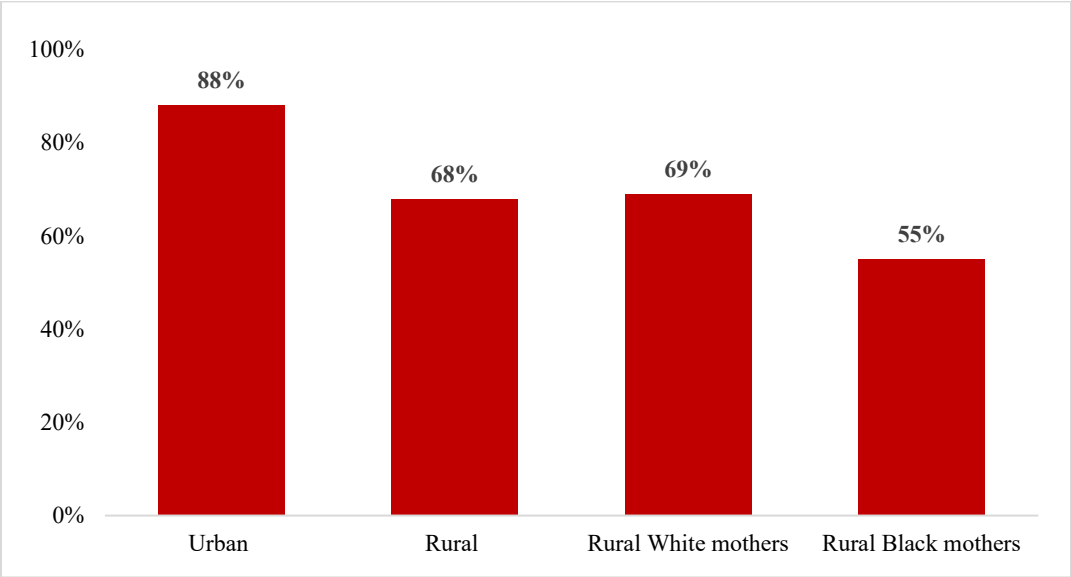
Population	Pregnancy-Associated Deaths per 100,000 Live Births	SMM per 100,000 Live Births
Race		
White women	34.7	920.0
Black women	142.1	2,130.0
Area		
Urban women	39.0	NA
Rural women	32.9	NA
Insurance		
Medicaid insurance	64.5	NA
Private insurance	12.5	NA

Notes: The PAMR defines a maternal mortality event as a pregnancy-associated death during or within one year of pregnancy. SMM rates by area and insurance status were not reported. Source: Missouri Pregnancy-Associated Mortality Review: 2017 Annual Report.

The PAMR also found substantial differences in the rates of level-appropriate care between high-risk births for urban and rural women. Only 55 percent of rural Black mothers statewide received level-appropriate care, compared to 69 percent of rural White mothers (Figure 3).

[ii] This rate should be interpreted with caution due to small sample size. According to NCHS, there were 12 maternal deaths in Missouri in 2018 for a rate of 16.4 (95% CI: 8.5, 28.6) per 100,00 live births.

Figure 3: Percent of Women Receiving Level-Appropriate Care for High-Risk Births in Missouri, 2014–2018

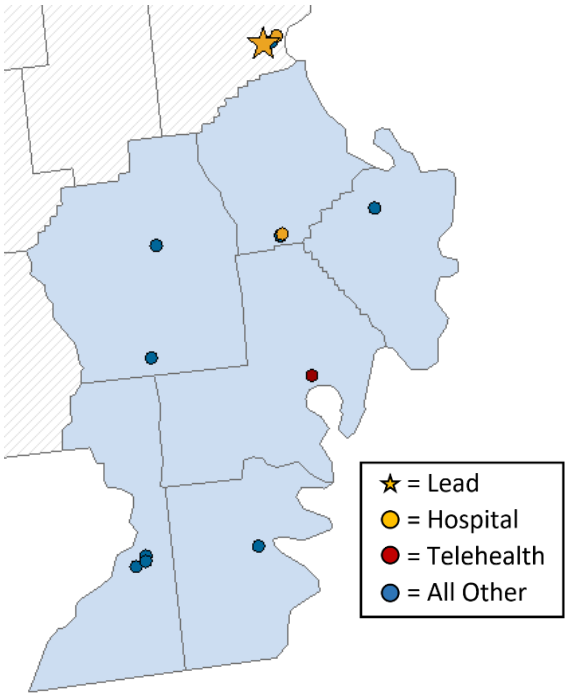


Notes: Level-appropriate care is defined as delivery at a Level III facility for high-risk births. Source: Missouri Pregnancy-Associated Mortality Review, 2017 Annual Report.

C. BPN Network Characteristics

BPN aims to improve these maternal and infant health outcomes by providing pregnant women (starting with those with high-risk conditions) with better access to care. This often means reducing transportation barriers and meeting women's socioeconomic needs. Below, we describe BPN's network composition and the progress made on model implementation.

Figure 4: Location of BPN Network Partners



Network Partners

BPN has a large and robust network of partners. The network's composition changed slightly over the planning year, demonstrating the need for awardees to maintain flexibility in adding new partners and the challenges of maintaining the active engagement of others. Led by Saint Francis Medical Center, the region's largest tertiary center, BPN contains the following partners:

Hospital systems: Three hospital systems currently participate in the network: Saint Francis Medical Center, Missouri Delta Medical Center, and SoutheastHEALTH. Three of the participating hospitals provide prenatal, postpartum, and labor/delivery services. SoutheastHEALTH Center of Stoddard County does not have obstetric services, but provides care to pregnant women in their

emergency room. Two other hospitals dropped from the network due to competing priorities; one provides no obstetric care and one is outside of BPN's service area, but provides obstetric care for some women within the service area. BPN hopes to reengage the latter in the future.

Health departments: The Bootheel Network for Health Improvement (BNHI), a not-for-profit collaborative formed by the health departments from the six participating counties, participates in the network. These health departments collaborate frequently on Bootheel-wide health initiatives through BNHI. Although the COVID-19 response has taxed health department resources, BNHI remains an active partner in all BPN work. The New Madrid County Department of Health will also host the first phase of the telehealth component of the network.

Support service agencies: Two home visitation programs—the Building Blocks/Nurse-Family Partnership, which is funded through Title V, and the Missouri Bootheel Regional Consortium (MBRC), home to Bootheel Healthy Start—are major players in the network, providing women with at-home services and social supports. With a clinical focus, the Building Blocks/Nurse-Family Partnership employs registered nurses to conduct home visits, while the MBRC deploys case managers and/or community health workers. Bootheel Babies and Families, an infant mortality coalition, also supports BPN's efforts, and BPN is exploring a future partnership with an established initiative to promote school readiness.

Federally Qualified Health Center (FQHC) network: Southeast Missouri (SEMO) Health Network is a system of 17 health centers throughout the Bootheel that recently added obstetric services. The obstetrics provider offers prenatal and postpartum care at two of the SEMO Health Network locations and has delivering privileges at all RMOMS network hospitals. SEMO Health Network will play an important role in the network by referring high-risk women to specialty care and support services facilitated by the network. Postpartum women who do not have a primary care home will be referred to SEMO Health Network as they transition from obstetric to primary care.

Behavioral health agencies: Three behavioral health agencies are also members of the network and coordinate with other partners to provide mental health and SUD services.

MO HealthNet: Medicaid is an essential partner to BPN as a large share of births in the Bootheel are covered through Medicaid. The state Medicaid agency, MO HealthNet, is an active member of all BPN activities. They are positioned to work with BPN to explore sustainability through enhanced Medicaid payment options.

SSM Health Perinatal Center: SSM Health is a Level III/IV Perinatal Center comprised of SSM Health St. Mary's Hospital, SSM Health Cardinal Glennon Children's Hospital, and Saint Louis University School of Medicine. Located in St. Louis (and not shown in Figure 4), this serves as BPN's tertiary/quaternary Perinatal Center partner. SSM Health provides specialty care services, technical assistance, and expertise related to telehealth and outreach education support.

Facilitators and Barriers: Maintaining the Network

BPN maintains partner engagement in this large and complex network through workgroup meetings, including those related to governance, workforce development, data, and technology. Meetings are scheduled monthly, but are adjusted as needed or scheduled on an ad hoc basis as needs arise. All network members have representatives in each of the workgroups. One partner has undergone leadership changes and relies on limited staff to attend meetings. The partner looks forward to involving additional staff as the leadership stabilizes so that attendance does not fall onto just one or two individuals. Another network partner also mentioned the benefits of having multiple types of staff, including IT staff, nurses, and leadership, participate in RMOMS workgroup meetings. This approach not only spreads the participation burden, but also promotes sustainability as more agency staff are involved in network activities and decision-making.

> "We have somebody that's on every single workgroup. Our IT folks are part of the workgroups. We have nurses that are part of the workgroup. We have our CEO and COO and CNO is part of the work groups. We're good about communicating with each other and working with everybody."
> – BPN Network Partner

The network also benefits from the decades-long maternal health experience that the BPN Project Director and other members of awardee leadership have in the region at multiple partner agencies. Their personal connections with partners and regular one-on-one conversations have kept the network strong. In addition, BPN leadership's background in social services, rather than hospital-based clinical care, was reported as an asset to the network since many barriers to care and poor maternal health outcomes are related to social determinants of health more than poor clinical care.

> "[Partners] are really staying at the table because they are seeing the value in using the resources more efficiently instead of throwing in another resource that ultimately is going to cause them to have more competition."
> - BPN Leadership

Despite these early successes, the network has faced some challenges. Awardee leadership indicated that some network partners are concerned with losing their client base as referral patterns change under the RMOMS initiatives. BPN leadership has worked to assuage these concerns by emphasizing that the goal of RMOMS is not to create a new program or service, but to increase the utilization of *existing* clinical and support services through better coordination.

In addition, staff turnover, lack of local control in decision-making processes, and the complexity of the planned Health Information Exchange (HIE) strategy at the beginning of the award influenced the two hospitals to leave the network. According to interviewees, these hospitals are part of large health care systems headquartered out of the state, which complicates local decision-making. In addition, as described in more detail below, the ambitious plan for HIE faced data-sharing and sustainability concerns that ultimately led to the exit of these hospitals and the discontinuation of that component of the RMOMS intervention.

Network Model and Goals

BPN's model involves three main strategies: system care coordination and support for high-risk women, telehealth, and provider training and outreach. These efforts address the lack of access to care in a large service area with few providers and transportation options.

Goal/Strategy 1: System Care Coordination and Supports for High-Risk Women

BPN is developing standardized processes to assess risk and support women in receiving the clinical care they need. This network-wide system care coordination strategy has five main components that connect women to services:

- **System care coordinator:** BPN is hiring a system care coordinator who will conduct risk assessments, follow up with women, and facilitate referrals. BPN leadership is developing the process and job description for the upcoming hire. BPN recognizes that connecting women to services is time-consuming and is considering hiring additional system care coordinators to station at other partner sites as the phases roll out.
- **Reduce immediate barriers to care:** To reduce no-show rates at appointments, the system care coordinator contacts women prior to the prenatal appointment to explore and address barriers that may hinder their attendance, such as a lack of transportation or insurance coverage.
- **Standardized risk assessment:** Saint Francis Medical Center has adopted two risk assessments to better understand the needs of high-risk women: the Edinburgh, which assesses prenatal and postnatal depression, and the PRAPARE Tool, which explores other social determinants of health concerns.[45,46] The system care coordinator conducts these assessments after an appointment. BPN leadership hopes that these assessments will eventually be used throughout the network.

> "Hospital expertise [does not] link people to services. If I show up at the hospital, I want to have the best doctors and nurses and hospital that I can, because I need you right then. But if I'm going in for my 10-minute prenatal visit and I don't have food and I don't have transportation, and I've got four kids that are making me nuts and I can't get out of bed in the morning, there's not a whole lot the hospital's going to do for me. The magic comes in when you can have the community people who understand that and who can help you."
> - BPN Leadership

- **Referrals to home visitation and/or behavioral health:** In addition to conducting the assessments, the system care coordinator refers women to both home visitation programs depending on their preferences and receptiveness. For example, a woman with clinical concerns might prefer Building Blocks/Nurse-Family Partnership to regularly connect with a nurse, whereas a woman needing more social and material supports may benefit by participation in Bootheel Healthy Start. Women receive home visits on a weekly, bi-weekly, or monthly basis depending on pregnancy status; during the postpartum period, frequency of visits depends on the age of the baby and lasts until the child is two years old. With COVID-19, visits have been occurring over the phone, and high-risk women are provided with blood pressure cuffs. If the score on the Edinburgh warrants it, the system care coordinator can also make a direct referral to one of the behavioral health agencies in the

network. Home visitation programs also regularly make referrals to behavioral health agencies.

- **Follow up on a regular basis**: Initially, the system care coordinator will follow up with the woman and the home visiting agency on a monthly basis to ensure that needs are met. Once service provision is established, contacts will then occur quarterly through one year postpartum.

> "This woman had all kinds of red flags with mental health. We did not find where any referrals to mental health were ever done. So, a big loss for that young lady and preparing her for this new baby. Our hope with RMOMS is that that situation improves. Women like that are not leaving or having a brand-new baby home and not having anyone to provide her with assistance."
> - Home Visitation Program

This system care coordination strategy has three phases. Each phase targets a new group of women, gradually expanding access over time. In January 2021, BPN started providing system care coordination services to women referred to the Saint Francis maternal-fetal medicine (MFM) provider from other obstetric providers (Phase 1a). In March 2021, BPN moved to the second MFM phase (Phase 1b), which include supporting women who receive MFM services through a partnership between SoutheastHEALTH and the SSM Health Perinatal Center in St. Louis, either through telehealth or traveling Saint Louis University MFM providers. Phase 2 will expand services to women who face other types of high-risk situations, such as SUD or housing insecurity (Figure 5).

Figure 5: Phases of BPN's System Care Coordination Component

Facilitators and Barriers: System Care Coordination and Supports for High-Risk Women

By rolling out system care coordination to different populations in a phased approach, BPN hopes to gain buy-in from early "wins." Connecting women referred to the Saint Francis MFM provider to additional services is a clear need that has the support of the entire network. In addition, BPN hopes to learn from lessons early and apply them to future phases. Finally, this phased approach reduces the workload at the start of implementation so that partners do not become overwhelmed and lose interest.

System care coordination also benefits from the rapport that the acting system care coordinator develops with the women based on her experience in the Bootheel. She recognizes that women may not be honest on the assessment tools due to social desirability bias and the tendency to under-report behaviors that may be perceived negatively by providers. Therefore, her role is to "engage them in a conversation" to understand what their "day-to-day looks like." Through this approach, participants are likelier to share their barriers and concerns that BPN can help address.

> "They go underground, whether something happened in their home that they're ashamed of, or they're afraid we're going to report them for, or... I had one young lady who went back to her abuser and I ran into her 14 years later. And the reason she quit the program was she didn't want to disappoint me."
> – BPN Leadership and Former Home Visitor

One of BPN's early challenges is encouraging the take-up of home visitation services. According to BPN leadership, demand for home visitation exceeded the available funding in the past. However, participation began to taper off in 2017. BPN hypothesizes that people have become warier of "outsiders" in their homes, potentially "judging" their lifestyles. Other potential participants may live with parents or other family members and have a hard time coordinating home visits around household activities. While virtual visits, implemented because of COVID-19, do not give home visitors as comprehensive a view of women's needs as in-person visits, they may feel less "intense" to participants and be more sustainable in the long-term. BPN also plans to explore other types of referrals outside of home visitation. For example, a woman may not be interested in participating in the full home visitation program, but may want to engage in a moms' group or need food support. In addition, the BPN staff person in the system care coordinator role shares the benefits of her own personal experience with home visitation to encourage take-up of the program.

> "The young woman, just the other day, that I had a conversation with, was very adamant. She did not want anyone in her home. She works nights. She has two young kids, and she was like, 'I'm exhausted. I don't want people coming to my home and checking in on me. Like, we are okay.'"
> – Acting System Care Coordinator

Finally, the use of a standardized assessment tool across all BPN partners may pose a challenge. The home visitation programs also have their assessments that they conduct upon enrollment. The Edinburgh and PRAPARE assessments may duplicate efforts and require women to "tell their story" more than once. However, BPN leadership emphasizes the value of these assessments because they identify priorities early on and might be the only opportunity to identify and address the needs of women who opt out of home visitation.

Goal/Strategy 2: Telehealth

BPN also aims to use telehealth to expand the network's prenatal and postpartum clinical care and reduce transportation barriers for participating women. BPN has identified the New Madrid County Department of Health as the initial hosting site based on its central location and the willingness of department leadership to participate. Women will visit the health department clinic, and with the support of a nurse and sonographer, connect to one of the Bootheel's OB or

specialist providers within the SSM Health Perinatal Center (depending on their needs). Sonogram images will be transferred in real time for review by the attending OB provider.

BPN has made progress in the following areas:

- **Exploration of technology options:** BPN is using the SSM Health Perinatal Center's "extensive knowledge" of telehealth to select the most appropriate technology for the RMOMS program. Through this partnership, BPN can also leverage additional funds to purchase the necessary equipment.
- **Provider education:** BPN is in the process of getting local OB providers onboard with telehealth. Leadership is educating OB providers so they are aware of the service and can set up processes for connecting with their patients via telehealth instead of through in-person visits.
- **Contracting of a sonographer:** BPN plans to hire a nurse and sonographer with award funds. Given that health department staff are already "stretched thin" with COVID-19, the program does not want to increase the burden on them.
- **Purchase of additional equipment:** In February 2021, the SSM Health Perinatal Center was awarded a grant from the United States Department of Agriculture to support expanded telehealth access to MFM and other services in the Bootheel and adjacent rural areas.
- **Procurement of additional equipment:** BPN recently facilitated applications for community agencies to obtain blood pressure "Cuff Kits" through the Preeclampsia Foundation program offered through Missouri's Perinatal AIM initiative. BPN assisted three community-based network partners (home visiting, mental health services and FQHC) in obtaining Cuff Kits so women can take their blood pressure at home and transmit the results to their OBs for follow-up.

BPN hopes that once the initial clinic gets off the ground and demonstrates evidence of increased access and decreased no-show rates, other BPN clinical partners in the Bootheel will adopt similar models.

Facilitator and Barriers: Telehealth

Multiple interviewees agreed that COVID-19 sped up the telehealth process through the reduction of payment-based requirements and the general acceptance of virtual visits across the patient population. In addition, the adoption of telehealth is being facilitated by regional efforts to expand broadband access.

BPN initially planned to implement an HIE, an automated system that would have allowed network partners to electronically share patient data to improve care coordination and quality of care. BPN formed a partnership with Missouri Health Connection (MHC) when submitting the RMOMS application. As RMOMS progressed during the planning year, MHC received grant funding from MO HealthNet to cover the costs of the first year of implementation. Over the subsequent two years, participating providers would gradually pay more for some of the adoption costs. While the MHC-MO HealthNet project would have supplemented the amount the

RMOMS program would have covered for HIE participation, BPN-participating health care providers became confused between the two programs, concerned with the resource requirements, and ultimately decided to drop the effort. While BPN was able to move ahead with other RMOMS project components, one partner reported that the loss of the HIE was a disappointment.

> "A challenge that we have had, is if we refer someone to the hospital, it is often difficult to receive those records back in a timely manner, whether it be for a non-pregnancy related issue or a pregnancy related issue. So, that was probably one of my most exciting things about this project, was that everybody was going to be connected to Missouri Health Connect. And it could can work without it, but I think it would work a whole lot better with it."
> – BPN Network Partner

Goal/Strategy 3: Provider Training and Outreach

BPN will also strengthen provider capacity, "tell the story of what women's health care looks [like] in a rural area," and educate the community on the services offered throughout the Bootheel. Through a collaboration with Southeast Missouri State University, BPN is in the process of developing a "virtual tour" of the Bootheel, using provider and patient experiences to describe the challenges the area faces and resources available in the community. This resource can support workforce development efforts and educate policymakers about challenges and opportunities for improvement.

