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Rural Maternal Care Crisis & Strained Workforce: An Integrative Review Revealing Factors in the Rural Maternal Care Crisis

Taylor F. High Elk
Bethel University

RURAL MATERNAL CARE CRISIS & STRAINED WORKFORCE: AN INTEGRATIVE REVIEW REVEALING FACTORS IN THE RURAL MATERNAL CARE CRISIS

BY

TAYLOR HIGH ELK

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Rural Maternal Care Crisis & Strained Workforce: An Integrative Review Revealing Factors in the Rural Maternal Care Crisis

Taylor High Elk RN, BSN

Department of Nursing, Bethel University

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Rebecca Smith

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Approvals

Project Advisor Name: Rebecca Smith, CNM, MSN

Project Advisor Signature: Rebecca A. Smith, MSN, CNM

Second Reader Name: Katrina Wu, CNM, PhD

Second Reader Signature:

Director of Nurse Midwifery Program Name: Katrina Wu, CNM, PHD

Director of Nurse Midwifery Program Signature:

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Abstract

Introduction: The United States is comprised of 75% rural areas and settings (American College of Obstetricians and Gynecologists (2014). Nearly five million women in the US do not have access to maternity care in the county in which they reside (Uribe-Leitz et al., 2022).

Purpose: The purpose of this integrative review is to assess the hospitals that provide maternity care in rural settings, the procedures performed in these locations, and the maternal care workforce in the rural obstetric setting. The goal of this research is to identify why there is a lack of maternity care in the rural setting, and how midwives can help to fill the gap in rural maternity care.

Methods: Whittemore and Knalf's updated methodology guided this review (2005). The databases used were PubMed ($n = 953$), CINAHL ($n = 50$), and SCOPUS ($n = 2{,}002$). The search included the keywords: *rural health* OR *rural health services*; AND *obstetrics* OR *midwifery* OR *maternity care* OR *birth* OR *pregnancy*; AND *workforce* OR *clinicians* OR *providers* OR *personnel*. Inclusion criteria for screening were: rural areas, midwifery, obstetrics, workforce, providers, clinicians, maternal care, and United States. Exclusion criteria included: language other than English, not original work, not full text. Relevant articles were classified into four categories: (a) procedures performed in rural obstetric units, (b) closure of rural hospitals and rural obstetric units, (c) perspectives of loss or lack of local obstetric units, and (d) characteristics of the rural obstetric workforce.

Results: Rural maternity units are at risk of closure, with 9% of rural maternity units closed from 2004–2014 (Hung et al., 2017). In rural locations where maternity care is still available, unnecessary interventions are more likely to. Obstetrician-gynecologists (ob-gyns) are difficult to recruit and retain, therefore family practice physicians tend to practice maternal care in a rural

setting (Kozhimannil et al., 2015). Reduced funding, inadequate staffing, and undertrained personnel can lead to increased maternal morbidity and mortality (Kozhimannil et al., 2016). Rural maternal care units are closing at staggering rates and their workforce is inadequate. Very little evidence in this review incorporated certified nurse-midwives (CNMs) in the rural maternal workforce, and how CNMs can close the gap and aid in the rural maternal health crisis, though the reviewer asserts that CNMs are uniquely positioned to add vital care in the rural setting.

Keywords: Rural health, maternal care, health workforce, midwifery, obstetrics

Rural Maternal Care Crisis and Strained Workforce: An Integrative Review Revealing Factors in the Rural Maternal Care Crisis

Background

In the United States, nearly five million women and their families do not have access to maternity care in the county in which they reside (Uribe-Leitz et al., 2022). Rural communities are widely underserved in all aspects of medical care, but particularly maternity care. It is well documented that families living in rural areas experience an increased rate of maternal mortality and morbidity. Access to care, social determinants of health, and workforce shortages play a key role in this statistic (Kozhimannil et al., 2019).

Childbirth continues to remain one of the most common reasons for hospital admission, but despite this, many obstetric units are closing or are at risk of closure. In the US, 54% of rural counties, do not have a hospital that offers obstetric services. From 2004 to 2014, maternity units in 179 communities or 9% of all rural maternity units closed their doors. Anticipated closures include one third of all remaining rural hospitals (Hung et al., 2017).

Of the land area in the United States, 75% is considered rural and only 6% of practicing ob-gyns in the US, work in a rural setting (Statz & Evers, 2020). Most of the US is rural, however most ob-gyns don't practice in this setting. Smulian et al. (2016) finds that family practice physicians and midwives are more likely to choose rural practice, but their numbers are still limited. This, paired with recent maternity unit closures, has led the US into a rural maternity care crisis.

The purpose of this integrative review is to assess the hospitals that provide maternity care in rural settings, the procedures performed in these locations, and the maternal care workforce in the rural obstetric setting. The goal of this research is to identify why there is a lack

of maternity care in the rural setting and how midwives can help to fill the gap in rural maternity care.