BPN also hopes to build the capacity of local providers through education. With the lack of transportation options in the region, it is not uncommon for women to deliver their babies in an ambulance. Therefore, BPN has incorporated Emergency Medical Services (EMS) into their workgroups. The SSM Perinatal Outreach program provides hospital and community education as directed through the Education Workgroup. Post-COVID, SSM Perinatal Outreach will provide standardized simulations for high-risk conditions for hospital partners and standardized didactic and simulation programs for EMS and non-delivering hospitals.

Finally, BPN leadership is leveraging its current participation in the state's maternal health ECHO telementoring model and encouraging RMOMS partners to participate as well. Through this telementoring program, partners can learn about evidence-based practices from experts and peers.[47]

D. Description of Maternal/Clinical Population

BPN's target population includes women of childbearing age living in the six counties of the Missouri Bootheel. However, as described earlier, BPN is rolling out its intervention in a phased approach, starting with system care coordination services for women referred to MFM services at Saint Francis Medical Center. In this section, we present an overview of the maternal/clinical Saint Francis MFM population as reported by BPN through de-identified patient-level data.

Overview of Maternal/Clinical Population: Patient-Level Data

Over 100 women participated in Phase 1a of BPN's system care coordination strategy, i.e., women with high-risk pregnancies who were referred to MFM services at Saint Francis Medical

Center. Of these women, all were pregnant at some point during the reporting period, and 87 (82%) delivered within the reporting period. As demonstrated by Table 5, 21 percent were Black or Hispanic, 64 percent were insured through Medicaid, and all had high-risk pregnancies and were living in one of the Bootheel counties. Most women (82%) under the age of 36.

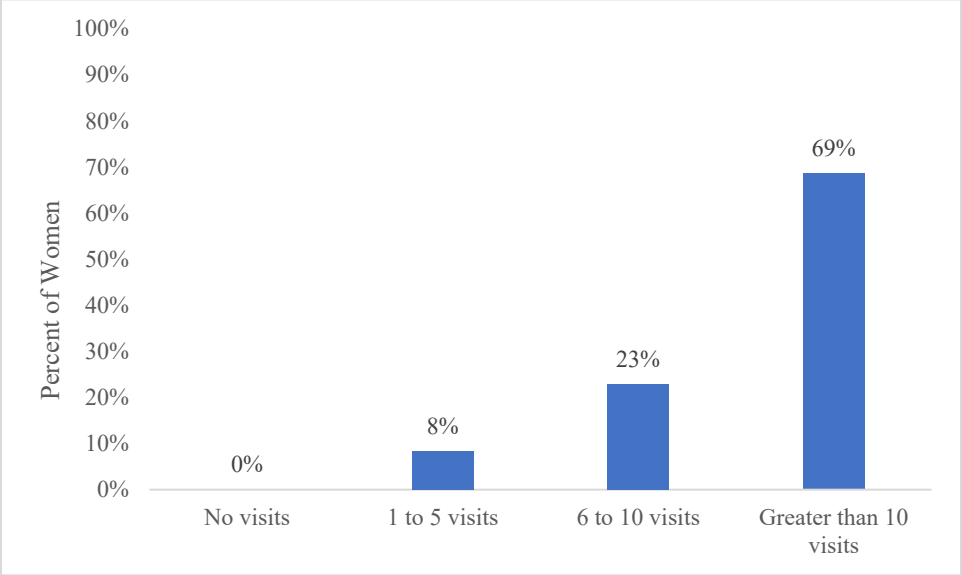
Table 5: Demographic Characteristics of High-Risk Women Served by RMOMS Partners in the Baseline Period Prior to Implementation, 2020 (n = 106)

Characteristic	Count	Percent
Age (years)		
25 or younger	30	28%
26-30	36	34%
31-35	21	20%
36 or older	19	18%
Race/ethnicity		
White (non-Hispanic)	84	79%
Black (non-Hispanic) or Hispanic	12	21%
Health insurance status		
Medicaid	68	64%
Private insurance	38	36%
High-risk pregnancy	106	100%
Resides in RMOMS county	106	100%

Source: Patient-level data submitted by awardee in December 2020. The baseline period was September 1, 2019 to August 31, 2020.

Over 70 percent of Phase 1a women received a prenatal visit within the first trimester. Of those who completed their pregnancies within the reporting period, the majority had more than 10 prenatal visits (Figure 6). Women of color (Hispanic and Black women) were slightly less likely to have a prenatal visit in the first trimester than their White counterparts (68% compared to 71%) and had fewer visits overall. While 72 percent of White women had greater than 10 visits, only 58 percent of women of color did even though both groups had been referred to MFM care for their high-risk pregnancies.

Figure 6: Prenatal Care Utilization for High-Risk Women as Defined by Number of Prenatal Visits in the Baseline Period Prior to Implementation, 2020 (n = 83)



Source: Patient-level data submitted by awardee in December 2020. The baseline period was September 1, 2019 to August 31, 2020.

Of the babies born to women in the baseline period, 79 (82%) were singletons and 17 (18%) were part of a multiple birth. Of all births, 25 percent were preterm, 11 percent had a low birthweight, and 17 percent required a NICU stay (Table 6). Multiples were much likelier to be delivered prior to 37 weeks, have a low or very low birthweight, and require a NICU stay.

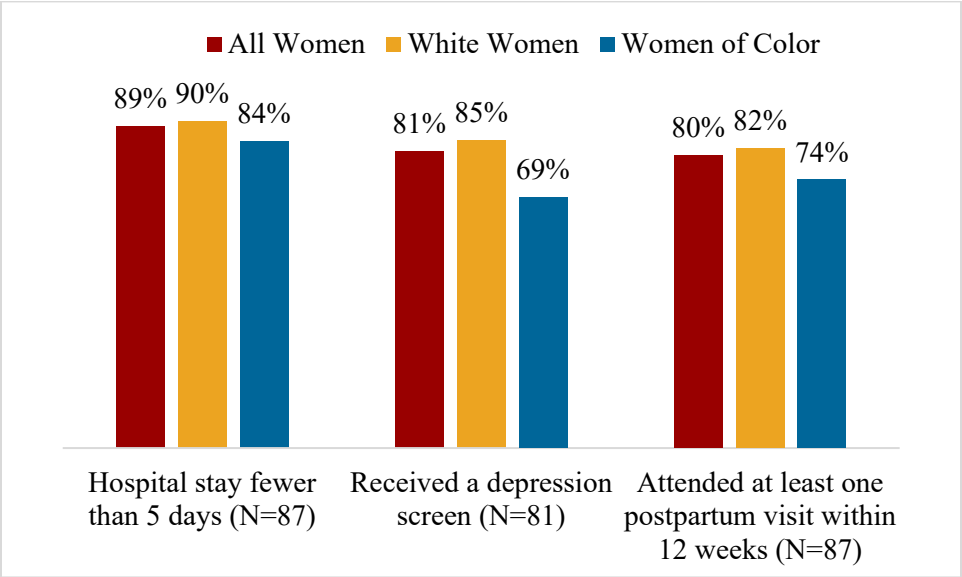
Table 6: Infant Health Outcomes in the Baseline Period Prior to Implementation, 2020

Characteristic	Births (n = 96)	
	Count	Percent
Gestational age		
Under 37 weeks	24	25%
Full-term delivery (37+ weeks)	72	75%
Birthweight		
Low birthweight (1,500-2,499 g)	11	11%
Very low birthweight (<1,500 g)	18	19%
NICU stay	16	17%

Source: Patient-level data submitted by awardees in December 2020. The baseline period was September 1, 2019 to August 31, 2020.

The vast majority of Phase 1a women (89%) who delivered within the reporting period had hospital stays of fewer than five days (Figure 7). Of those who delivered with sufficient time to receive postpartum follow-up care (i.e., at least eight weeks before the end of the reporting period), 80 percent had a postpartum visit and 81 percent received a postpartum depression screening. Women of color had longer hospital stays and lower rates of depression screening and postpartum visit attendance.

Figure 7: Maternal Labor/Delivery and Postpartum Outcomes in the Baseline Period Prior to Implementation



Source: Patient-level data submitted by awardees in December 2020. The baseline period was September 1, 2019 to August 31, 2020.

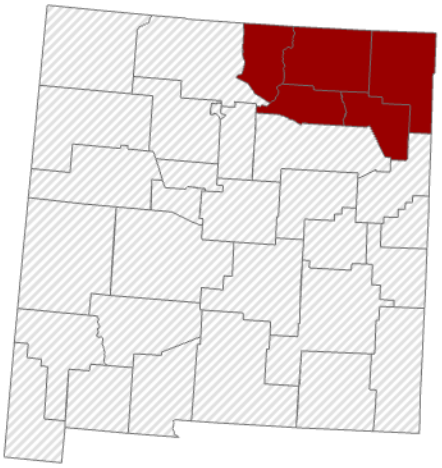
E. Sustainability

Sustainability is a top priority for BPN leadership. The role of the system care coordinator is the primary long-term expense of the network because telehealth visits are covered by insurance and home visitation services are funded through other grants. BPN is pursuing sustainability for this position through partnerships with Medicaid and other organizations. BPN aims to demonstrate the value of the system care coordinator in terms of improving maternal health outcomes and reducing costly services. MO HealthNet, the state Medicaid agency, attends BPN workgroup meetings, and leadership from Medicaid managed care organizations have also demonstrated interest. In addition, BPN leadership engages with agencies across the state to stay apprised of other opportunities for funding and collaboration.

As BPN advances into the first implementation year, the network plans to expand its care coordination strategy to women referred to MFM services through SoutheastHEALTH in March 2021. Women with other risk factors will be rolled into the effort in 2022. BPN also hopes to launch its telehealth initiative by the middle of the first implementation year after purchasing equipment and contracting the sonographer. Finally, BPN will begin its training simulations both at participating hospitals and EMS once the COVID-19 pandemic does not pose a significant risk to attendees.

IV. Rural Obstetric and Maternal Services Program—New Mexico

The ROAMS network is establishing new clinics, promoting support services, and exploring financial sustainability to improve access to and financial viability of maternal services in the region. Below we describe the area context, the maternal and child health landscape of the ROAMS service area, and the progress the program has made toward model implementation.



A. About the Area

Located in a geographically isolated and mountainous area of northeastern New Mexico, ROAMS covers five counties: Colfax, Taos, Union, Harding, and Mora. The ROAMS service population includes just over 50,000 individuals, 9,400 of which are women of childbearing age.[1] ROAMS counties represent the state overall in terms of demographic indicators, demonstrating similar rates of poverty, educational attainment, and unemployment (Table 7).[1] However, ROAMS counties have a higher share of Hispanic individuals than in the state overall and a much lower median income.[1] ROAMS counties differ from the state's urban counties. For example, 36 percent of residents of ROAMS counties are below 150 percent FPL, compared to 31 percent in urban counties.

Table 7: ROAMS Service Area Population Demographics, 2018

Metric	ROAMS Counties	All Rural Counties in NM	All Urban Counties in NM	State
Household median income	$33,266	$40,815	$48,899	$42,529
Percent below 150% FPL	36%	35%	31%	34%
Percent with high school education or less	46%	48%	42%	47%
Unemployment rate	7%	7%	7%	7%
Percent of people less than 65 years old without insurance	10%	11%	11%	11%
Race/ethnicity				
White (non-Hispanic)	38%	37%	38%	38%
Black (non-Hispanic)	<1%	2%	2%	2%
Native American/Alaskan Native (non-Hispanic)	4%	12%	7%	9%
Multiple or other (non-Hispanic)	2%	2%	4%	3%
Hispanic	56%	47%	49%	49%

Source: American Community Survey Data, United States Census Bureau, 2018.

State Policy and Funding Landscape

Medicaid Policy:

- *Name:* Centennial Care

- *Births covered by Medicaid:* 71 percent[3]

- *Income requirement for pregnant women:* Less than 255 percent FPL[32]

- *Length of postpartum coverage:* 60 days post-delivery[48]

- *Medicaid expansion:* New Mexico expanded Medicaid in 2014, offering coverage to all adults with incomes lower than 138 percent FPL.[3]

- *Medicaid Core Measures:* Centennial Care falls short of both 2020 Healthy People Goals. Only 73 percent of women have timely prenatal care compared to a target of 78 percent and almost 10 percent of babies have low birthweight compared to a target of 8 percent.[34]

Other Federal Grant Funding: New Mexico receives over $4 million in federal funding under Title V.[49] HRSA FORHP funds various health care systems in New Mexico through the Rural Health Network Development Program, the Rural Health Care Coordination Program, and the Rural Health Network Development Planning Program, which is awarded to the ROAMS network hospital, Miners Colfax Medical Center. New Mexico also participates in the HRSA MCHB AIM Maternal Health and Safety Initiative with an initial focus on the Severe Hypertension in Pregnancy and Obstetric Hemorrhage bundles.

Broadband Access: While broadband access is more limited in ROAMS counties than in urban areas in New Mexico, all ROAMS county residents are served by at least two broadband providers.[38]

B. State and Regional Maternal Health Landscape

Women living in the geographically isolated, mountainous ROAMS service area face significant maternal health challenges (described below).

Maternal Access to Care

In its application for RMOMS program funding, ROAMS staff reported that women must drive long distances to access care and that there are high rates of maternal mortality, unplanned and teen pregnancies, low birthweight, infant mortality, and substance use among women in the region. ROAMS also reported that maternal mortality rates among Hispanic women in New Mexico are nearly twice the national average and that rates are increasing steeply. This carries particular significance for the mostly majority-Hispanic ROAMS service counties. Within the service region, there are just two hospitals that provide labor and delivery services and no neonatal intensive care hospitals. Data from NVSS support the ROAMS network's findings. Women living in the ROAMS counties have lower rates of adequate prenatal care and lower rates of timely initiation of prenatal care than the state and national averages. While the ROAMS county average rate of C-section deliveries is lower than the statewide average for 2016-2018, the rate is still higher than the HHS Action Plan target for the year 2025 (Table 8).

Table 8: Prenatal and Delivery Measures in New Mexico, 2016–2018

Measure	ROAMS County Average (2015-2018)	Statewide Average	National Average	Healthy People 2020 or HHS Action Plan Goal
First trimester prenatal care	65%	68%	75%	77.9%
Inadequate prenatal care	37%	28%	19%	NA
C-section rate	20%	24%	32%	19.4%

Notes: Inadequate prenatal care is pregnancy-related care beginning in the fifth month of pregnancy or later or less than 50 percent of the appropriate number of visits for an infant's gestational age. The C-section target for 2025 was identified from the HHS Action Plan to Improve Maternal Health in America. Source: Centers for Disease Control and Prevention, National Vital Statistics System Restricted Natality Data 2015–2018.

Women living in New Mexico also struggle with a lack of access to adequate care in the postpartum period, and there are disparities by race/ethnicity. Only 77 percent of Hispanic women attended a postpartum check-up after delivery in 2017, the lowest of any reported racial/ethnic group in New Mexico that year.[39]

Infant Health Outcomes

Women and infants living in the ROAMS region experienced lower rates of preterm birth (birth at less than 37 weeks gestation) and low birthweight (less than 2,500 grams) than the state and national averages in 2015–2018 (Table 9). The rate of infants presenting with abnormal conditions is also lower in ROAMS counties than the national average.

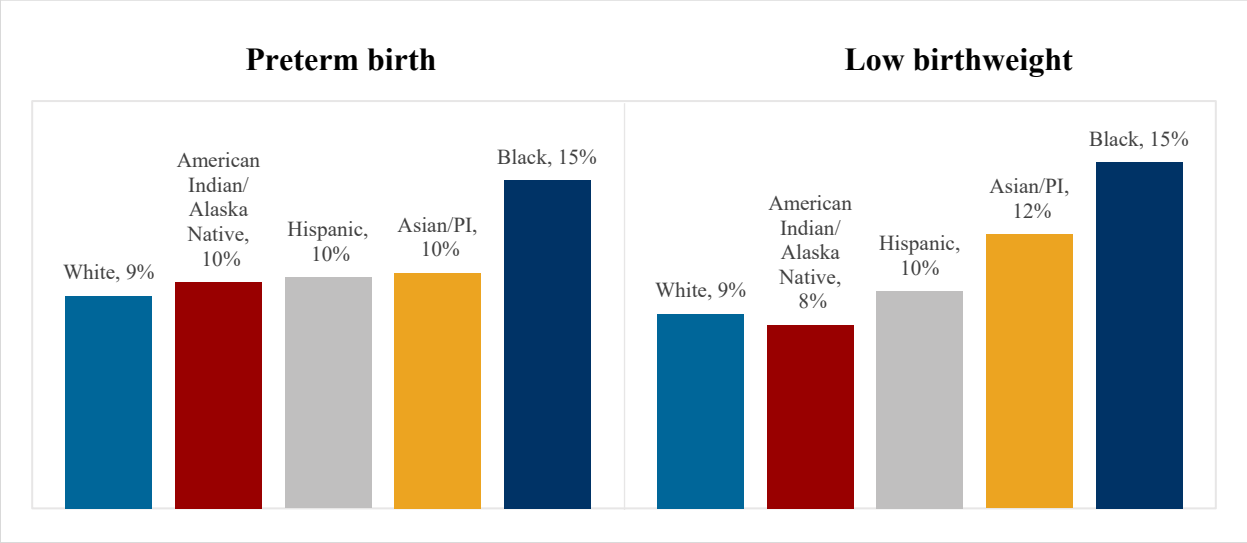
Table 9: Infant Health Outcomes in New Mexico, 2016–2018

Measure	ROAMS County Average (2015-2018)	Statewide Rate	National Rate	Healthy People 2020 Maximum Target
Preterm birth	8%	12%	12%	11.4%
Low birthweight	7%	9%	8%	7.8%
Abnormal condition	8%	13%	11%	NA

Notes: Preterm birth is before 37 weeks gestation. Low birthweight is less than 2,500 grams. Abnormal condition includes presence of seizures, lack of surfactant, need for antibiotics, or assisted ventilation. Source: Centers for Disease Control and Prevention, National Vital Statistics System Restricted Natality Data 2015–2018.

While average infant outcomes in ROAMS counties generally exceed Healthy People 2020 standards, there are significant racial disparities in infant health outcomes in New Mexico. The rates of preterm birth and low birthweight are highest for Black infants. The rate of low birthweight is also notably higher among Asian/Pacific Islander infants compared to White and American Indian/Alaska Native infants (Figure 8). Infant mortality for 2017 follows similar trends. There is a 6.5 percentage point difference between Black infants, who have the highest mortality rate (12%), and White infants, who have the lowest mortality rate (5%).[41]

Figure 8: Racial Disparities in Infant Health Outcomes in New Mexico, 2017-2019



Notes: All race categories exclude Hispanics. Preterm birth is before 37 weeks gestation. Low birthweight is less than 2,500 grams. All race categories exclude Hispanics. County-level data by race/ethnicity are not available. Source: National Center for Health Statistics, final natality data and period-linked birth-infant death data. Retrieved December 1, 2020 from www.marchofdimes.org/peristats.

Maternal Mortality

New Mexico is one of 25 states that received funding from the CDC's ERASE MM program.[42] Through support from ERASE MM, the New Mexico Department of Health MMRC identified 58 maternal deaths statewide from 2015 to 2017.[50] Of these, 17 were considered pregnancy-related and 41 pregnancy-associated; 74 percent of all deaths were deemed preventable.[50] The vast majority of deaths (86%) occurred among women with Medicaid insurance, and a majority (55%) were among women living in rural areas (Table 10).[50] NCHS did not report 2018 maternal mortality data for New Mexico due to confidentiality restrictions, which apply to states that had fewer than 10 maternal deaths in 2018.[43]

Table 10: Pregnancy-Associated Deaths in New Mexico, 2015–2017 (n = 58)

Population	Percent of Maternal Deaths
Race/ethnicity	
White	36%
Hispanic	40%
American Indian/Alaska Native	19%
Black	3%
Mixed race	2%
Area	
Urban	45%
Rural	55%
Insurance	
Medicaid	86%

Population	Percent of Maternal Deaths
Private	10%
Other	4%

Source: New Mexico Department of Health, MMRC. Maternal Mortality in New Mexico, 2015–2017. Presentation by Sharon Phelan, M.D., et al. Accessed January 15, 2021.

The committee also found that motor vehicle crashes, mental health problems, other injuries, and embolisms were leading contributors to maternal deaths and that most deaths (59%) occurred more than 43 days postpartum.[50] Information on whether these factors were more prevalent for rural women is not currently available.[50]

Regional Maternal Health Challenges Reported by Interviewees

The ROAMS interview participants emphasized how the region's geography impacts access to maternal health services and described key challenges in the area:

> "...According to recent literature…31 percent of our moms who die, die in car accidents, which is an astronomical number…part of the ROAMS [model] is to keep people close to their home for their care."
> – ROAMS Clinician

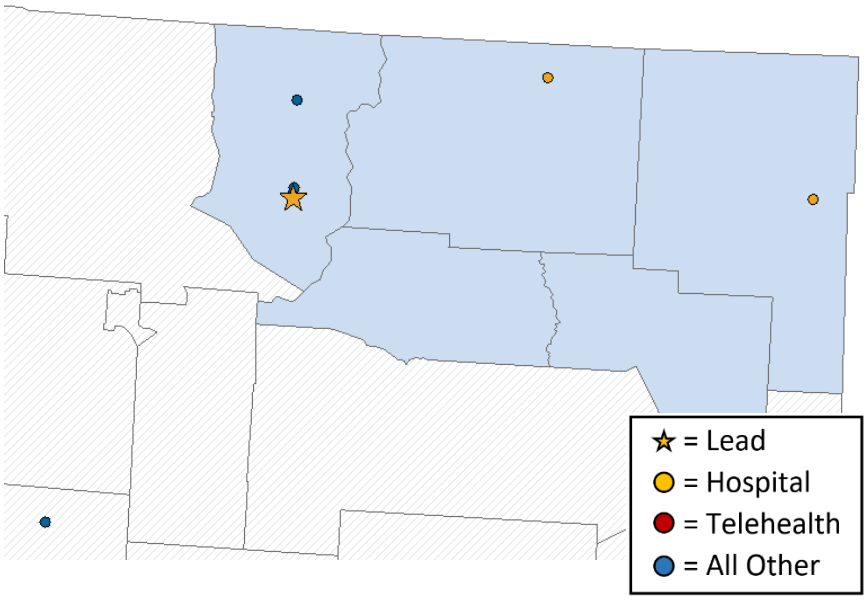
- **Lack of obstetric services:** Some hospital obstetric units in the region have closed and two counties (Mora and Harding) have no obstetric services at all. Union County General Hospital, which is part of the ROAMS network, stopped delivering babies years before ROAMS was established, leaving women in the greater Clayton area with no nearby access to obstetric care. Women with high-risk pregnancies must travel long distances and sometimes across state lines to access level-appropriate care.
- **Challenging weather and mountainous roads:** Network partners are far apart from each other; the lead hospital is more than 160 miles away on a winding mountainous road from one of the other network hospitals.
- **High prevalence of maternal health conditions, particularly hypertension, diabetes, mental health, substance use, and high rates of fatal car accidents:** Clinical providers described substance use as a particular difficulty with multiple impacts, including inadequate prenatal care, higher rates of preterm birth, and lack of access to SUD treatment in a region with few treatment facilities. One clinician reported that substance use remains a major barrier to keeping pregnant women engaged in regular prenatal care and that many women become lost to follow-up as a result. Mental health issues are a challenge in this setting, particularly for pregnant women; the state's MMRC found that mental health causes were the second-highest cause of pregnancy-associated deaths in the state after car accidents.[50] New Mexico overall has the second-highest rate of suicide in the U.S., and the number of women who died by suicide statewide increased by 22 percent from 2017 to 2018.[51]
- **Population diversity:** Taos County alone is home to two of the 23 federally recognized American Indian/Alaska Native tribes in New Mexico.[52] One interviewee in Taos described the area as having significant subpopulations of American Indian/Alaska

Natives, Hispanics, a Jewish community, individuals living alternative lifestyles "off the grid," professionals working in higher-paying jobs at larger companies or hospitals, individuals living in deep poverty, and wealthy part-time residents who visit the region's destination ski resort during the winter. As a result, providers must find ways to serve populations who face very different maternal health challenges.

C. ROAMS Network Characteristics

The ROAMS network offers maternal health care to women living in Colfax, Taos, Union, Harding, and Mora counties in northeastern New Mexico, which span prairie, high desert, and alpine terrain in the Rocky Mountains at elevations as high as 13,000 feet. ROAMS has the smallest and most isolated patient population of the three awardees; Harding County, the least populous county in New Mexico, has a total population of just 665.[53] ROAMS expects to serve fewer than 100 women of childbearing age for services across the continuum of care in Harding County.

Figure 9: Location of ROAMS Network Partners



The ROAMS network developed its structure and partnerships by responding to community and geographic challenges and identifying partners with a strong interest in the mission of the networked model. The major regional maternal health challenges and primary network partners are described in the sections below.

Network Partners

The ROAMS network is led by Holy Cross Medical Center as well as a Governing Council, which consists of leadership from each of the network partners. ROAMS' primary partners and clinical sites are detailed below. Of the three hospitals in the network, only two offer labor and delivery services. All three hospitals in the network are Critical Access Hospitals (CAHs), which must have 25 or fewer inpatient beds and be located more than 35 miles from other hospitals to be eligible for a CMS reimbursement program designed to support rural hospitals' financial viability.[54]

- **Hospitals**: Two CAHs offering labor and delivery services (Holy Cross Medical Center in Taos and Miners Colfax Medical Center in Raton) and one CAH (Union County General Hospital in Clayton) that does not offer obstetric care, but will host the new prenatal clinic opening in spring 2021.
- **Prenatal care clinics**: Women's Health Institute (affiliated with Holy Cross Medical Center) in Taos; Miners Colfax Medical Center; Union County General Hospital

(opening spring 2021); and Questa Health Clinic (an existing FQHC with a new prenatal clinic opening in spring 2021).

- **Support services agencies**: Taos First Steps, a home visiting program based in Taos, is the only one of the five support agencies with a formal partnership agreement with the ROAMS network. Informal partners include the Children's Workshop offering services related to developmental delays in Raton and Clayton; Youth Empowerment Services offering home visiting and lactation support in Raton; The Taos Center for Breastfeeding offering lactation support in Taos; and Noesis offering behavioral health and substance use recovery services in Raton, Clayton, and Taos.
- **Financial and data partners**: Centennial Care (New Mexico Medicaid) and the University of New Mexico (UNM), the network's data partner.

The ROAMS network also has a unique system of collaborative workgroups and oversight entities participating in the network. These include the ROAMS Governing Council, a planned Mothers Council to solicit feedback from local women, and three official workgroups: the ROAMS Social Service Continuum of Care Workgroup, the ROAMS Data & IT Workgroup, and the ROAMS Clinical Workgroup. ROAMS also participates in the external Postpartum Care Legislation Workgroup, a collaboration of maternal health stakeholders and policymakers that advocates for improved postpartum care coverage in New Mexico.

The structure has changed slightly since ROAMS received its award; two new prenatal clinics will open in spring 2021 and one hospital system in the Albuquerque area dropped out due to competing priorities. In addition, UNM joined the network to assist with data and evaluation activities after the planning year was already underway.

> "Union County [General Hospital] and Questa were both very anxious to be part of the network because they don't provide any OB services. So, they saw this as a boon for their community…it sort of fell into line that folks that really wanted to be part of, and understood what we were trying to accomplish, were the natural partners."
> – ROAMS Leadership

Network Model and Goals

ROAMS aims to improve access to and quality of maternal health services for rural women across the entire continuum of care with a particular focus on women receiving pregnancy-related services. The primary strategies of the ROAMS model fall within three overarching goals.

Goal/Strategy 1: Expand Access to Care

ROAMS aims to improve access to high-quality maternal health care with a focus on reducing travel and geographic barriers to both routine pregnancy care and care for high-risk mothers. Within this goal, ROAMS has three primary strategies: open new prenatal clinics, expand telehealth offerings, and contract an MFM provider for high-risk pregnancies.

Open New Prenatal Clinics and Obtain New Equipment for Existing Clinics

ROAMS is opening two new prenatal clinics in the towns of Questa and Clayton in spring 2021 to help more women access routine prenatal care closer to home and to complement the network's two existing clinics in Taos and Raton. The two clinics will partner with another ROAMS network facility in a combined telehealth/in-person visiting model. The Questa clinic is housed at an FQHC, Questa Health Clinic, which previously did not provide any prenatal care. This new clinic will partner with Holy Cross Medical Center in Taos, approximately 30 miles away. The Clayton clinic is housed at Union County General Hospital, which stopped offering obstetric services years before joining ROAMS, and will partner with Miners Colfax Medical Center in Raton, just over 80 miles away.

> "We're the only OB for 100 miles in all directions…there's lots of weather issues and so sometimes they don't make their appointments and sometimes they come at the beginning of their pregnancies and then we don't see them again until they're delivering. So that was one of our biggest reasons for wanting to be involved in the ROAMS program to find some alternative ways to reach out to these moms."
> – ROAMS Clinician

ROAMS clinical providers from the two hospital partners will staff or support the two new clinics. The Questa-Holy Cross Medical Center partnership will utilize a combined in-person/telehealth model once a week for three weeks of each month. A Holy Cross OB provider will travel to Questa to provide in-person prenatal appointments during the first week of each month, a telehealth-only clinic will be held during the second week, and a Holy Cross midwife will travel to Questa for in-person visits during the third week. The Union County General Hospital-Miners Colfax Medical Center partnership will utilize a telehealth-only model on two days of each month, which reflects the longer driving distance between the two sites. This partnership plans to offer nurse practitioner-led prenatal visits onsite in Clayton under synchronous telehealth supervision from a family practice OB provider at Miners Colfax.

> "I do think this partnership between Miners Colfax, the labor and delivery hospital, and Union County General Hospital in Clayton, where the new prenatal clinic is located, is a huge achievement. They tried to do that in the past and it fell apart…this kind of partnership and network building between hospitals and clinics requires a lot of trust, data-sharing, and collaboration, which is difficult on the best day."
> – ROAMS Leadership

ROAMS estimates that 15 to 20 women, possibly more, will seek services in Questa through the new model, while an additional 10 to 12 women will take advantage of the new prenatal clinic offerings in Clayton. While Clayton will treat a relatively small number of women overall, the impact on these women is expected to be significant since they must currently travel long distances to the closest available prenatal care at Miners Colfax Medical Center.

All four prenatal clinics in the ROAMS network have been equipped with new ultrasound machines, vital signs equipment, fetal heart rate monitors, telehealth equipment, and other supplies to provide prenatal care visits. The updated equipment includes telehealth functionality to ensure standardized technology and less user error for providers who travel between different sites.

Expand the Use of Telehealth

ROAMS has embarked on a major expansion of telehealth capacity in network hospitals, clinics, and in patients' homes. During interviews, the network participants reported that for some women who live in very remote areas, telehealth may offer their very first connection to regular prenatal care. The ROAMS-specific telehealth intervention aims to fill these gaps and ensure that clinically complete telehealth prenatal visits can take place at home. The network's work includes contracting with a telehealth vendor to establish standardized systems in clinics, training providers on how to use modern video conferencing systems, and creating "home telehealth kits" that can be distributed to mothers during pregnancy. These kits, which will include electronic tablets that can record blood pressure, weight, blood oxygen level, glucose level, and fetal heart rate, aim to support women in attending routine prenatal care visits from home and collecting clinical data to share with their providers. ROAMS has awarded the contract to an established telehealth vendor to provide the clinical equipment and home telehealth kits, which are both on track for roll-out in spring 2021. ROAMS is also bolstering the telehealth intervention by contracting with an MFM provider for high-risk pregnancies (discussed in the next section).

Types of Telehealth Technology in ROAMS

- Remote patient monitoring
- Telehealth visits from home
- Data transmission
- Grand Rounds and training

Some providers within the ROAMS network already access telehealth training through Project ECHO, particularly related to the AIM initiative, and ROAMS plans to continue to promote attendance and to explore ECHO offerings related to SUD treatment. ROAMS also plans to begin "telehealth Grand Rounds" in spring 2021, which will be led by the ROAMS Medical Director based at Miners Colfax Medical Center and open to both medical practitioners and social services providers.

ROAMS interviewees noted that providers have been forced to adopt telehealth practices due to the COVID-19 pandemic, which partially accelerated progress in the ROAMS telehealth strategy. However, one provider reported that some of the COVID-driven visits still have gaps in quality due to the lack of home telehealth equipment for mothers, which prevents providers from collecting weight, blood pressure, and other vital signs needed for a complete prenatal visit. Some mothers also lack sufficient internet access and may need additional support to utilize home telehealth in the future.

Contract an MFM Provider for High-Risk Pregnancies

While expanding MFM access was not a priority strategy in the ROAMS program's original application, ROAMS collected survey feedback from local mothers who identified a need for greater access to telehealth MFM care for high-risk pregnancies, particularly among women living in very remote areas. Based on this feedback, ROAMS decided to pursue contracting with a telehealth MFM provider to help more women access care locally and avoid long drives over challenging terrain for in-person visits with MFM providers in Santa Fe or Albuquerque. The telehealth MFM visits will

> "…I talked to the mothers in Clayton that are driving four or five hours one-way over a mountain pass to get to a high-risk appointment…I think this MFM telehealth support and partnership is going to be important in a whole lot of ways."
> – ROAMS Leadership

complement ROAMS' other telehealth expansion activities by providing a way for women with high-risk pregnancies to receive local prenatal care for a longer period of time, even if they ultimately may need to deliver at a non-ROAMS facility that offers a higher level of care. This approach aims to remain responsive to local mothers' concerns and convenience, but also to reduce the risk of car accident-associated maternal mortality, which is a leading cause of preventable pregnancy-associated death in New Mexico.[50] By avoiding "defaulting" to sending women with high-risk pregnancies to larger cities for their routine prenatal care, ROAMS can prevent these women from making a high number of long, potentially dangerous drives.

ROAMS began exploring MFM vendors during the planning year and early in the first implementation year. Depending on which MFM provider ROAMS selects, women will be able to access telehealth MFM care either from home or from local clinics. The process included collaboration and communication among different ROAMS network providers to identify the top priorities and requirements for the MFM vendor offerings. For example, Miners Colfax Medical Center noted that while it already has a relationship with an MFM provider to review ultrasound results, it wanted to explore greater opportunities for direct provider–patient interaction via telemedicine and to prioritize smooth telemedicine technical functionality in the new ROAMS MFM initiative. The network aims to select an MFM provider in spring 2021.

Goal/Strategy 2: Connect Women to Social Services

ROAMS seeks to enhance connections and referral patterns to help women access social services in the community, including family support, lactation consulting, and other services to support maternal and family health across the continuum of care. Within this framework, ROAMS has three primary strategies: offer patient navigation services, hire lactation consultants, and develop new advertising campaigns to promote the services and births in ROAMS network hospitals.

Offer Patient Navigation Services

The ROAMS network hired a consultant and set an early goal of hiring family navigators to help improve referrals to social supports in the community, such as lactation consultation and home visiting services, for women receiving clinical services in the network. ROAMS aims to promote a warm handoff approach, particularly for women with greater support service needs, and to promote more cross-referrals between services.

During the planning year, ROAMS learned about the Pathways Community HUB Institute, a care model program that offers specific patient navigation pathways and clinical targets that must be met in exchange for insurance reimbursement for patient navigation services.[55] ROAMS applied to join this model as a pilot agency. ROAMS' goal in joining the Pathways pilot was not only to utilize an evidence-based navigation model that rewards specific targets, such as the completion of referrals, but also to establish a financial structure for patient navigation that can be sustained after the RMOMS award period expires. Joining as a pilot program will save ROAMS approximately $20,000 in application fees upfront and certification (expected late in 2021) will enable ROAMS to receive Medicaid and private insurance reimbursement in the future, both of which will produce substantial cost savings for the network.

> "It's also working towards sustainability because [the Pathways patient navigation program] in other states has become reimbursable through Medicaid and managed care organizations…when the RMOMS [award] is done, because it would be reimbursable by insurance, those family navigators would be able to continue on."
> – ROAMS Leadership

ROAMS received approval for its Pathways pilot application in January 2021 and expects to hire three part-time patient navigators, one serving each of the three most populous RMOMS counties (Taos, Union, and Colfax). The network will work with the prenatal clinics to integrate the navigators into clinical practice and meet the requirements of the Pathways program, ideally using a model in which the patient navigator checks in with pregnant women at least three times: once early in pregnancy, once in the middle or late in pregnancy, and one during the postpartum period. The family navigators will also be responsible for making and tracking completed referrals to support services in the community, such as lactation consultation and home visiting programs.

Hire Lactation Consultants

The ROAMS network hired two lactation consultants with the goal of enhancing postpartum services and providing lactation support to every interested mother. ROAMS has set an initial target of completing at least one consultation for 75 percent of mothers who receive clinical services from network facilities. While some lactation consultation services were already available in the community, access to high-quality services is inconsistent and costs are often prohibitive, particularly in the immediate postpartum period. Interview respondents identified breastfeeding support as a high-priority need in the service region. ROAMS ultimately hopes to improve access to lactation consultations and to use it as a pathway to make more cross-referrals to other social services with assistance from the family navigators.

> "I am really excited about [the ROAMS program]…I wish I'd had this my entire career to be able to do this type of medicine."
> – ROAMS Clinician

Develop Advertising Campaigns to Promote Social Services and Births in ROAMS Facilities

ROAMS is implementing an advertising strategy with two main prongs: 1) promote services at ROAMS network hospitals to decrease the estimated 40 percent market loss from women choosing to deliver elsewhere, and 2) help support services partners by highlighting new network offerings, such as lactation consultation, home visiting, and family navigation. ROAMS is working with an advertising agency to "get the word out" about the network and operates a ROAMS website and a Facebook page, which were used to distribute a survey in both English and Spanish for mothers to identify their top maternal health needs and priorities. Other planned initiatives include mailing informational letters and postcards to women living in the service region, sending press releases to local media outlets, and making posters to hang in the network's prenatal clinics and at support services agencies. ROAMS plans to work closely with the support services agencies throughout the process, including during quarterly meetings, and has solicited their input on the advertising campaigns. The materials will ultimately advertise the services available at the support services agencies as well as the new MFM provider access and telehealth offerings at the ROAMS prenatal clinics.

> "We're about to do press releases and more advertising once we have opening dates announced for the new clinics…I think [ROAMS] is going to build and become a really popular program, especially the MFM telehealth and the home telehealth options during COVID." – ROAMS Leadership

Goal/Strategy 3: Expand Pathways to Sustainability

ROAMS seeks sustainable payment and financial structures to ensure the long-term viability of the ROAMS program. This goal includes three main strategies: analyzing market share data, promoting improved Medicaid reimbursement and policies, and completing cost savings analyses.

Identify and Address Reasons Why Women Leave the Service Area for Care

As discussed above, the ROAMS network aims to analyze market share data each year to see if ROAMS can reduce the share of women in the service region, around 40 percent in 2017, who opt to deliver at non-network hospitals. ROAMS has begun analyses by extracting delivery data from New Mexico's Indicator-Based Information System (NM-IBIS), a state surveillance database, and engaging in discussions with network hospitals to confirm how many deliveries they attend each year. ROAMS is pairing these statistics with information from its surveys of mothers, which will be analyzed each spring and shared with the Governing Council, to learn more about women's reasons for delivering at non-ROAMS facilities.

Findings from the first round of surveys in 2020 revealed that mothers have three primary reasons for delivering at non-ROAMS facilities: a) they have high-risk pregnancies and cannot access appropriate care locally; b) they have had previous negative experiences with ROAMS network facilities or providers; and c) they believe that a rural hospital is likely to offer lower-quality care and non-modern equipment. A ROAMS interview participant confirmed these findings and reported that deliveries at one ROAMS network hospital had declined in recent years due to community perceptions of poor-quality care and interpersonal issues related to a particular OB provider. These findings led to ROAMS' decision to pursue a telehealth MFM provider to help offer high-quality care for high-risk pregnancies locally, but the network plans

to analyze new survey data each spring to obtain current information on mothers' preferences and perceptions of the network. ROAMS also hopes that its improved services will attract women who currently prefer to deliver with local midwives or travel to larger facilities farther south.