Theoretical Framework

Wagner's Chronic Care Model is used as the guiding framework for this review. This model has six fundamental categories that promote effective chronic health management. The focus of this theory is community partnership with both patients and healthcare systems to promote wellness (1998). This framework is used as a guide for discussion and solution to the current maternal care crisis.

Methods

An integrative review was completed using Whittemore and Knalf's (2005) updated methodology, which helped to ensure the review was nonbiased and complete. This integrative review began in January 2023, and involved the following databases: PubMed, CINAHL, and SCOPUS. Initial searches were trialed in each database for relevance, and then the keywords and search strategy were finalized using input from a research librarian.

The search terms used were: *rural health* OR *rural health services*; AND *obstetrics* OR *midwifery* OR *maternity care* OR *birth* OR *pregnancy*; AND *workforce* OR *clinicians* OR *providers* OR *personnel*. Boolean operators were utilized to facilitate the search. The databases searched included PubMed (n = 5,1315), CINAHL (n = 50), and SCOPUS (n = 2,002). The search was limited to the last 10 years, 2013–2023. CINAHL's advanced search options limited the search to US, text in English, and peer reviewed articles only. SCOPUS' advanced search options similarly limited the search to US, text in English, and peer reviewed. The location-filtering feature was not available within PubMed's database; therefore, *United States* was added to the search terms to help aid in the relevance of the search.

Articles were screened thoroughly for inclusion and for applicability to the purpose of this review. During screening, inclusion criteria consisted of the following: rural areas, midwifery, obstetrics, workforce, providers, clinicians, maternal care, and United States. Exclusion criteria included: language other than English, not original work, not full text. Only articles that discussed patient care during pregnancy, labor, or delivery were included; gynecologic and primary care were excluded, as were rural-urban studies. The primary focus was on maternal care workforce, hospital maternity units, and obstetric-, maternity-, and midwifery services provided by rural hospitals.

Covidence software was used to aid in this integrative review. The software complied 3,025 titles and abstracts for review, and automatically removed 180 duplicate articles. During title and abstract screening, 2,900 articles were excluded due to the criteria presented earlier, and 125 articles were selected for full text review. Following full text review, 25 articles were saved to include in the in-depth analysis. A literature matrix was used to organize the articles and is included in Table 1.A Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) is illustrated in Figure 1, while the percentage breakdown of each topic in the review is presented in Figure 2.

Results

Data from the 25 articles included in this integrative review were extracted, and included qualitative ($n = 15$), quantitative ($n = 5$), and mixed methods ($n = 5$) articles. The information obtained was highly descriptive in nature. Quality levels followed the John's Hopkins nursing evidence-based practice model (Dang & Dearholt, 2017). The reviewed articles were held level I or level II classifications, with A (high) or B(good) quality. All data were obtained in the United States, with a large portion collected from nine states: Colorado, Iowa, Kentucky, New York,

North Carolina, Oregon, Vermont, Washington, and Wisconsin. Relevant articles were further classified into four categories as follows: (a) closure of rural hospitals and rural obstetric units; (b) perspectives of loss or lack of local obstetric units ($n = 2$); (c) procedures performed in rural obstetric units ($n = 8$); ($n = 3$); (d) and rural obstetric workforce ($n = 12$).

Closure of Rural Hospitals and Rural Maternal Care Units

Of the studies reviewed, 12% (n =3) involved the closure of rural hospitals and rural maternal care units. Nine percent of rural communities experienced a loss of maternal care. Low-income, non-Hispanic, Black communities in rural U.S. were at an increased risk of losing maternal care services (Hung et al., 2017).

Rural counties have seen a decline in recent births. Maternal care providers felt 200 annual births were needed to retain competence. Common reasons for rural maternal care unit closures included inability to obtain proper staffing, low birth volume, and financial concerns (Kozhimannil et al., 2022).

The lack of access to maternal care means that many women will receive less prenatal care (Hung et al., 2017. Low-income families are more likely to live in rural areas without maternal care and are acutely affected by maternal care unit closures. Maternal care "deserts" are widespread though rural United States, leaving 2.4 million women without maternal care (Hung et al., 2017.

Perspectives on Loss or Lack of Local Obstetric Units

Of the studies, 8% ($n = 2$) included community members' perspectives on loss of rural maternal care. Medical mistrust and travel burden were identified as reasons for frustration, since many rural patients are low income and cannot afford to travel to obtain healthcare outside of the

communities, they reside in. (Efird et al., 2021). Studied depicted patients' frustration over the closure of rural maternal care units.

Though many patients felt upset over hospital closures, some had already been choosing regional hospitals over local hospitals for maternal care. Some of the reasons regional care was preferred over local care was the ability to receive epidural analgesic, on-site cesarean deliveries, and NICU care (Pearson et al., 2018). When maternal care is available locally, many women choose local care; however, women with complications or preterm births were more likely to deliver at nonlocal hospitals. This is due to higher levels of care in nonrural hospitals. Despite that, patients still felt discouraged by increased travel time for care, financial burden, and decreased access to care (Pearson et al., 2018). This leads to an increase in anxiety about receiving care, both locally and when requiring travel to receive maternal care.