Improve Medicaid Reimbursement and Policies

Centennial Care, the New Mexico state Medicaid agency, is a formal partner within the ROAMS network. ROAMS is pursuing two long-term strategies related to Medicaid policy:

> "Colleen [the Executive Director of ROAMS] is looking ahead and realizing that it's going to take us a while to get those state policies modified. It won't happen in a single legislative session. [She's] trying to prepare us for when the RMOMS [award] is over, and how we can augment a Medicaid reimbursement."
> – ROAMS Leadership

- **Pursuing higher reimbursement rates for deliveries covered by Medicaid.** The ROAMS leadership team has engaged in conversations with the state Medicaid director and with a state senator to call attention to the impact of low Medicaid reimbursement rates for deliveries at ROAMS network hospitals and to compare New Mexico's rates to higher rates in other states. ROAMS reported that according to its analyses, up to 77 percent of deliveries within the network are covered by Medicaid and that an increase in reimbursement rates would have a substantial impact on hospital finances. ROAMS has produced a report for the state Medicaid agency and the New Mexico State Legislative Committee showing the gap between delivery costs compared to Medicaid reimbursement. ROAMS has also called attention to the problem of rural hospital and clinic closures in the state and plans to continue these conversations moving forward.
- **Pursuing Medicaid coverage for one year postpartum**. New Mexico Medicaid currently offers coverage for only 60 days postpartum.[32] The ROAMS network is part of the New Mexico Postpartum Care Legislation Workgroup, which is currently working on strategies for approaching the state Medicaid program to expand coverage in the postpartum period to 12 months. If this change is enacted, it would represent a major expansion of coverage for the women in the network who have Medicaid insurance during pregnancy (more than 75%).

ROAMS initiated its work on each of these strategies during the planning year, but views both strategies as long-term efforts to promote greater financial sustainability after the RMOMS program ends.

Complete Annual Cost Analysis and Produce Cost Savings Estimates

ROAMS plans to complete an annual cost analysis of the ROAMS program with the goal of capturing estimated cost savings, such as savings from using mid-level practitioners to offer prenatal care or from the use of telehealth. This work, which ROAMS has not yet started, pairs with the cost work that ROAMS has already completed for the New Mexico State Legislative Committee, which shows the gap between obstetric costs and Medicaid reimbursement at ROAMS facilities.

An Overarching Theme: Community Involvement and Collaboration

The ROAMS network's goals and strategies described above are informed by and supported by clinical, data and evaluation, and support services workgroups. These groups provide input to ROAMS leadership and the Governing Council. ROAMS also solicits feedback from mothers through surveys and a Mothers Council to help identify priority needs in the community. Implementation of an in-person Mothers Council has been delayed due to COVID-19, but ROAMS plans to pursue these meetings as soon as it is safe to do so. Progress on each of the major ROAMS network goals and strategies is summarized in the table below.

Table 11: Summary of Progress on ROAMS Network Strategies, April 2021

Goal	Primary Strategies	Progress to Date (April 2021)
Expand access to care	Establish two new prenatal clinics	Opened March 2021
	Enhance in-clinic telehealth capability	Rolled out March 2021
	Distribute home telehealth kits to women	On target for roll-out in April 2021
	Contract new MFM provider	On target for roll-out in May-June 2021
Connect women to social services	Hire patient navigators	In progress
	Hire lactation consultants	Complete
	Support advertising campaigns and promote births at ROAMS network facilities	In progress
Enhance sustainability	Examine market share data and survey data	In progress
	Improve Medicaid reimbursement and policies	In progress
	Complete annual cost analysis and produce cost-savings estimates from program activities	Not yet started

Implementation Challenges and Successes

While most ROAMS interview respondents expressed optimism about the network's progress and future implementation plans, several noted the impact of start-up challenges in the planning year.

The Main Driver of Success: Strong Leadership and Engagement

Despite these challenges, nearly all interview respondents reported feeling positive about the progress the ROAMS network made in its first year and the prospects for future progress. Motivated and engaged network partners appeared to play a strong role in this achievement. Several respondents specifically identified the ROAMS Executive Director, who was hired after the RMOMS program was awarded, as a "home run" and "a real positive" for the network and credited her with driving progress in difficult circumstances and helping all network members understand the purpose of the program. Respondents also reported that other staff and clinicians at participating sites played crucial roles in maintaining momentum, addressing specific issues, and providing input on how best to tailor proposed initiatives for the highest chance of success.

> "I think at a high level, we've achieved a remarkable amount, especially during COVID times…with the diverse networks that we have, I've been really impressed with people doing what it takes to move it forward. I'm astounded that we have accomplished as much as we have."
> – ROAMS Leadership

COVID-19

COVID-19 has had a mixed impact on the ROAMS network. The initial pandemic response took center stage and required significant time and attention from ROAMS program administrators and clinical staff; then, nearly a year after the pandemic started, many staff became heavily involved in vaccine distribution. The pandemic response has required time, resources, and adaptability at all levels of the network; it "slowed everything down" and prevented some planned network activities, such as the Mothers Council meetings, site visits, and in-person collaborative meetings between clinicians, from ever taking place.

> "[The ROAMS director] got hired on, and then the pandemic started…so our hospital got very COVID-focused very fast…our hospital has had to shift their priority and now the priority is the vaccine distribution."
> – ROAMS Leadership

Some interview participants reported that COVID-19 decreased utilization of services and that women were fearful of attending in-person medical appointments. One respondent based at a hospital reported that in the early days of the pandemic, the hospital instituted a "no visitors" policy that prevented women from having a support person present during delivery. This had an immediate negative impact on birth volumes as women opted to travel to hospitals with looser restrictions. However, other interview respondents reported that ongoing safety measures, including mask-wearing and social distancing policies, have assuaged women's concerns and helped restore normal levels of utilization. Most interview participants reported that the COVID-19 pandemic dramatically accelerated the adoption of telehealth but that the ROAMS network telehealth initiatives, including the home telehealth kits, remain necessary to improve care quality and ensure that women still receive complete prenatal visits supported by vital signs data.

One ROAMS clinician described some unique challenges in providing in-person care during COVID-19; for example, mask-wearing has made it challenging to read patients' expressions to assess their pain levels and conversational cues. In addition, clinicians have had to constantly

adapt to changing COVID-19 treatment protocols, including for pregnant women, as new evidence has emerged.

Getting Clinicians "On Board" with ROAMS

Some interview respondents described challenges in getting other clinical partners in the network "on board" with some of the ROAMS program initiatives, particularly related to the new prenatal clinic at Union County General Hospital and to telehealth, which ROAMS providers believe is not a complete substitute for in-person care during pregnancy. While most providers agree that telehealth can supplement in-person care, particularly for at-risk mothers, all providers in the network agree that in-person care must remain a focus as well. The COVID-19 pandemic also hindered some of the communication activities and site visits that had been planned to build trust and collaboration structures between the participating sites.

Next Steps for Implementation

The ROAMS network's short-term implementation goals include launching the two new prenatal clinics, commencing the in-clinic and home telehealth initiatives, hiring three patient navigators, and selecting the MFM provider to begin MFM care for high-risk pregnancies. Increasing the utilization of these services and pursuing long-term sustainability in the form of policy changes will help promote long-term financial strength, opening possibilities for ROAMS to further expand service lines in the future.

D. Description of Maternal/Clinical Population

The ROAMS' target population includes women of childbearing age and their children who reside in Taos, Colfax, Union, Harding, and Mora counties and are likely to receive medical care in the three northeastern New Mexico counties (Taos, Colfax, and Union). Within this population, the maternal/clinical population includes women who received any clinical care related to pregnancy at ROAMS network facilities. This section describes this population as reported by ROAMS in the first patient-level data submission.

Overview of the Maternal/Clinical Population: Patient-Level Data

ROAMS submitted de-identified patient-level data for 504 unique women who received any pregnancy-related care at ROAMS network facilities. These 504 women had a total of 505 pregnancies during the reporting period. However, this included women who experienced pregnancy loss that did not result in a delivery; these cases were excluded from the patient-level data analysis because they did not receive significant services from the ROAMS network and did not have pregnancy, delivery, or outcomes data to report. The final populations that were included in this analysis (the total, pregnancy, delivery, and postpartum populations) are shown in Table 12 below.

Table 12: ROAMS Maternal/Clinical Population in the Baseline Period Prior to Implementation

Analytic Populations	Count
Total number of unique women	467 (*total population*)
Total pregnancies in the reporting period	466 (*pregnancy population*)
Total number of deliveries in the reporting period	264 (*delivery and postpartum population*)
Out-of-network deliveries	47

Notes: Pregnancy losses before 20 weeks gestation were excluded from these figures and the entire patient-level data analysis. Out-of-network deliveries include deliveries that took place at non-ROAMS facilities for women who received prenatal care at ROAMS facilities. Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

Overview of the ROAMS Maternal/Clinical Population Prior to RMOMS Implementation

Among the total population who received any pregnancy-related services from network partners in the baseline period (n = 467), 89 percent resided in one of the five ROAMS counties (Taos, Union, Colfax, Mora, and Harding). The vast majority of women (80%) were between the ages of 21 and 39 and most (76%) were White. Five percent of the population served by ROAMS identified as American Indian/Alaska Native. Just over half of the population (53%) identified as Hispanic or Latina. Almost three-quarters of the total population (71%) had Medicaid insurance (Table 13).

Table 13: Demographic Characteristics of Women Served by ROAMS in the Baseline Period Prior to Implementation (Total Population, n = 467)

Characteristics	Count	Percent
Age (years)		
20 or younger	79	17%
21-25	122	26%
26-30	135	29%
31-35	79	17%
36-39	37	8%
40 or older	15	3%
Race		
American Indian/Alaska Native	25	5%
White	346	76%
All Other	84	18%
Ethnicity		
Hispanic	236	53%
Non-Hispanic	212	47%
Maternal health insurance status		
Private insurance	129	28%

Characteristics	Count	Percent
Medicaid	333	71%
Unknown	5	<1%

Notes: Cell counts do not sum to the table n due to missing information for each characteristic; missing values are not included in the calculation of percentages. The "All other" race group includes women who identified as Black, Asian, or Other and was combined due to small cell counts. Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

Care Utilization In the Baseline Period (Prior to RMOMS Implementation)

Women with high-risk pregnancies were less likely to receive a prenatal visit in the first trimester than non-high-risk pregnancies, 66 percent compared to 74 percent (Table 14). However, women with high-risk pregnancies were likelier to attend telehealth visits (not specific to the intervention) and were the only group that received MFM consultation. While the MFM intervention for ROAMS is not yet operational, these numbers reflect the current MFM practices at Miners Colfax Medical Center, which is the only site that reported data on MFM consultation. Miners Colfax sends all ultrasounds to an external MFM provider for review, but will also participate in the new ROAMS MFM initiative once it is rolled out in 2021.

Table 14: Prenatal Health Care Utilization for Pregnancies by High-Risk Status in the Baseline Period Prior to Implementation (Pregnancy Population, n = 466)

Measure	All Pregnancies (n = 466)		Pregnancy Is Not High-Risk (n = 170)		Pregnancy Is High-Risk (n = 282)	
	Count	Percent	Count	Percent	Count	Percent
Received prenatal visits beginning in first trimester	310	69%	124	74%	181	66%
Attended one or more telehealth visits	56	12%	--	<8%	50	18%
Mother received MFM consultation*	147	81%	0	0%	147	97%

Notes: Cell counts do not sum to the table n due to missing information for each characteristic; missing values are not included the calculation of percentages. Missing cell counts are figures below 10 (indicated with "--", and corresponding percentages mask actual cell count. High-risk pregnancy is determined by the prenatal care provider and may be due to medical, obstetric, behavioral health, or genetic problems identified during pregnancy. *The MFM consultation measure was reported for Miners Colfax Medical Center only and captures consults prior to the start of RMOMS implementation. This table tracks the total number of pregnancies, which is higher than the total number of unique women with a pregnancy. Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

Most of the postpartum population (76%) received a postpartum visit within 12 weeks of delivery during the baseline period, and all postpartum visits were connected to postpartum care providers in the ROAMS network (Table 15).

Table 15: Postpartum Care Utilization in the Baseline Period Prior to Implementation (Postpartum Population, n = 264)

Measure	Count	Percent
Received postpartum visit	193	76%
Postpartum care from provider in the ROAMS network	193	100%

Notes: Postpartum visit status was unknown for 9 women. Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

Delivery and Maternal Health Outcomes Prior to RMOMS Implementation

In the year prior to implementing the RMOMS interventions, most deliveries were full-term (87%) and normal birthweight (89%). Eleven percent of infants were born with low or very low birthweights. Neonatal deaths occurred in very few deliveries; the small cell count is excluded in Table 16 below.

Table 16: Infant Health Outcomes for Deliveries in the Baseline Period Prior to Implementation (Infant Population, n = 268)

Characteristic	Infants	
	Count	Percent
Gestational Age		
Delivery before 37 weeks	33	13%
Full-term delivery (37+ weeks)	230	87%
Birthweight		
Normal birthweight (2,500+ g)	220	89%
Low or very low birthweight (<2,500 g)	26	11%
NICU stay	33	13%

Notes: Cell counts do not sum to the table n due to missing information for each characteristic; missing values are not included in the calculation of percentages. All NICU stays took place at non-ROAMS facilities since there are no in-network NICUs. Missing count for gestational age is 5 and 21 for birth weight. Postpartum care was unknown for 9 women. Preterm birth is before 37 weeks gestation. Low birthweight is less than 2,500 grams. Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

ROAMS reported data on various maternal health outcomes associated with delivery in the year prior to RMOMS implementation. Among the delivery population, 75 percent had vaginal deliveries (Table 17). For women with prior deliveries, the C-section rate was higher, at 28 percent compared to the combined rate of 16 percent for those with prior deliveries.

Table 17: Delivery Method by Prior Delivery Status in the Baseline Period Prior to Implementation (Delivery Population, n = 264)

Delivery Method	All Deliveries n = 264		No Prior Delivery n = 84		Prior Delivery n = 172	
	Count	Percent	Count	Percent	Count	Percent
C-section	63	25%	11	16%	46	28%
Spontaneous or induced vaginal birth	193	75%	68	84%	121	72%

Notes: The missing count for no prior deliveries is 3. The missing count for previous deliveries is 5. Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

SMM Prior to RMOMS Implementation

Among the delivery population in the baseline period, 12 deliveries (5%) required a hospital stay of four or more days. The same proportion of deliveries (5%) was transferred to a higher level of care during delivery. There were 16 deliveries experiencing any SMM, defined as one or more of the following: blood transfusion during delivery, ICU admission during delivery, or hospital readmission within two weeks of delivery (Table 18). These rates are somewhat higher than expected based on national-level findings about the prevalence of SMM during deliveries; however, national measures of SMM use a significantly different methodology to calculate rates.[27]

Table 18: SMM for Deliveries in the Baseline Period Prior to Implementation (Delivery Population, n = 264)

Experienced SMM	Count	Percent
Experienced SMM	16	6%
No SMM	232	93%

Notes: Twelve deliveries reported "unknown" for SMM and four deliveries were missing data. Sub-types of SMM are not shown due to small cell counts (<10). Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

Racial Disparities in Utilization Prior to RMOMS Implementation

Seventy-one percent of White women in the pregnancy population during the baseline period received a prenatal visit in the first trimester compared to 65 percent of American Indian/Alaska Native women. Pregnancies to White women were also likelier to be considered high-risk (59 percent of pregnancies) compared to American Indian/Alaska Native women (52 percent of pregnancies). Pregnancies to Hispanic women were likeliest to receive a prenatal visit in the first trimester (74%) compared to pregnancies for non-Hispanic women (65%), and were less likely to be classified as high-risk, at 58 percent compared to 65 percent for pregnancies for non-Hispanic women (Table 19).

Table 19: Racial Disparities in Pregnancy in the Baseline Period Prior to Implementation (Pregnancy Population, n = 466)

Characteristics	Received Prenatal Visit in First Trimester		Pregnancy is Considered High-Risk	
	Count	Percent	Count	Percent
Race				
American Indian/Alaska Native	17	65%	13	52%
White	242	71%	198	59%
All Other	48	66%	60	75%
Ethnicity				
Hispanic	167	74%	132	58%
Non-Hispanic	136	65%	134	65%

Notes: Missing counts for each Race and Race & Ethnicity category is as follows for the Prenatal Visit measure: AI/AN, 0; White, 4; Other, 11; Hispanic/Latina, 9; AI/AN Non-Hispanic/Latina, 0; WOC Non-Hispanic/Latina, 2; White Non-Hispanic/Latina, 1. The missing counts for the high-risk measure are: AI/AN, 1; White, 9; Other, 4; Hispanic/Latina, 7; AI/AN Non-Hispanic/Latina, 1; WOC Non-Hispanic/Latina, 2; White Non-Hispanic/Latina, 4. High-risk pregnancy is determined by the prenatal care provider and may be due to medical, obstetric, behavioral health, or genetic problems identified during pregnancy. Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

Special Analysis: Substance Use Among Women Served by Miners Colfax Medical Center Prior to RMOMS Implementation

Miners Colfax Medical Center reported data on alcohol abuse or dependence, tobacco use in pregnancy, and SUD during the baseline period. Among the delivery population at this facility, 15 percent of deliveries were to women with alcohol abuse or dependence, 11 percent to women with tobacco use during pregnancy, and 18 percent to women with SUD (defined as use of

opioids, amphetamine, or other substances) (Table 20). While the total counts for these outcomes were small, these findings reflect the behavioral health challenges facing pregnant women in the Miners Colfax Medical Center service region.

Table 20: Substance Use Among Deliveries at Miners Colfax Medical Center (Subset of Delivery Population, n = 83) in the Baseline Period Prior to Implementation

Substance Use Types	Count	Percent
Alcohol abuse or dependence	17	15%
Tobacco use in pregnancy	12	11%
SUD	20	18%

Notes: Sub-types of SUD are not shown due to small cell counts (<10). Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

E. Sustainability

As discussed in the Network Model section, the ROAMS network has already made significant progress in identifying policies and strategies to promote long-term financial sustainability after the RMOMS award ends. These strategies fall into two categories:

Network-Level Policy Priorities:

- Establish a patient navigation program that is eligible for Medicaid reimbursement;
- Pursue initiatives with high community demand (e.g., telehealth MFM care);
- Utilize mid-level providers and telehealth to reduce long-term costs of care;
- Increase ROAMS network market share of regional births; and
- Conduct annual cost analysis of network activities.

State-Level Policy Priorities:

- Seek higher reimbursement rates for Medicaid-covered births; and
- Extend Medicaid coverage to 365 days postpartum.

These strategies assume that improving the quality of care and variety of services at ROAMS facilities will increase their popularity in the community, improve market share in the immediate term, and achieve long-term financial gains that can be supported by targeted Medicaid policy changes.

> "I'm still very optimistic about the opportunity that we have [with the ROAMS program.] In my mind, it's twofold. One is to improve the quality of care that we provide, but then also to expand and make it more viable. I am convinced that maternity services are a mission-critical element of what we do. This gives us an opportunity to rethink how we've done it rather than being siloed, and every hospital doing its own thing…how can we sustain a program regionally?"
> – ROAMS Leadership

V. TX-RMOMS—Texas

Through enhanced case management and telehealth, TX-RMOMS aims to develop sophisticated care navigation and referral processes to assist with insurance navigation, behavioral health needs, and comprehensive postpartum care. Below we describe the area context and maternal and child health landscape of the TX-RMOMS service area and the progress the program has made toward model implementation.

A. About the Area

TX-RMOMS serves an area along the U.S.—Mexico border, including the Val Verde and Uvalde service regions (Val Verde, Uvalde, Edwards, Real, Kinney, and Zavala counties). These counties, with almost 100,000 residents and 21,000 women of childbearing age, have higher rates of poverty than the state overall and other rural and urban areas within the state (Table 21).[1] The median household income is just over $37,000 in Val Verde and Uvalde compared to over $51,000 in the state, almost $60,000 in urban counties, and almost $48,000 in all rural counties.[1] The area also has a substantially larger Hispanic population than the state overall.[1] As of 2019, Texas has the highest rate of uninsured individuals (18%)[56] and the highest rate of uninsured women ages 19-64 (22%) of any state.[57]

Table 21: TX-RMOMS Service Area Population Demographics, 2018

Metrics	RMOMS Counties	All Rural Counties	All Urban Counties	State
Household median income	$37,475	$47,856	$59,316	$51,465
Percent below the 150% FPL	39%	29%	24%	28%
Percent with high school education or less	56%	54%	45%	51%
Unemployment rate	5%	6%	5%	6%
Percent of people less than 65 years old without insurance	22%	22%	19%	21%
Race/ethnicity				
White (non-Hispanic)	21%	57%	41%	42%
Black (non-Hispanic)	8%	7%	12%	12%
American Indian/Alaskan Native (non-Hispanic)	<1%	<1%	<1%	<1%
Multiple or other (non-Hispanic)	1%	2%	7%	6%
Hispanic	77%	34%	40%	39%

Source: American Community Survey Data, U.S. Census Bureau, 2018

State Policy and Funding Landscape

Medicaid Policy:

- *Name:* Medicaid

- *Births covered by Medicaid:* 53 percent[3]

- *Income requirement for pregnant women:* Less than 203 percent FPL[32]

- *Length of postpartum coverage:* 60 days post-delivery; Texas is implementing a limited postpartum coverage expansion for women enrolled in the state's family planning program.[58]

- *Medicaid expansion:* Texas has not expanded Medicaid.

- *Medicaid Core Measures:* Texas Medicaid performs better than the 2020 Healthy People Goal of timely prenatal care (86 percent compared to a target of 78 percent) and falls slightly short of the low birthweight target (9 percent compared to a target of 8 percent).[34]

Other Federal Grant Funding: Public funding in Texas for maternal and rural health care primarily stems from Medicaid and HRSA/MCHB's Title V. HRSA/MCHB provides $34.5 million of Title V funding.[59] The AIM Health and Safety Initiative also operates in Texas with a focus on the Obstetric Hemorrhage and Obstetric Care for Women with Opioid Use Disorder bundles.

Broadband Access: In the rural areas of the RMOMS counties in Texas, broadband access is more limited when compared to urban areas, since there tend to be fewer providers servicing rural areas.[38] However, in all TX-RMOMS counties, 100 percent of the population lives in an area served by at least two broadband providers.[38]

B. State and Regional Maternal Health Landscape

Women in the TX-RMOMS counties face significant maternal health challenges. The majority of women in the region receive inadequate prenatal care and the rate of C-section in the region does not meet national targets. Access to providers is limited; the birth-to-provider ratio in the region is twice the state average, 415 compared to just 208.[60] There are also significant disparities in infant and maternal health outcomes by race.

Maternal Access to Care

In its application for RMOMS funding, TX-RMOMS reported health disparities in teen birth rates, infant birthweight, and access to timely prenatal care. Secondary data from NVSS illustrate the challenges that TX-RMOMS counties face. While C-section rates in the TX-RMOMS counties are lower than the statewide average, they remain higher than the HHS Action Plan target for the year 2025. The counties also have significantly lower rates of initiation of first trimester prenatal care and higher rates of inadequate prenatal care compared to the state and national averages (Table 22). In the TX-RMOMS region, 50 percent of mothers receive inadequate prenatal care and only 44 percent initiate prenatal care in the first trimester, over 30 percentage points lower than the national average and Healthy People 2020 average.

Table 22: Prenatal and Delivery Measures in TX-RMOMS Service Area, 2016–2018

Measure	RMOMS County Average	Statewide Average	National Average	Healthy People 2020 or HHS Action Plan Goal
First trimester prenatal care	44%	67%	75%	77.9%
Inadequate prenatal care	50%	26%	19%	NA
C-section rate	26%	35%	32%	19.4%

Notes: Inadequate prenatal care is pregnancy-related care beginning in the fifth month of pregnancy or later or less than 50 percent of the appropriate number of visits for an infant's gestational age. The C-section target for 2025 was identified from the HHS Action Plan to Improve Maternal Health in America. Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System Restricted Natality Data 2015–2018.

Infant Health Outcomes

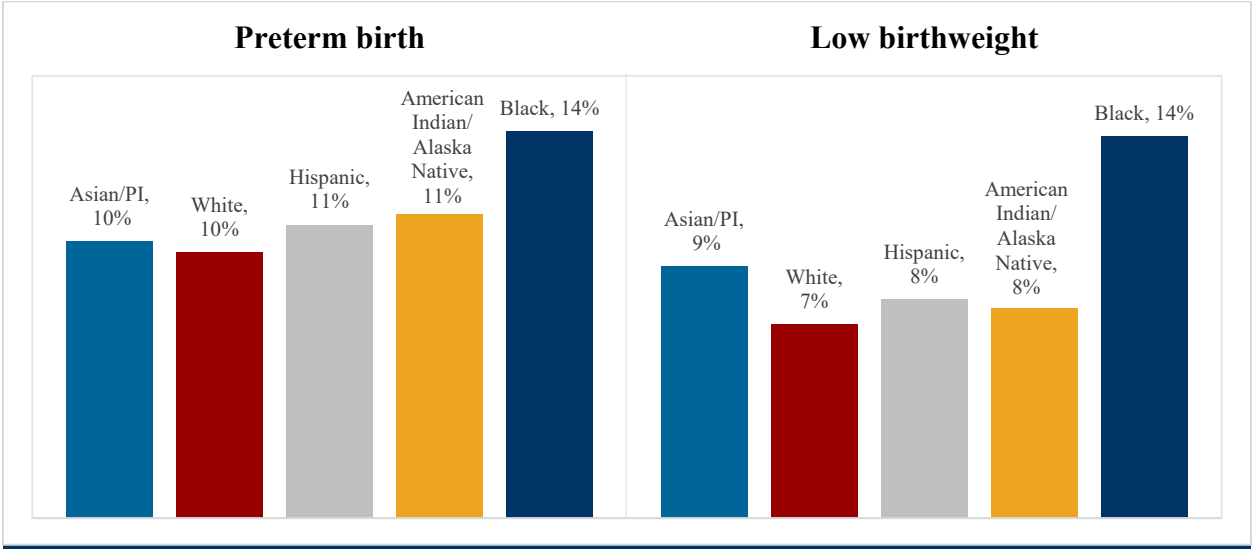
Preterm birth (birth at less than 37 weeks gestation) and low birthweight (less than 2,500 grams) remain persistent problems in Texas. While the RMOMS county rates for these outcomes are better than the statewide rates (Table 23), there are still significant statewide disparities in outcomes by race/ethnicity. Black infants had the highest rates of preterm birth and low birthweight for 2016–2018 (Figure 10). American Indian/Alaska Native infants have the highest rates of infant mortality statewide. At 13.2 percent, their rate of infant mortality in 2017 was almost four times that of Asian and Pacific Islander babies, who had the lowest rate of infant mortality in the state (3.5%).[41]

Table 23: Infant Health Outcomes in TX-RMOMS Service Area, 2016–2018

Measure	RMOMS County Average	Statewide Rate	National Rate	Healthy People 2020 Maximum Target
Preterm birth	6%	12%	12%	11.4%
Low birthweight	4%	8%	8%	7.8%
Abnormal condition	3%	11%	11%	NA

Notes: Preterm birth is before 37 weeks gestation. Low birthweight is less than 2,500 grams. Abnormal condition includes presence of seizures, lack of surfactant, need for antibiotics, or assisted ventilation. Source: Centers for Disease Control and Prevention, National Vital Statistics System Restricted Natality Data 2015–2018.

Figure 10: Racial Disparities in Infant Birth Outcomes in Texas, 2016-2018



Notes: All race categories exclude Hispanics. County-level data by race/ethnicity are not available. Low birthweight is less than 2,500 grams. Preterm birth is less than 37 weeks of pregnancy. Source: National Center for Health Statistics, final natality data and period-linked birth-infant death data. Retrieved December 1, 2020 from www.marchofdimes.org/peristats.

SMM and Mortality

TX-RMOMS is one of 25 states that received funding from CDC's ERASE MM program to support MMRC efforts.[42] TX-RMOMS reported in its RMOMS application that maternal mortality remains a pressing struggle and that the state has one of the highest maternal mortality rates in the nation. The NCHS maternal mortality data update in 2020 found that the maternal mortality rate in Texas in 2018 was 18.5 deaths per 100,000 live births, higher than the national rate of 17.5 but lower than the rates in several other states.[43]

The Texas MMRC reviewed 137 of 175 pregnancy-associated deaths in 2013 in its most recent report published in 2020.[61] The committee found that 40 percent of deaths were pregnancy-related (an additional 18 percent were undetermined) and that among these, deaths occurred at a disproportionately high rate among non-Hispanic Black women (Table 24). Most pregnancy-related deaths (71%) occurred during the postpartum period and the vast majority (89%) may have been preventable. Leading causes of pregnancy-related death included cardiovascular conditions, mental disorders, obstetric hemorrhage, preeclampsia and eclampsia, infection, and embolism.[61]

Table 24: Disparities in Maternal Deaths in Texas, 2013

Race	Percent of Statewide Live Births	Percent of Maternal Deaths
Black (non-Hispanic)	11%	31%
White (non-Hispanic)	34%	41%
Hispanic	48%	26%
Other races and ethnicities	6%	2%

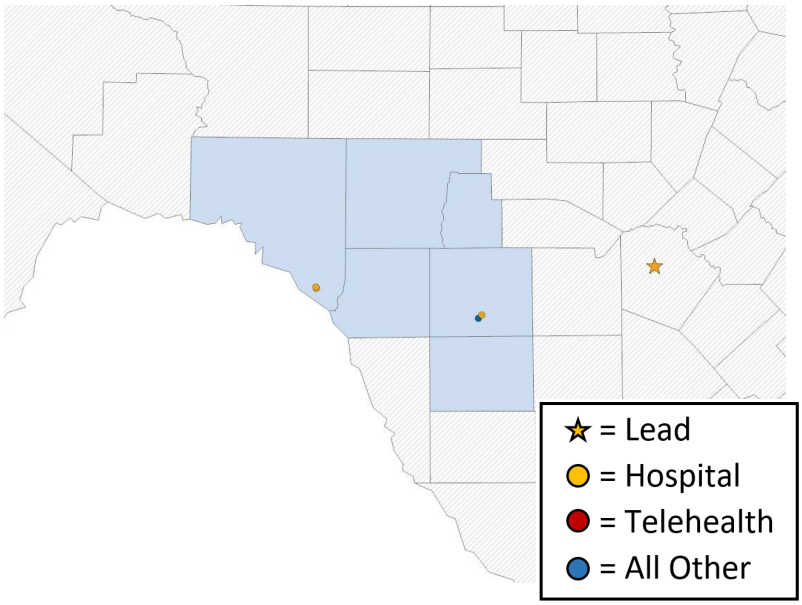
Notes: Includes reviewed deaths only. Source: Texas Maternal Mortality and Morbidity Review Committee and Department of State Health Services Joint Biennial Report, December 2020.

The Texas MMRC also conducted an analysis of delivery hospitalization-associated SMM for the years 2011–2018 using the Texas Hospital Inpatient Discharge Public Use Data Files. This analysis revealed a widening disparity gap in SMM for non-Hispanic Black women; the rate of SMM for Black women in 2018 was 2,994 per 100,000 live births compared to 1,823 per 100,000 live births in the state overall, reflecting the significant and disproportionate burden of maternal mortality and SMM on Black women in the state.[61]

C. TX-RMOMS Network Characteristics

The TX-RMOMS network aims to improve maternal health outcomes from preconception to postpartum in two service regions covering Val Verde, Uvalde, Edwards, Real, Kinney, and Zavala counties. During the planning year, the network included two rural hospitals, one FQHC, and one rural health clinic with a leadership team affiliated with University Health (UH), a large academic health system in San Antonio. Prior to TX-RMOMS, women from one of the two rural service areas were often referred to San Antonio for prenatal services, regardless of whether they were considered high-risk, because their local FQHC offered no prenatal services. This lack of local capacity to offer the most basic maternal health care services was just one of several barriers the TX-RMOMS network sought to address.

Figure 11: Location of TX-RMOMS Network Partners



Network Partners

Lead Agency. UH leads the TX-RMOMS network. The third largest public health system in the state, UH provides preventive, surgical, and hospital care to the region's medically underserved populations. UH is located in and primarily serves the San Antonio metropolitan area, but the hospital also serves as the nearest source of specialty care for residents of geographically isolated counties in southwestern Texas.

UH partnered with facilities in the Val Verde and Uvalde service areas to form the TX-RMOMS network. Network partners in Val Verde County include Val Verde Regional Medical Center (VVRMC) and Val Verde Rural Health Clinic. In Uvalde County, the current network partners are Uvalde Memorial Hospital (UMH) and Community Health Development, Inc. (CHDI), an FQHC. UH oversees professional training, implementation, and monitoring of program activities across these four sites. Each network partner is described in more detail by type below.

Rural Hospitals. The two rural hospitals are VVRMC and UMH. VVRMC is an acute care hospital located in the city of Del Rio (population about 36,000) and is the only inpatient hospital facility serving Del Rio, Val Verde County, the Laughlin Air Force Base, and several surrounding counties. It is 160 miles from San Antonio and 70 miles from Uvalde. The Women's Center at VVRMC offers labor and delivery services and attends 75 births per month. The Neonatal Program within the Women's Center includes a special care nursery for babies who are born premature or who otherwise require close observation. Neonates born before 35 weeks of gestation are stabilized and transferred to UH's Level IV NICU.

UMH is a 25-bed CAH serving Edwards, Kinney, Real, Uvalde, and Zavala counties. These five counties are a HRSA-designated Medically Underserved Area. The hospital's obstetric services include labor and delivery and childbirth classes. The hospital also has an onsite imaging center where women can access preventative care and diagnostic imaging, including ultrasounds.

Clinics/FQHCs. There are two clinics, Val Verde Regional Medical Center Rural Health Clinic and Community Health Development, Inc. The Rural Health Clinic is located just a half mile from VVRMC. Most of the providers at this clinic practice family medicine or general internal medicine. At the start of the TX-RMOMS program, the clinic had just one part-time OB provider, so prenatal services included little more than pregnancy testing.

Community Health Development, Inc. is an FQHC and National Committee for Quality Assurance (NCQA)-recognized Patient-Centered Medical Home (PCMH). This clinic serves the same five counties as UMH. CHDI serves as a primary source of health care for uninsured or underinsured individuals in its service area and has an inter-disciplinary team of family medicine, internal medicine, and psychiatry clinicians. While CHDI does not provide prenatal care directly, the agency maintains a Perinatal Case Management Program that tracks pregnant patients throughout the pregnancy. As part of the TX-RMOMS program, CHDI entered into a formal referral agreement with a nearby private practice whereby pregnant CHDI patients are referred out for prenatal and obstetrics care, while remaining connected with their Care Coordinators at CHDI. Additionally, CHDI has maintained its previous formal referral relationship for OB/prenatal care with a sister FQHC in San Antonio.

Adding New Partners. During the planning year, the TX-RMOMS leadership team learned about two additional facilities they aim to incorporate into the network: Sage Family Medical Associates (FMA) in Uvalde and United Medical Center (UMC) in Val Verde. Though Sage FMA, a private practice, is not far from CHDI, the two sites had little communication with each other prior to RMOMS. In fact, CHDI often referred women who became pregnant to clinics or practices in San Antonio, which is a 90-minute drive from Uvalde, rather than referring them to Sage FMA. When it became evident that this approach was not aligned with the TX-RMOMS program's goal to provide care in-network, CHDI thought it might need to withdraw from the network. Later in the planning year, CHDI identified a solution that would enable the clinic to remain a network partner and provide services to women across the entire continuum of care. CHDI and Sage FMA formed a partnership allowing pregnant women to see a physician at Sage FMA for prenatal care while also remaining connected with a care manager at CHDI responsible for coordinating medical and behavioral health services and ensuring continuity of care from preconception through the postpartum period. To formalize the partnership, CHDI and Sage

FMA signed a Memorandum of Understanding to allow the sharing of patient data and for Sage FMA to support the TX-RMOMS network.

In Val Verde, the network plans to make UMC, a local FQHC in Del Rio, an official partner in the first implementation year. UMC has two full-time OB providers on staff, both of whom have privileges at VVRMC, and operates under a sliding scale model.

Network Model and Goals

The TX-RMOMS network aims to improve access to continuous, coordinated, and community-based care among women of childbearing age living in the service area. Primary strategies to accomplish that goal include expanding the maternal and child health (MCH) workforce in network clinics, purchasing equipment, implementing telemedicine/telehealth at partner sites for training/mentoring and consultation purposes, improving coordination and continuity of care through case management and patient navigation, and enhancing perinatal services using a Healthy Start-like model.

Goal/Strategy 1: Expand the Workforce of MCH Professionals in the Service Regions

A key component of the early TX-RMOMS strategy was to hire additional health care professionals to serve the target population in the rural clinics. Each clinic planned to form a prenatal/postpartum health care team comprising an OB/GYN, a care manager, and a part-time behavioral health consultant. Near the end of the planning year, VVRMC hired a full-time OB/GYN and a care manager. The addition of these two professionals made it possible for the clinic to meet the health care needs of pregnant women and their families in one place. These hires are expected to enhance not just the clinic's capacity but also its sustainability by retaining women as patients during and after their pregnancies.

> "Prior to the RMOMS [program], any pregnant lady that was seen there would actually be referred to San Antonio, high risk or not high risk, they were just being referred to San Antonio. So, with the RMOMS [program], we're trying to keep these patients local without having the inconvenience of travel if we can provide the care for them."
> - Hospital-Based Clinician

CHDI hired a case manager and a behavioral health consultant by the end of the planning year, but the clinic does not have an OB/GYN. The care manager coordinates with Sage MFA to ensure that CHDI patients who go to Sage MFA for prenatal appointments receive seamless care before, during, and after their pregnancy. The behavioral health care worker connects women with social or mental health services.

Several challenges slowed progress toward the network's goal to expand the health care workforce. At the start of the planning year, network leadership traveled to the rural clinics and hospitals to meet with providers and tour their facilities, but the COVID-19 pandemic put an end to these in-person visits. Issues that might have been identified early on, such as concerns about referring women to neighboring practices, did not come to light until much later in the planning year. Uvalde's hiring process was delayed, while CHDI's continued participation in the network was in question. By the time those issues were resolved, the planning year was coming to an end,

and the site was just beginning to consider the onboarding of providers supported by TX-RMOMS.

Goal/Strategy 2: Expand Local Capacity Via Telehealth/Telemedicine

Telehealth/telemedicine is a key component of the TX-RMOMS network's workplan. The purchase and installation of telehealth equipment in the two network clinics aims to ensure that all pregnant women, including those with high-risk pregnancies, can get the care they need locally rather than having to travel to San Antonio for prenatal visits. The network's plan includes training providers to use telemedicine for high-risk pregnancy ultrasounds, medical visits, case management visits, and behavioral health consultations as needed.

> "The greatest impact I see the RMOMS [program] having is the telehealth part…that will have a huge impact because it would prevent those patients from having to travel to San Antonio, which quite often, they're not compliant just because of the travel. With the telehealth, they would be able to come into our hospital, have their visit through telehealth, and we can take care of that high-risk prenatal visit here at our local hospital."
> – TX-RMOMS Clinician

TX-RMOMS encountered some telehealth challenges that slowed progress toward its goals. At the end of the planning year, the VVRMC Rural Health Clinic had purchased a telemedicine cart, but other essential pieces were not yet in place. By the end of the planning year, the clinic was able to address some connectivity and security problems, but the clinic staff had not yet been trained on its use. CHDI also procured a telemedicine cart, but it was not yet in use at the start of implementation on September 1, 2020.

Goal/Strategy 3: Improve Maternal Health Outcomes for High-Risk Obstetric Patients through Patient Navigation

> "The model and strategy that we selected for our program is to implement patient navigation, and through that, improve continuity of care for all women from preconception, through duration of their pregnancy and the postpartum care."
> - TX-RMOMS Leadership

To ensure that geographically isolated women with high-risk pregnancies have access to the level of care they need, TX-RMOMS hired a patient navigator to serve as a liaison between the care managers at the rural sites and the MFM specialist team at UH. Based in San Antonio, the patient navigator reaches out to pregnant women referred to UH and assists them with planning visits to San Antonio. For some women, this includes arranging for transportation to and from San Antonio or finding affordable lodging if the patient needs to stay overnight. The patient navigator can coordinate with the state Medicaid agency to schedule transportation, and she can also locate free accommodations for patients at the nearby Ronald McDonald House or book a room at one of the local hotels that offers discounted rates for out-of-town patients. Though telemedicine is expected to reduce travel to San Antonio for prenatal visits, as of January 2021 (in the first implementation year), neither rural site had started using telemedicine yet. Once implemented, it will support live visits with an MFM from UH.

The patient navigator continues to support TX-RMOMS patients when they return home by working with the local case manager to connect them with local wraparound services. Early in the planning period, when the leadership team was conducting needs assessments and mapping

local services, they learned that patients are often unaware of resources available in their own community and that the TX-RMOMS program may be able to connect these women to services.

Goal/Strategy 4: Implement Enhanced Case Management and Lactation Support in Local Clinics

Each clinic has used the support of the RMOMS program to hire a case manager to provide more comprehensive prenatal services. These case managers are changing women's experiences of care in local clinics in several ways. At CHDI, the care manager helps to ensure continuity of care for women who consider CHDI their "medical home," but who see a provider outside the network for prenatal care. Specific responsibilities of the care manager include tracking the patient's visits to make sure her medical records are complete and coordinating medical services and behavioral health services.

At the VVRMC Rural Health Clinic, every pregnant woman meets with the case manager during her first prenatal visit and throughout the pregnancy. The case manager checks the patient's insurance status, determines if she is eligible for Medicaid, and offers to help eligible patients enroll in Medicaid and WIC. She also assesses whether the patient needs any additional resources, such as mental or behavioral health counseling, and makes referrals as appropriate. Case managers have the potential to increase the likelihood that women will attend all scheduled prenatal visits by making a reminder call before each appointment and following up with a phone call if the patient misses an appointment. Prior to RMOMS, it was impossible to offer patients this level of support due to limited financial and human resources.

Case managers also support TX-RMOMS patients by discussing healthy behaviors that are particularly important during and after pregnancy, including breastfeeding. One case manager explained that many of her patients are not comfortable breastfeeding, and she suspects this is at least partly due to limited community support for women who choose to breastfeed or for women having difficulty with breastfeeding. Neither the clinic where she works nor the hospital have a lactation consultant and the hospital nurses do not typically discuss breastfeeding with patients. Though WIC peer counselors previously could visit the hospital to offer in-person support, those visits stopped after the COVID-19 pandemic began. The case manager explained that by the time a woman shows up for her postpartum visit, she may have already given up on breastfeeding. She tries to encourage breastfeeding by discussing it with patients during each prenatal visit and inviting them to ask questions. For many women, early discussions with the case manager might be the only time they receive any advice about breastfeeding.

Another enhancement that TX-RMOMS planned to implement was a program of services modeled after Healthy Start that would include outreach services, depression screening, and behavioral health counseling. The Healthy Start model aims to connect women with prenatal care as early as possible in their pregnancy. Following delivery, the program expands its focus to ensure that the family unit has access to a range of medical and behavioral health services. Though TX-RMOMS case managers were connecting patients with some of these services, the Healthy Start-like program had not yet been formalized at the end of the planning year.

Implementation Facilitators and Barriers

TX-RMOMS interviewees shared many examples of progress made and challenges encountered over the course of the planning year. An important facilitator in the planning year was a willingness among rural providers to collaborate with other medical practices to best meet patient needs. Prior to RMOMS, it was uncommon for providers and staff from CHDI and Sage FMA to communicate with each other, even though they may have been serving some of the same families. Some interviewees suggested that each facility's concern with maintaining their "patient numbers" promoted competition rather than collaboration with each other. The partnership established between the two entities was critical to Uvalde's continued participation in the network. One interviewee observed that the partnership "really helps to make sure that there's a continuity of care from your private providers, to the FQHC, to a medical center, and to a hospital, so everybody's covered and treated with equity."

> "What we learned in doing our services inventory is that while there's a lot of organizations in each market, they don't necessarily work that closely together. It's like they have a resource list. But they don't really have a connection with each other. Working with them on the work plan is allowing us to have them take a look at who else could be a partner here and how could you improve or augment the relationship that you already have with that organization?"
> - TX-RMOMS Leadership

A few exceptional barriers contributed to the delayed implementation of network strategies. The COVID-19 pandemic impacted both TX-RMOMS network administration and patient experience. As one interviewee put it, "we're competing for equipment, competing for priorities, competing for meeting time." Interviewees noted that the pandemic slowed data collection efforts, left providers sick or overburdened, and in the early phases of the pandemic, seemed to affect women's willingness to seek care.

Some barriers did not become evident until implementation was underway. For example, both network clinics purchased the necessary telemedicine equipment, but that was just one of many steps that needed to occur before that equipment could be used. Without prior experience using a telemedicine cart, neither clinic was fully prepared to meet some of the associated requirements regarding security, training, and staffing. Though the sites continue to work on resolving issues as they arise, it is not clear how soon they might be able to implement telehealth training and telemedicine consultations as planned.

Other noted challenges were related to utilizing data to improve care. UH has two EHR systems: one for providers affiliated with UH and another for providers affiliated with University of Texas (UT) Health. A TX-RMOMS patient who sees an MFM specialist from UH and another specialist from UT will have a health record in both systems. Because the RMOMS patient navigator currently has access to just one system, she needs to work with another staff member to gather information stored in the other system, which introduces delays in the data collection process.

Similarly, VVRMC, which is located in the border town of Del Rio, serves an unknown number of pregnant women who travel across the U.S.–Mexico border to deliver. The network often has no means of following up with these women, nor does it have any data about their prenatal care.

While women living outside the U.S. are not part of the TX-RMOMS program target population, their experiences illustrate some of the challenges associated with providing high-quality, consistent care across the entire continuum of care with limited and disconnected data on patient demographics and care utilization.

D. Description of Target and Maternal/Clinical Populations

The target population for TX-RMOMS is women of childbearing age and children residing in the Uvalde and Val Verde service areas and counties. This section describes this population's demographic make-up and service use as reported in the patient-level data, in addition to challenges TX-RMOMS faced in reporting de-identified patient-level data, particularly prenatal and postpartum data.

TX-RMOMS Data Challenges

A few issues resulted in unreliable baseline prenatal and postpartum data. During the baseline period, many women who gave birth at a network hospital received prenatal care from non-network clinics or practices. Data from these non-network facilities were not available for analysis, resulting in high rates of missing data for these women.

Women crossing the border from Mexico to deliver at VVRMC were difficult to identify in the patient-level data. While these women are not part of the target population, some report a U.S.-based address, likely the address of relatives who live in Val Verde, resulting in a lack of clarity about their residence status. TX-RMOMS reported that some women who live in Mexico may have inadvertently been included in the baseline data. TX-RMOMS is exploring how to best identify Mexican residents for exclusion from future data submissions. Possible strategies include using the patient navigator to connect with women directly or using alternate variables in the patient's medical record to determine place of residence.

Overview of Maternal/Clinical Population Prior to RMOMS Implementation

As described earlier, most of the women who delivered at one of the two RMOMS rural hospitals during the planning year received prenatal and postpartum care from providers or clinics outside the RMOMS network. Over the course of the planning year, the two TX-RMOMS clinics worked to identify ways to obtain data on women's out-of-network clinical encounters from the prenatal to the postpartum period. Though the network has identified some solutions that will allow for reporting of de-identified, patient-level data going forward, prenatal and postpartum data are missing for many of the women served by TX-RMOMS during the baseline period. The tables presented in this section are based on the limited data that the network could report for the baseline period.

More than three-quarters of the women served by the TX-RMOMS program during the baseline period prior to implementation were between the ages of 21 and 35. Thirteen percent were younger than 20 years old. Women insured by Medicaid/CHIP represented the largest proportion of patients (39%), followed by women with no health insurance (24%). Nearly a quarter of the pregnancies were identified as high-risk (Table 25).

Table 25: Demographic Characteristics of TX-RMOMS Women Served in the Baseline Period Prior to Implementation (n = 1,644)

Characteristics	Count	Percent
Age (years)		
20 or younger	210	13%
21-25	534	32%
26-30	477	29%
31-35	284	17%
36-39	98	6%
40 or older	41	2%
Missing or unknown	0	0%
Race		
American Indian/Alaska Native	0	0%
Asian	--	<1%
Black	14	1%
Native Hawaiian or other Pacific Islander	--	<1%
White	1,382	84%
Missing or unknown	243	15%
Maternal health insurance status		
Private insurance	366	22%
Medicaid/CHIP	637	39%
Indian Health Service	0	0%
No insurance/uninsured/other	400	24%
Missing or unknown	241	15%
High-risk pregnancy	388	24%
Resides in RMOMS county	1,319	80%

Source: patient-level data submitted by awardee in January 2021. Missing cell counts are figures below 10 (indicated with "--"), and corresponding percentages mask actual cell count. The baseline period was September 1, 2019 to August 31, 2020.

Gestational age and birthweight were analyzed separately for singletons and multiple births. Gestational age is not reported because data were missing for 56 percent of singleton births and just 10 multiple births were identified. Birthweight reported for singleton births (n = 909) indicated that 94 percent of babies had a normal birthweight, six percent had a low birthweight, and no babies had a very low birthweight.

Fewer than one-third of babies were delivered via C-Section during the baseline period. Among pregnancies not considered high risk, the share of spontaneous or induced vaginal births was more than double the share of C-section births. The share of C-section births was slightly higher for pregnancies considered high-risk. However, more than a quarter of the pregnancies

considered high-risk did not have information on the delivery method compared to only eight percent of pregnancies not considered high-risk (Table 26).

Table 26: Maternal Health Outcomes in the Baseline Period Prior to Implementation (n = 1,230)

Characteristics	Not High-Risk Pregnancy (n = 797)		High-Risk Pregnancy (n = 315)	
	Count	Percent	Count	Percent
Delivery method				
C-section	222	30%	87	35%
Spontaneous/induced vaginal birth	517	70%	163	65%
Total	797	100%	315	100%

Notes: Of the delivery population, 118 deliveries were missing the high-risk indicator. Source: patient-level data submitted by awardee in January 2021. The baseline period was September 1, 2019 to August 31, 2020.

E. Sustainability

By offering comprehensive services close to home and access to specialty care via telemedicine, TX-RMOMS partner sites expect to attract more patients and generate sufficient income to sustain some key components of their RMOMS model. However, sustainability may be hampered by the state's choice not to adopt Medicaid expansion, and one interviewee expressed skepticism that the network could maintain the same level of services once RMOMS ends. The network is working on a few small-scale efforts that could potentially continue without further RMOMS support. For example, case managers are connecting with other local agencies and health care practices to launch more community-based programming, such as free prenatal classes and support groups for postpartum depression. Though these initiatives are unlikely to match the improvements made possible by RMOMS support, they may mark the beginning of a local movement to advocate for better quality, more accessible care.

VI. Overview of the RMOMS Program in the Baseline Period

Although each RMOMS awardee operates a unique program with different goals and strategies, a cross-awardee comparative analysis can help identify lessons learned to promote future replication of the network models. Below, we compare awardees' service areas, the networks they have developed for the RMOMS program, the implementation of different care strategies, and the baseline populations served.

A. Policy and Regional Context

The three RMOMS service areas represent various kinds of rural areas (Table 27). BPN covers a smaller, more densely populated service area with almost 30,000 women of childbearing age. In contrast, TX-RMOMS and ROAMS cover more than 10,000 square miles, but have smaller populations of women of childbearing age compared to BPN. The ROAMS service area is the least dense with about 9,400 women over almost 14,000 square miles, including an extensive mountain range. In all three areas, almost 40 percent of households are below the poverty line. Populations in both the ROAMS and TX-RMOMS service areas are majority Hispanic. The population in BPN's service area is majority White, but also has a large share of individuals who are Black.

Medicaid policies and coverage are quite different between Texas, Missouri, and New Mexico (Table 27). Medicaid covers 71 percent of births in New Mexico, in part because of a relatively high income eligibility threshold for pregnant women, at 255 percent FPL. Both Texas and Missouri set this income threshold at just above 200 percent FPL. In Missouri, 38 percent of births are Medicaid-covered, compared to 53 percent of births in Texas. Texas did not expand Medicaid under the Affordable Care Act, while New Mexico expanded Medicaid relatively early (2014). Missouri has not yet expanded Medicaid but voted to do so under a 2020 ballot referendum. Missouri is also considering an increase in Medicaid coverage for postpartum women with SUD.

Table 27: Comparison of Awardee Policy and Regional Context Prior to Implementation

Metrics	BPN	ROAMS	TX-RMOMS
Service area			
Women of childbearing age	29,898	9,401	21,000
Counties	6	5	6
Geographic Area (square miles)	3,363	13,842	10,171
Population density (people per square miles)[55]	43	4	10
Service area indicators of poverty			
Household median income	$36,438	$33,266	$37,475
Percent below FPL	38%	36%	39%
Percent uninsured[60]	13%	10%	22%
Service area race/ethnicity			

Metrics	BPN	ROAMS	TX-RMOMS
White (non-Hispanic)	82%	38%	21%
Black (non-Hispanic)	12%	<1%	1%
Native American/Alaskan Native (non-Hispanic)	<1%	4%	<1%
Multiple or other (non-Hispanic)	2%	2%	1%
Hispanic	3%	56%	77%
Medicaid			
Percent of births covered by Medicaid[3]	38%	71%	53%
Income eligibility threshold for pregnant women[32]	201% FPL	255% FPL	203% FPL
Postpartum coverage	60 days*	60 days	60 days**
Medicaid expansion	Passed in 2020	2014	None
Other relevant federal grants/ initiatives	AIM	AIM	AIM

Notes: *Pending policy would extend postpartum coverage to one year for women with SUD. **Postpartum coverage is partially extended for women enrolled in the state's family planning program. Source: American Community Survey, 2018, except where noted otherwise.

All three service areas are worse than the national averages for inadequate prenatal care, with more mixed results on rates of C-sections, low birthweight, and preterm births (Table 28). The counties served by ROAMS and TX-RMOMS show inadequate prenatal care for more than a third of births. C-section rates in BPN were higher than the national average, while ROAMS and TX-RMOMS' rates were both lower. Similarly, BPN's rates of preterm birth and low birthweight were slightly higher than the national averages, while ROAMS and TX-RMOMS improved upon the national average.

Table 28: National Data on Maternal and Infant Health Outcomes in the RMOMS Awardee Counties Prior to Implementation

Metrics	BPN Average (%)	ROAMS Average (%)	TX-RMOMS Average (%)	National Average (%)
Inadequate prenatal care	26%	37%	50%	19%
C-section rate	39%	20%	26%	32%
Preterm birth	13%	8%	6%	12%
Low birthweight	10%	7%	4%	8%

Notes: Averages for inadequate prenatal care, c-section, preterm birth and low birthweight are a 2016-2018 average. Inadequate prenatal care is pregnancy-related care beginning in the fifth month of pregnancy or later or less than 50 percent of the appropriate number of visits for an infant's gestational age. Preterm birth is before 37 weeks gestation. Low birthweight is less than 2,500 grams. Source: RMOMS counties averages and statewide average from Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System Restricted Natality Data 2015-2018.

As discussed in the awardee-specific chapters, each of the RMOMS awardees has other unique maternal health challenges that serve as focal points for their RMOMS interventions.

B. RMOMS Networks

The RMOMS program uses a network approach to coordinating care with hospitals or hospital systems serving as the lead agencies for all three awardee networks (Table 29). For two of the three awardees, the lead hospitals are outside the RMOMS service area. TX-RMOMS is led by UH, a large hospital system with 700 beds serving the metropolitan area of San Antonio.[62] BPN is led by Saint Francis Medical Center, a tertiary center with 300 beds located in Cape Girardeau, Missouri, a town of approximately 150,000 residents.[63] Both of these hospitals are located outside of the RMOMS services areas. Only ROAMS is led by a hospital within its service area. Holy Cross Medical Center is a CAH with 25 beds based in Taos, New Mexico, a town of just over 5,000 people.

Table 29: Awardee Network Overview as of 2021

Awardee Network Participants	BPN	ROAMS	TX-RMOMS
Lead Agency	Saint Francis Medical Center	Holy Cross Medical Center	UH
Number of Counties	6	5	6
Total Hospitals / Systems	3	3	3
Critical Access Hospital	0	3	1
Other Hospital Type	3	0	2
Other Clinical Partners	1 FQHC network	4*	2
Behavioral Health Agencies	3	0	0
Support Services Agencies	2	5	0
Other Partners	6 health departments; SSM Health Perinatal Center	UNM	NA
State Medicaid Program	MO Healthnet	Centennial Care	Medicaid

Notes: Includes formal network partners only. *Include two new prenatal clinics opening in spring 2021.

The awardee networks reflect different approaches in part because of the role of partner organizations. The TX-RMOMS model puts UH at the center of the network with two rural health systems as the only formal partners. These rural systems include VVRMC and its affiliated clinic in Del Rio (150 miles from UH) combined with UMH and CHDI (90 miles from UH). This network mimics a hub and spoke model, where UH, a large urban hospital system, receives patient referrals from Uvalde and Val Verde for advanced specialty care while supporting them in local capacity building efforts. TX-RMOMS has some involvement with Healthy Start and WIC, but they are not considered formal support services partners. However, Medicaid is a formal partner for all awardees.

In contrast, ROAMS provides patient care through smaller sub-networks of providers within the larger network. These sub-networks coordinate capacity building, advocacy, and marketing efforts. The three participating hospitals in ROAMS are CAHs with fewer than 25 beds, and only

two offer labor and delivery services. However, the network has a robust set of support services partners and active engagement with UNM based in Albuquerque to support data and evaluation activities.

Within BPN, all providers in the large network share patient referrals and provide support and expertise. This network includes: three hospital-based systems that offer prenatal, labor and delivery, and postpartum services; a large FQHC network of medical, dental, and school-based clinics; six county health departments; two home visitation programs; three behavioral health agencies; and SSM Health Perinatal Center, which provides technical support. Although the network is closely integrated and offers a wide variety of services, BPN has managed its roll-out gradually by concentrating first on women needing MFM specialist care.

C. Awardee Models and Goals

The network approaches play out in the strategies RMOMS awardees employ to improve maternal health in their communities. Each awardee has developed a unique approach to achieve the overarching RMOMS program focus areas, which include aggregating low-volume services, utilizing a network model of care, promoting telehealth, and promoting sustainability. Awardees' strategies for care coordination, telehealth, expanding access, and building provider capacity (discussed below) draw on their networks' structures, but also reflect their communities' unique needs and align with the focus areas of the RMOMS program.

Goal/Strategy One: Patient Navigation and Care Coordination

Patient navigation and/or care coordination are central to all RMOMS network models to improve access to clinical care and support services. BPN has perhaps the most robust care coordination model among the three sites. The model, which BPN developed for RMOMS, currently applies to a subset of women who have been referred to MFM services for high-risk pregnancies, but will ultimately expand to women facing other pregnancy risks, such as housing instability. Spanning the entire continuum of care, the program has a structured patient flow, including standardized risk assessments, navigation of insurance and transportation options, and referrals to home visitation services.

Care Coordination Models

BPN: Internally developed, highly structured

ROAMS: External model, tailored to local setting

TX-RMOMS: Internal model with focus on referrals to UHS

ROAMS also has a formal patient navigation structure in place based on an existing framework developed by the Pathways Community HUB Institute. This care model program includes reimbursable patient navigation services tied to clinical targets and specific standards of care. Because the reimbursement structure is built into the model, the approach allows ROAMS to improve patient navigation with a clear pathway to long-term sustainability. ROAMS patient navigators will be hired using the RMOMS funding. These navigators will integrate into the Pathways model and collaborate across clinical sites to improve referrals to social supports in the community that are underutilized, despite high community need. These supports include lactation consultation, home visiting programs, and other services. The opportunity to join Pathways arose in the planning year; ROAMS leadership chose to shift its focus to the Pathways strategy to leverage external resources, but adapt them to local needs.

This flexibility in model implementation and openness to new approaches has been an advantage for the program.

TX-RMOMS has a patient navigator at UH and case managers who work at the rural health clinics in Val Verde and Uvalde. The case managers assist women with insurance, schedule appointments, and provide education and support on healthy behaviors during pregnancy. They also refer women with high-risk pregnancies to UH. The patient navigator at UH schedules appointments for referred women to see the MFM team and ensures that medical records are available to the UH specialists and the local care team, including a case manager and prenatal clinician. This network strategy ensures that women can access care coordination services at rural clinics, but also receive navigation supports to help them access higher-level care at UH when needed.

Goal/Strategy Two: Telehealth

Telehealth is another core feature of the RMOMS model. Each awardee has developed at least one telehealth strategy to improve access to care, particularly for women with high-risk pregnancies and/or transportation barriers. This component is intended to allow women to access prenatal care closer to home and avoid long trips to metropolitan areas. Across many health care settings, the COVID-19 pandemic has hastened the adoption of telehealth by providers. However, the pandemic created challenges to launching telehealth for the RMOMS awardees, especially in coordinating across network sites and procuring equipment. Despite these setbacks, the three awardees have made significant progress in establishing telehealth as a viable service option for women in their service areas.

ROAMS has made the most progress in its telehealth intervention. The network's ambitious telehealth plan includes an expansion of clinic telehealth capacity for prenatal visits, home telehealth kits for pregnant women, telehealth MFM services, and Grand Rounds and provider training opportunities. The clinic telehealth expansions will include not only live patient visits, but also review of ultrasounds and test results. Given the isolated, mountainous service region, women in the ROAMS service area face major geographic and travel barriers. The telehealth expansion will enable many women who have no nearby access to services to participate in their first regular, accessible prenatal visits.

Shared Telehealth Goals

- Reduce geographic barriers to prenatal and postpartum care
- Promote access to specialists for high-risk pregnancies
- Improve on unexpected COVID-19 telehealth progress

For TX-RMOMS, the lead agency will serve as a telehealth hub for high-risk pregnancies. MFM providers employed at UH will provide telehealth appointments to women living in the rural service regions. These visits can prevent unnecessary trips to the San Antonio area; the network had identified this travel distance as a barrier to patients' adherence to their prenatal appointment schedules. TX-RMOMS also plans to enhance provider knowledge using telehealth consultations and case study presentations. Though challenges with connectivity and security between the network's clinical sites have hampered implementation of telehealth, the network is working to

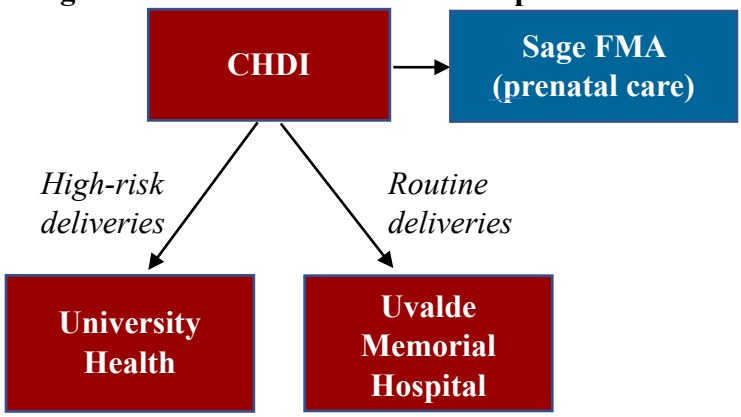
resolve these issues. TX-RMOMS plans to make telehealth implementation its highest priority in the first RMOMS implementation year.

BPN is using a different approach to telehealth where a county health department will serve as the "hosting site" for its telehealth initiative. Their strategy will bring women to the health department clinic and connect them from there with an OB/GYN or specialist provider. BPN has made progress educating providers to gain buy-in, but the network is still in the planning phase for purchasing equipment and contracting a sonographer.

Goal/Strategy Three: Service Expansion

While BPN's network already integrates a wide range of service providers, TX-RMOMS and ROAMS are both working to expand the availability of maternal clinical services. TX-RMOMS is filling service gaps by hiring more clinical staff at network sites and establishing additional partnerships with nearby facilities. At VVRMC, physician turnover and long appointment wait times (especially during the pandemic) prompted some women to seek care outside of the network. To keep women in the network, TX-RMOMS has hired a new full-time OB/GYN and a prenatal case manager. The lack of on-site prenatal care nearly prevented the FQHC near UMH, CHDI, from participating in the RMOMS program. To address this, CHDI established a formal partnership and data-sharing agreement with a local private practice offering prenatal care, Sage FMA. This partnership gives more women the opportunity to receive care locally instead of driving to San Antonio. CHDI will use a case manager and a behavioral health consultant to support this relationship and manage the transmission of clinical data about RMOMS participants from Sage to CHDI. CHDI will continue to refer non-high-risk pregnancies to nearby UMH for delivery and high-pregnancies to UH. The new partnership with Sage therefore allows CHDI to expand its clinical offerings and ensures that women can receive delivery care within the TX-RMOMS network for both routine and high-risk pregnancies (Figure 12).

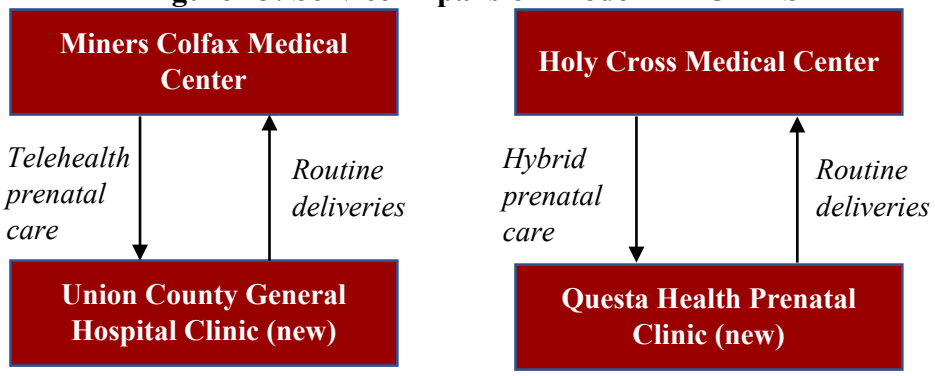
Figure 12: TX-RMOMS Service Expansion Model



ROAMS is also embarking on a significant expansion of prenatal care. The network will extend services through two new prenatal clinics, one at a network-partner FQHC (Questa Health Center) that did not previously offer prenatal care and one at Union County General Hospital, which discontinued obstetric services several years ago. In contrast to CHDI's expansion via an external partner, clinical staff from Holy Cross Medical Center and Miners Colfax Medical

Center will staff the two new ROAMS sites using a combination of in-person clinic days and telehealth. This staffing approach effectively keeps the expanded prenatal care services "in-network" (Figure 13). In addition, ROAMS is pursuing telehealth MFM services network-wide to increase the availability of local care for high-risk pregnancies.

Figure 13: Service Expansion Model in ROAMS



Goal/Strategy Four: Building Provider Capacity

Finally, all three awardees have a focus on building providers' skills and capacity. ROAMS plans to use telehealth Grand Rounds, Project ECHO trainings, and cross-site collaboration between providers to promote provider education and skills. BPN's approach includes a "virtual tour of the Bootheel" to help both providers and policymakers understand the social and health challenges faced by women in the region. BPN also plans to engage in direct provider education and skill-building, including emergency delivery simulations and Project ECHO participation. TX-RMOMS plans to bolster provider capacity by offering training on telemedicine, advanced ultrasonography, and case management for pregnant women.

D. Baseline Data for Women Served by Awardees

For the three RMOMS awardees, September 1, 2019 to August 31, 2020 was a planning period. The experiences of women served by network members during this period will also serve as the baseline for evaluation comparisons over time. However, the awardees' unique network models and goals mean that the populations of women included in these baselines differ across the awardees. ROAMS reported data for all women who had received some type of maternal care through the network during the reporting period. This included women who received pregnancy, delivery, and/or postpartum care and was the broadest population reported among the three networks. In contrast, BPN's population was the most limited in scope; BPN reported baseline data just for the women who were referred to MFM services at Saint Francis as part of its planned, gradual intervention roll-out. BPN plans to submit additional baseline data for other populations as the program rolls out. TX-RMOMS included all women who gave birth at the two rural hospitals (excluding births at UH).

Recognizing these differences in reporting, the tables below provide a comparison of patient-level data across the three awardees during the planning year/baseline period. Most women served by awardees were between the ages of 21 and 35, although about one in six of BPN's high-risk group was older than 35. ROAMS has by far the highest percentage of Medicaid-

insured women (71%) compared to 64 percent in BPN and 39 percent in TX-RMOMS (Table 30). Only TX-RMOMS had a notable share of uninsured women (24%).

Table 30: Summary Comparison of Maternal/Clinical Populations in the Baseline Period Prior to Implementation

Characteristics	BPN	ROAMS	TX-RMOMS
Women who…	Received an MFM referral at Saint Francis	Received maternal health services from network partners	Received maternal health services at the two rural hospitals
Total reported (n)	106	467	1,644
Total who delivered (n)	87	264	1,230
Age (years)			
20 or younger	--	17%	13%
21–25	28%	26%	32%
26–30	34%	29%	29%
31–35	20%	17%	17%
36–39	16%	11%	6%
40 or older	--	--	2%
Missing	2%	0%	0%
Health insurance status			
Medicaid	64%	71%	39%
Private insurance	36%	28%	22%
VA, Tricare, or other military health care	0%	0%	0%
Indian Health Service	0%	0%	0%
No insurance/uninsured	0%	0%	24%
Unknown	0%	<1%	15%
RMOMS county residence	100%	89%	80%

Source: patient-level data submitted by awardees in December 2020 and January 2021. Due to small cell size, age group is collapsed into the next higher or lower age group where "--" is listed. The baseline period was September 1, 2019 to August 31, 2020.

All three awardees reported data on preterm birth and infant birthweight (Table 31) for the planning year. Consistent with its high-risk population for reporting (those referred for MFM care), the BPN service area had high rates for both infant outcome measures at 30 percent for low birthweight and 25 percent for preterm birth. As expected from this population, these rates are higher than the Bootheel county rates reported in NVSS data (discussed previously). ROAMS' baseline data aligns with the rates found in NVSS for its service area in earlier years. Among the ROAMS delivery population, 13 percent of women experienced preterm birth and a similar share had low birthweight infants. TX-RMOMS had high rates of missing data for both

metrics. The table below shows the findings for the data reported, but these results may not be representative of the full TX-RMOMS population during the planning year.

Table 31: Infant Health Outcomes among the RMOMS Delivery Populations in the Baseline Period Prior to Implementation

Metric	BPN	ROAMS	TX-RMOMS
Low birthweight (<2,500 g)	30%	11%	6%
Preterm birth (<37 weeks)	25%	13%	15%

Notes: For TX-RMOMS, gestational age information was missing for 52 percent of the deliveries and birthweight was missing for 39 percent of the deliveries. Preterm birth is before 37 weeks gestation. Low birthweight is less than 2,500 grams. Source: patient-level data submitted by awardees in December 2020 and January 2021. The baseline period was September 1, 2019 to August 31, 2020.

For BPN and ROAMS, the baseline data also included information on prenatal and postpartum care (Table 32). First trimester prenatal care was comparable to rates seen in the NVSS data, and between 76 and 80 percent of women had postpartum visits within 12 weeks of delivery. While the TX-RMOMS prenatal and postpartum visit data were not reliable due to challenges in collecting data from participating clinical sites, all three awardees reported hospital stay visits for the baseline period. TX-RMOMS and ROAMS reported comparable rates of short hospital stays for delivery (99% and 98%, respectively). For BPN, more women had longer hospital stays (only 89 percent of women had hospitals stays of fewer than 5 days). This likely reflects BPN's focus on high-risk women who may be likelier to experience delivery-related complications.

Table 32: Prenatal and Postpartum Care Utilization at RMOMS Awardee Network Providers in the Baseline Period Prior to Implementation

Prenatal Care Metrics	BPN	ROAMS	TX-RMOMS
Prenatal visit(s) in first trimester	71%	69%	NA
Hospital stay of fewer than 5 days	89%	98%	99%
Received postpartum visit within 12 weeks of delivery	80%	76%	NA

Notes: Prenatal and postpartum visit data for TX-RMOMS lacked sufficient reliability for reporting. For TX-RMOMS, 20 percent of the deliveries had missing information for hospital stay length. Source: patient-level data submitted by awardees in December 2020 and January 2021. The baseline period was September 1, 2019 to August 31, 2020.

ROAMS submitted the most data elements of any awardee, including extensive information on risk factors and behavioral health, despite early concerns about provider capacity to collect the required elements. One of the two ROAMS delivery hospitals also reported additional data elements for its patient population. The set of required data elements will be larger in future data submissions, which will allow for comparisons on a greater variety of maternal health access and outcomes measures. The baseline data ultimately serve as the "starting point" to assess maternal health among the populations that awardees will serve in future implementation years. The evaluation will not only capture trends in maternal health outcomes over time, but also changes in awardees' models, data collection strategies, and implementation efforts.

VII. LESSONS LEARNED FROM THE PLANNING YEAR

This Annual Report is the first step in a larger evaluation to assess the impact of RMOMS network models on health care access and outcomes. In this section, we present some lessons learned from the planning year, early evidence of impact, and considerations for awardees as they advance into their first implementation year. Finally, we describe the next steps for the evaluation moving forward.

A. Lessons Learned from the Planning Year

Various factors—both internal to programs and driven by the external environment—supported or hindered planning activities of the RMOMS models in the first year. Here we describe the facilitators and barriers to maintaining the network and implementing models of care.

Maintaining the Network

Overall, the three awardees reported that their networks were strong throughout the planning year with the majority of partners staying actively engaged. Some factors that promote network engagement include:

- **Strong leadership**: Leaders for all three awardees have deep knowledge and experience in the field. They are familiar with the provider landscape and maternal health challenges in their areas. In some cases, they have longstanding personal and professional relationships with network partners, which brings commitment and legitimacy to the effort. BPN participants reported that the social services-oriented background of leadership supports the RMOMS program's mission of tackling the social determinants of health, while strong leadership in ROAMS maintained progress on the network's strategies during the COVID-19 pandemic. The awardee lead of TX-RMOMS, a large urban hospital system located outside the service area, did not have the same relationships with partners as BPN and ROAMS. Instead, TX-RMOMS built partnerships by conducting an extensive resource map of the area and visiting all facilities to encourage participation. The lead also leveraged its role in providing specialty care to other hospitals in the area to build the network.
- **Effective communication**: Formal workgroups that meet regularly and continual ad hoc communication were viewed as essential for keeping the networks strong. Awardees had planned to communicate through in-person meetings, but they effectively pivoted to virtual meetings at the onset of COVID-19.
- **Emphasis on collaboration to increase service utilization**: Some partners expressed initial concerns about losing market share due to network efforts. Leadership addressed these concerns by emphasizing how the goal of the network is to increase the current use of services. For example, a primary goal of ROAMS and TX-RMOMS is to build local capacity so women do not leave the service area for care and delivery. Similarly, BPN aims to better connect women to *existing* services to reduce barriers to clinical care.

Despite these successes, there was some planning year fluctuation in network composition and/or concerns that the networks do not include all important players in the service area. BPN lost two

hospitals due to concerns about the cost and complexity of an ambitious effort to connect partners through an HIE. These hospitals are headquartered out-of-state, and, according to interviewees, this ownership structure may have prolonged decision-making and hampered commitment to local efforts. A large Albuquerque-based health system left the ROAMS network due to a lack of engagement. However, this change did not greatly affect the ROAMS service model since this system is not a major care provider for women in the service area, although the shift opened up an opportunity for ROAMS to engage a new partnership with UNM. TX-RMOMS did not lose any network partners, but leadership identified additional partners that are important providers of care in the area. Without these providers, the network may not be able to track continuity of care for all women in the community.

Transitioning to Model Implementation

As they move into implementation, awardees are implementing multiple initiatives, ranging from direct service expansion to telehealth to patient navigation. They experienced varying degrees of success in getting these efforts off the ground at the start of the first implementation year. ROAMS seemed to juggle multiple strategies the best, making the most progress of the three awardees both during the planning year and during the transition to implementation. One reason for this early success may be the network's responsiveness to local needs and stakeholder input. The telehealth MFM initiative was driven by feedback provided by women through a survey and focus groups. In addition, the ROAMS sustainability plan incorporates stakeholder input on why women leave the service area for care and delivery. ROAMS has also excelled at setting specific targets for the network, such as aiming to serve 75 percent of women in the network with a patient navigation appointment and beginning negotiations with maternal health stakeholders to expand the Medicaid postpartum coverage period. ROAMS was able to make strong progress on each of its major strategies despite facing setbacks ranging from staff turnover to COVID-19.

BPN and TX-RMOMS have rolled out implementation in a more phased approach. BPN strategically launched its care coordination strategy with a small subset of women. The network hopes to apply the lessons learned from this "pilot" to future efforts. TX-RMOMS will focus its first implementation year on hiring staff to bolster clinical capacity and ramping up telehealth services. Early success in these endeavors will help both BPN and TX-RMOMS increase partner commitment. These staged approaches have also reduced the implementation burden on the provider community, which has been important during a pandemic that has imposed emergent challenges on both clinicians and administrators.

All awardees leveraged existing partnerships, programs, and funding sources to prepare for implementation. Awardees looked outside the networks for additional resources and support. ROAMS, for example, selected the Pathways framework to develop a more sustainable and evidence-based patient navigation model. During the planning year, BPN partnered with SMM Health, a leading health care provider in St. Louis, to support telehealth efforts. TX-RMOMS identified a gap in prenatal care services for women served by CHDI and helped CHDI establish a new contract with a private practice provider to provide more local prenatal care.

In addition, all awardees have benefited from greater acceptance of telehealth. COVID-19 has generally slowed the transition to implementation by diverting time and resources to the

pandemic and limiting in-person services and communication. However, use and acceptance of telehealth has increased dramatically at all types of clinical sites. Awardees reported that both providers and patients are more open to virtual platforms of care and that there are fewer reimbursement requirements and administrative hurdles. As a result, telehealth efforts have taken off faster than expected, although awardees have identified areas where the RMOMS program can fill in gaps and better support unique telehealth needs related to pregnancy.

B. Early Evidence of Impact and Considerations for Awardees

Even though network impact was not a focus of data collection and analysis for this Annual Report, some examples of early successes emerged during the planning year. TX-RMOMS reported that having the resources to bring on an OB/GYN and case manager increased the satisfaction of women who chose the VVRMC Rural Health Clinic for their prenatal care. As one interviewee explained, "I've had some women that have transferred from another provider. They say, 'We don't have that in other clinics. I like that I get to talk to you if I have questions or if I have concerns. I like that you give us stuff to read at home.'" Similarly, BPN provided an example of how the system care coordinator was able to connect a woman to desperately needed transportation services to make her MFM appointment. Finally, ROAMS noted that the network succeeded in establishing a partnership between Union County General Hospital and Miners Colfax Medical Center, two hospitals that had unsuccessfully tried to partner in the past, which will open up prenatal care to women living in the most remote parts of the service region.

Awardees have the foundation in place to continue this positive momentum. Some strategies they can consider to enhance impact moving forward include the following:

- **Advocate to have all providers that render care in the service area join the network**: A comprehensive network ensures better continuity of care and tracking of service utilization and outcomes for program monitoring and evaluation. The gaps in TX-RMOMS' prenatal visits are primarily driven by a lack of data, not a lack of care. By including additional partners in network activities and data reporting, TX-RMOMS can gain a more accurate picture of care quality and refine efforts for better impact.
- **Identify and track key process measures that lead to improved health outcomes:** The tracking of process measures can be a powerful strategy for achieving longer-term goals of improved maternal health care and outcomes. For example, BPN plans to assess no-show rates at the MFM provider as an indicator of care continuity and an early warning about possible impact on labor and delivery outcomes. By identifying and tracking key process measures that have a clear relationship with outcomes of interest, awardees can determine if they are on target for meeting their goals and adjusting strategies as needed.
- **Focus on patient data quality to guide programs:** Awardees can maximize their interventions by gaining a thorough and accurate understanding of gaps in care and priority health needs among their maternal/clinical populations. Early data collection hurdles, including high rates of missing data and difficulty connecting provider EHR systems, demonstrate areas where awardees lack the information to guide their interventions. Better data quality will also help to evaluate the benefits of the network models.

- **Gather feedback from stakeholders, especially consumers, through surveys, interviews, and focus groups:** By assessing the pulse of the women who receive services, awardees can ensure their needs are met. ROAMS has learned through surveys why women choose to leave the area for care, allowing ROAMS to address these issues through the network's interventions. While COVID-19 has limited awardees' ability to gain consumer feedback through in-person interactions, awardees can bring back a greater focus on patient focus groups, surveys, and interviews once the pandemic is controlled.
- **Plan for sustainability:** As awardees shift into implementation, they can promote sustainability for their initiatives by exploring reimbursement models, partnerships, and policies that can help support maternal health long-term. ROAMS, the only awardee with an early sustainability focus, has launched a reimbursable patient navigation pilot and has begun advocating for higher Medicaid reimbursement for births and extended Medicaid coverage in the postpartum period. Early planning for sustainability may include identifying stakeholders, policies, and programs that can support the goals of the RMOMS program now and maintain progress well into the future.

C. Next Steps

The first year of the RMOMS program was a planning year. As awardees implement their models, the evaluation will follow the work of the awardees through interviews, quantitative data, and other data sources. Future rounds of the evaluation will rely more heavily on maternal access and outcomes metrics from the de-identified patient-level data, including maternal health indicators that were not feasible to capture during the planning year. The next year of the evaluation will deepen the focus on payer issues and sustainability. It will incorporate interviews with state Medicaid officials to learn more about Medicaid's interaction with RMOMS and to explore possibilities for a future quantitative analysis of Medicaid claims data.

Going forward, the evaluation will also delve more into the role and structure of rural health networks for maternal health care. The first year of the RMOMS program illustrated that a "network" can entail various forms of collaboration. The most relevant for RMOMS awardees is the coordination of patient care across providers to ensure that women's needs are met along the continuum of care. Network partners can also share information, skills, and expertise to help each other build capacity and improve the quality of care. Finally, network partners may collaborate on non-patient-centered efforts, such as advocacy or marketing.

Over the next year of the evaluation, we will further examine the structures of the networks to understand their effects on the health impact of the RMOMS program. This analysis will be informed by network-level data collection to capture referral patterns among network partners. The network analysis will examine the network structure, analyze how each structure serves the awardees' rural contexts, and analyze their benefits and tradeoffs in promoting access to care and improving maternal health outcomes. In this way, the evaluation will support HRSA in promoting the replication of effective rural maternal health models.

REFERENCES

1. United State Census Bureau. American Community Survey 5-Year Data, 2013-2018. Accessed August 31, 2020. https://www.census.gov/data/developers/data-sets/acs-5year.html

2. National Center for Health Statistics. National Vital Statistics System Restricted Natality Data, 2015-2018.

3. Kaiser Family Foundation. Births Financed by Medicaid. Missouri (2017), Texas (2016), New Mexico (2018). https://www.kff.org/medicaid/state-indicator/births-financed-by-medicaid/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D

4. Improving Access to Maternal Health Care in Rural Communities: Issue Brief. Published online September 3, 2019. Accessed January 2, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/equity-initiatives/rural-health/09032019-Maternal-Health-Care-in-Rural-Communities.pdf

5. U.S. Department of Health and Human Services Health Resources and Services Administration. *Maternal Mortality Summit: Promising Global Practices to Improve Maternal Health Outcomes - Technical Report*.; 2019:24. Accessed April 17, 2019. https://www.hrsa.gov/sites/default/files/hrsa/maternal-mortality/Maternal-Mortality-Technical-Report.pdf

6. Ellison A. State-by-state breakdown of 102 rural hospital closures. Published March 20, 2019. Accessed January 17, 2020. https://www.beckershospitalreview.com/finance/state-by-state-breakdown-of-102-rural-hospital-closures.html

7. Mosley D, DeBehnke D. Rural Hospital Sustainability: New Analysis Shows Worsening Situation for Rural Hospitals, Residents. Published online February 2019. https://www.navigant.com/-/media/www/site/insights/healthcare/2019/navigant-rural-hospital-analysis-22019.pdf

8. Mead A. Strengthening the Workforce to Improve Pregnancy Outcomes in Rural Areas. The Rural Monitor. Published July 11, 2018. Accessed January 7, 2020. https://www.ruralhealthinfo.org/rural-monitor/pregnancy-outcomes/

9. Rural Health Research Gateway. Rural Health Research Recap: Rural Obstetric Services: Access, Workforce, and Impact. Published online April 2019. https://www.ruralhealthresearch.org/assets/2792-10798/rural-ob-services.pdf

10. Maron DF. Maternal Health Care Is Disappearing in Rural America. Scientific American. Accessed January 3, 2020. https://www.scientificamerican.com/article/maternal-health-care-is-disappearing-in-rural-america/

11. Kozhimannil KB, Interrante JD, Tuttle MS, Gilbertson M, Wharton KD. Local Capacity for Emergency Births in Rural Hospitals Without Obstetrics Services. *J Rural Health Off J Am*

Rural Health Assoc Natl Rural Health Care Assoc. Published online November 17, 2020. doi:10.1111/jrh.12539

12. Kozhimannil KB, Interrante JD, Henning-Smith C, Admon LK. Rural-Urban Differences In Severe Maternal Morbidity And Mortality In The US, 2007–15. *Health Aff (Millwood)*. Published online December 3, 2019. doi:10.1377/hlthaff.2019.00805

13. Iglehart JK. The Challenging Quest to Improve Rural Health Care. *N Engl J Med*. Published online January 31, 2018. doi:10.1056/NEJMhpr1707176

14. Henning-Smith C, Hernandez AM, Kozhimannil KB. Racial and Ethnic Differences in Self-Rated Health Among Rural Residents. *J Community Health*. Published online September 10, 2020. doi:10.1007/s10900-020-00914-9

15. Murphy KM, Hughes LS, Conway P. A Path to Sustain Rural Hospitals. *JAMA*. 2018;319(12):1193-1194. doi:10.1001/jama.2018.2967

16. Cameron NA, Molsberry R, Pierce JB, et al. Pre-Pregnancy Hypertension Among Women in Rural and Urban Areas of the United States. *J Am Coll Cardiol*. 2020;76(22):2611-2619. doi:10.1016/j.jacc.2020.09.601

17. Jarlenski MP, Paul NC, Krans EE. Polysubstance Use Among Pregnant Women With Opioid Use Disorder in the United States, 2007-2016. *Obstet Gynecol*. 2020;136(3):556-564. doi:10.1097/AOG.0000000000003907

18. Centers for Disease Control and Prevention. US Opioid Crisis: Addressing Maternal and Infant Health. Accessed February 19, 2021. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/substance-abuse/opioid-use-disorder-pregnancy/pdf/MMWR-Opioids-Use-Disorder-Pregnancy-Infographic-h.pdf

19. McKee K, Admon LK, Winkelman TNA, et al. Perinatal mood and anxiety disorders, serious mental illness, and delivery-related health outcomes, United States, 2006-2015. *BMC Womens Health*. 2020;20(1):150. doi:10.1186/s12905-020-00996-6

20. U.S. Department of Health and Human Services. Healthy Women, Healthy Pregnancies, Healthy Futures: Action Plan to Improve Maternal Health in America. Published online December 3, 2020. Accessed December 3, 2020. https://aspe.hhs.gov/system/files/aspe-files/264076/healthy-women-healthy-pregnancies-healthy-future-action-plan_0.pdf

21. Alhusen JL, Ray E, Sharps P, Bullock L. Intimate Partner Violence During Pregnancy: Maternal and Neonatal Outcomes. *J Womens Health*. 2015;24(1):100. doi:10.1089/jwh.2014.4872

22. Mishkin K, Gupta R, Estrella R. Pregnancy-associated deaths will increase in the COVID-19 era. Maternal Health Task Force. Published February 4, 2021. Accessed February 4, 2021. https://www.mhtf.org/2021/02/04/pregnancy-associated-deaths-will-increase-in-the-covid-19-era/

23. Jarlenski M, Krans EE. Co-occurring Substance Use Disorders Identified Among Delivery Hospitalizations in the United States. *J Addict Med*. Published online December 1, 2020. doi:10.1097/ADM.0000000000000792

24. Tikkanen R, Gunja M, FitzGerald M, Zephyrin L. Maternal Mortality and Maternity Care in the United States Compared to 10 Other Developed Countries. The Commonwealth Fund. doi:https://doi.org/10.26099/411v-9255

25. National Center for Health Statistics. Maternal Mortality: Frequently Asked Questions. Published November 9, 2020. Accessed January 20, 2021. https://www.cdc.gov/nchs/maternal-mortality/faq.htm

26. Hoyert DL, Miniño AM. Maternal Mortality in the United States: Changes in Coding, Publication, and Data Release, 2018. *Natl Vital Stat Rep Cent Dis Control Prev Natl Cent Health Stat Natl Vital Stat Syst*. 2020;69(2):1-18.

27. Agency for Healthcare Research and Quality. Healthcare Cost and Utilization Project (HCUP) Data: National Inpatient Sample, Nationwide 2016-2018. Published online 2018. https://www.hcup-us.ahrq.gov/tech_assist/centdist.jsp

28. U.S. Government Accountability Office. Maternal Mortality and Morbidity: Additional Efforts Needed to Assess Program Data for Rural and Underserved Areas. Published April 8, 2021. Accessed May 11, 2021. https://www.gao.gov/products/gao-21-283

29. Lewis C, Paxton I, Zephyrin L. The Rural Maternity Care Crisis. To the Point. doi:https://doi.org/10.26099/j0nn-ap16

30. Health and Human Services. HHS Outlines New Plans and a Partnership to Reduce U.S. Pregnancy-related Deaths. HHS.gov. Published December 2, 2020. Accessed December 3, 2020. https://www.hhs.gov/about/news/2020/12/03/hhs-outlines-new-plans-to-reduce-us-pregnancy-related-deaths.html

31. Robert Wood Johnson Foundation. County Health Rankings and Roadmaps. https://www.countyhealthrankings.org/explore-health-rankings

32. Kaiser Family Foundation. Medicaid and CHIP Income Eligibility Limits for Pregnant Women as a Percent of the Federal Poverty Level. Published online January 1, 2020. https://www.kff.org/health-reform/state-indicator/medicaid-and-chip-income-eligibility-limits-for-pregnant-women-as-a-percent-of-the-federal-poverty-level/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D

33. Medicaid.gov. Missouri Targeted Benefits for Pregnant Women Section 1115 Demonstration. https://www.medicaid.gov/medicaid/section-1115-demo/demonstration-and-waiver-list/82361

34. Data.medicaid.gov. 2019 Child Health Care Quality Measures: Child Core Set Data. Published 2019. Accessed February 26, 2021. https://data.medicaid.gov/Quality/2019-Child-Health-Care-Quality-Measures-Quality/napm-9as8/data

35. Health Resources and Services Administration. Title 5 MCH Block Grant Program Missouri, State Snapshot. Published online FY Application / FY 2019 Annual Report 2021. https://mchb.tvisdata.hrsa.gov/uploadedfiles/StateSubmittedFiles/2021/stateSnapshots/MO_StateSnapshot.pdf

36. Missouri Department of Health & Senior Services. DHSS is awarded grant from CDC to improve maternal health in Missouri. Published September 12, 2019. Accessed January 28, 2021. https://health.mo.gov/news/newsitem/uuid/35a60075-c388-4a30-881e-a7602adb209e

37. Missouri Department of Health and Senior Services. Missouri Title V Facts: Maternal Morbidity/Mortality. Accessed February 4, 2021. https://health.mo.gov/living/families/mch-block-grant/pdf/maternalmortalityandmorbidity_final.pdf

38. Federal Communications Commission. FCC Fixed Broadband Deployment. Accessed February 8, 2021. https://broadbandmap.fcc.gov/

39. Centers for Disease Control and Prevention, Pregnancy Risk Assessment Monitoring System. Postpartum Checkup Data, 2017. Published online 2017. Accessed February 4, 2021. www.marchofdimes.org/peristats

40. Saint Francis Medical Center, Cape Girardeau, Missouri. Application for Federal Assistance (Rural Maternity and Obstetrics Management Program) Submitted to HRSA. Published online June 16, 2019.

41. March of Dimes PeriStats. National Center for Health Statistics, final period-linked birth-infant death data (2017). Published online 2017. Accessed December 2, 2020. www.marchofdimes.org/peristats.

42. Centers for Disease Control and Prevention. Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM). Published March 17, 2020. Accessed January 15, 2021. https://www.cdc.gov/reproductivehealth/maternal-mortality/erase-mm/index.html

43. National Center for Health Statistics. Maternal Mortality by State, 2018. Published online November 9, 2020. Accessed January 20, 2021. https://www.cdc.gov/nchs/maternal-mortality/faq.htm

44. Missouri Department of Health and Senior Services D. *Missouri Pregnancy-Associated Mortality Review: 2017 Annual Report*.; 2020:46. https://health.mo.gov/data/pamr/pdf/annual-report-2020.pdf

45. Edinburgh Postnatal Depression Scale (EPDS). Accessed February 10, 2021. http://www.perinatalservicesbc.ca/health-professionals/professional-resources/health-promo/edinburgh-postnatal-depression-scale-(epds)

46. About the PRAPARE Assessment Tool. NACHC. Accessed February 10, 2021. https://www.nachc.org/research-and-data/prapare/about-the-prapare-assessment-tool/

47. Missouri Moms and Babies. Show-Me ECHO. Accessed February 18, 2021. https://showmeecho.org/clinics/missouri-moms-and-babies/

48. New Mexico Department of Health. Health Insurance Coverage Patterns Before and After Implementation of the Affordable Care Act, New Mexico PRAMS. Accessed March 1, 2021. https://www.nmhealth.org/data/view/maternal/2421/

49. Health Resources and Services Administration. Title V MCH Block Grant Program New Mexico State Snapshot. FY 2021 Application / FY 2019 Annual Report. https://mchb.tvisdata.hrsa.gov/uploadedfiles/StateSubmittedFiles/2021/stateSnapshots/NM_StateSnapshot.pdf

50. Sharon Phelan, MD, Melissa Schiff, MD, MPH, Catherine Avery, CFNP, MS, Katherine Nardini, CNM, WHNP-BC, MPH, Eirian Coronado, MA, Sarah Heartt, MS, Thomas Massaro, MD. New Mexico Department of Health, Maternal Mortality Review Committee. Maternal Mortality in New Mexico, 2015-2017. Published online 2020. Accessed January 15, 2021. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiTlNjatvfwAhVQWs0KHaN-BFoQFjABegQIBxAD&url=https%3A%2F%2Fsasgog.memberclicks.net%2Fassets%2Fdocs%2F2020_Abstracts%2F49_Phelan-7-14-20-FINAL%2520with%2520comments.ppsx&usg=AOvVaw0K8ksGIHabWPddE_dcNZk3

51. Kaplan E. New Mexico's suicide rate is highest in US. *AlbuquerqueJournal*. https://www.abqjournal.com/1472695/new-mexicos-suicide-rate-is-highest-in-us.html. Published July 5, 2020. Accessed February 19, 2021.

52. New Mexico Secretary of State. 23 NM Federally Recognized Tribes in NM Counties. Accessed February 23, 2021. https://www.sos.state.nm.us/voting-and-elections/native-american-election-information-program/23-nm-federally-recognized-tribes-in-nm-counties/

53. Harding County. New Mexico Counties. Accessed January 25, 2021. https://www.nmcounties.org/counties/harding-county/

54. Rural Health Information Hub. Critical Access Hospitals (CAHs) Introduction. RHIHub. Published August 20, 2019. Accessed February 4, 2021. https://www.ruralhealthinfo.org/topics/critical-access-hospitals#medicaid

55. Pathways Community Hub Institute (PCHI). PCHI. Accessed February 25, 2021. https://pchi-hub.com/

56. Health Insurance Coverage of the Total Population. Kaiser Family Foundation. Published October 23, 2020. Accessed February 8, 2021. https://www.kff.org/other/state-indicator/total-population/

57. Health Insurance Coverage of Females 19-64. Kaiser Family Foundation. Published October 23, 2020. Accessed February 8, 2021. https://www.kff.org/other/state-indicator/health-insurance-coverage-of-nonelderly-adult-females/

58. Eckert E. Despite Many States Doing What They Can, The Federal Government Must Act Now To Extend Postpartum Medicaid Coverage. Health Affairs. Accessed March 1, 2021. https://www.healthaffairs.org/do/10.1377/hblog20201207.582148/full/

59. Health Resources and Services Administration. Title V MCH Block Grant Program Texas State Snapshot. FY 2021 Application/FY 2019 Annual Report. https://mchb.tvisdata.hrsa.gov/Home/StateSnapshot

60. Health Resources & Services Administration. Area Health Resource Files. Accessed February 26, 2021. https://data.hrsa.gov/topics/health-workforce/ahrf

61. Texas Department of State Health Services. *Texas Mortality and Morbidity Task Force and Department of State Health Services Joint Biennial Report, December 2020*.; 2020. Accessed December 11, 2020. https://www.dshs.texas.gov/legislative/2020-Reports/DSHS-MMMRC-2020-UPDATED-11282020.pdf

62. About University Health. University Health System. Published 2021. Accessed February 16, 2021. https://www.universityhealthsystem.com/about-us

63. System SFH. About Saint Francis Healthcare System: Southeast Missouri Regional Healthcare System. Saint Francis Healthcare System Southeast Missouri / St. Francis Hospital in Cape Girardeau. Accessed February 16, 2021. https://www.sfmc.net/healthcare-system/

APPENDIX: RESEARCH QUESTIONS

Research Question	Data Source					
	Doc. Review	Interviews	Progress Reports	Patient-Level Data	PIMS	Medicaid Claims*
Network Approach to Coordinating Care						
1. How do network partners coordinate services to improve access to the continuum of care?		P	P		P	
2. What is the governance structure of the network?		P	S			
3. Are awardees able to implement their work plans and achieve outcomes as planned?	P	P	P			
4. What are the barriers and facilitators to creating regional networks that span the continuum of care and improving maternal and neonatal outcomes?		P				
Delivery and Access to Services						
5. What impact do these rural networks have on the types of medical services utilized, settings of care, and patterns of utilization at each site and across the program?				P	S	P
6. What impact do rural networks have on utilization of non-medical resources, referrals, and services, such as transportation, dietary services, and social services?		P	P	P		
7. What role can telehealth, such as fetal monitoring, play in supporting rural clinicians and the obstetric patients they serve?		P	P	P	S	
Maternal and Neonatal Outcomes						
8. Does the program improve clinical outcomes during the prenatal period, labor/delivery period, and postpartum period?				P		P
9. What are the characteristics and risk factors of the patients served?				P		
Financial Sustainability and Viability						
10. Is there a reduction in high-cost, high-intensity services?				P		P
11. What impact did the program have on Medicaid costs and health care utilization?				P		P
12. What strategies are most effective to reduce or avoid high-cost services?		P				
13. Can a regional network with several rural hospitals aggregate obstetric services to ensure enough patient volume to be financially viable and provide high-quality obstetric services?		P				
14. What is the role of Medicaid/other payers in facilitating the network and financial sustainability?		P				
15. How can avoided costs be captured and accounted for?		P				

*If exercised.