Medicaid beneficiaries are more likely to give birth at a nonlocal hospital (Kozhimannil et al., 2016). Many rural families are Medicaid beneficiaries and added travel expenses become a financial burden, leading to missed prenatal care.

Procedures Performed in Rural Maternal Care Units

Obstetric procedures vary in the rural maternal care setting, and 32% of the studies (n = 8) examined this topic. This category includes data on cesarean delivery, vaginal delivery after cesarean (VBAC), deliveries in emergency rooms in hospitals without maternal care, and the ability to transfer maternal care patients to tertiary care centers.

A large portion of the rural population is located more than 30 minutes from the nearest hospital that provides cesarean delivery (Uribe-Leitz et al., 2022). Rural hospitals that do perform cesarean delivery have a lower rate of both indicated and nonindicated cesarean delivery when policies outlining safe staffing are in place for all obstetric procedures. The risks of any

unnecessary obstetric procedure in labor were reduced by 25% in hospitals with outlined staffing policies (Kozhimannil et al., 2016). Trial of labor after cesarean sections (TOLAC/VBAC) in all rural Michigan hospitals was lower than expected. This means that more repeat cesarean sections are being performed in these locations. In many rural Michigan hospitals, VBAC wasn't even provided (Wendling et al., 2021). Access to local cesarean delivery and appropriate staffing have an impact on the quality of care provided to maternity patients.

Rural hospitals that do not have maternal care units are still experiencing emergency room deliveries and staff in these locations felt unprepared. Most of these emergency room deliveries took place more than 30 miles from the nearest hospital that provides maternal care. A delay in transfer or inability to transfer patients was noted as being another factor detrimental to obstetric care. (Kozhimannil et al., 2020).

Quality and safety vary across rural hospitals by birth volume, with higher volumes often leading to more practiced staff and safer deliveries. Areas without access to maternal care may be at risk for increased perinatal morbidity and mortality (Waits et al., 2020), but high birth volume does not always equate to superior results regarding unnecessary intervention and adverse outcomes (Kozhimannil et al., 2014). Additional research is needed to identify why access to care is essential to reducing the risk of perinatal morbidity and mortality, but high-volume care may not be the best solution to care

Rural Obstetric Workforce

Of the studies, 48% ($n = 12$) examined the characteristics of the rural maternal workforce. Only 12% ($n = 3$) focused on a certified nurse-midwife's role in rural maternal care. Of the studies, 20% ($n = 5$) focused on a family practice physician's role in maternal care and evaluated concerns such as economics and staffing.

Family physicians more commonly practice obstetrics in a rural setting than in an urban setting. General surgeons and family practice physicians also frequently perform cesarean delivery in rural communities (Kozhimannil et al., 2015). Maternal care providers choose rural practice locations for a variety of reasons, ranging from proximity to family and friends, work-life balance, interest in rural healthcare, desire to serve the underserved, and the extent of obstetric training they received (Smulian et al., 2016).

In rural, low birth volume settings, maternal care units described staffing challenges as difficulty recruiting, retaining, and training staff (Kozhimannil et al., 2015). No current evidence was included in this study about the financial benefit of adding a midwife to an obstetric practice, but one study revealed that adding a family practice physician who provides maternal care can benefit a rural practice by $488,560 annually (Avery et al., 2014).

Midwives in Rural Maternal Care

Certified nurse-midwives are more likely to practice in a rural setting than physicians (Smulian et al., 2016). States with autonomous practice, where midwives can practice independently, were more likely to have midwives working in rural hospitals. However, rural hospitals with low birth volumes are significantly less likely to have certified nurse-midwives practicing in the hospital, and only 32% of hospitals surveyed had certified nurse-midwives attending births (Kozhimannil et al., 2016). Many of these hospitals hoped to add midwifery or grow their midwifery department.

Kansas has large areas of maternal care "deserts," and it is also a state without autonomous practice. Certified nurse-midwives do not have full privileges in many rural Kansas hospitals, and it is not anticipated that many of these hospitals will grow their midwifery practice (Koschwanez et al., 2021).

By contrast, in Colorado, most midwives practicing in hospitals have autonomous practice, but most practicing midwives are in non-rural areas. Low Medicaid reimbursement rates are a limiting factor in incorporating midwifery care into the rural Colorado setting (Smith et al., 2023).

The rural maternal workforce faces many challenges. Family practice physicians play avital role in developing and sustaining maternal care in rural areas. Family practice physicians and general surgeons who practice in rural areas are likely to perform cesarean delivery (Kozhimannil et al., 2015). While their presence can be vital in rural communities, many family practice physicians do not receive enough obstetric training, and rarely receive rural medicine training (Smulian et al., 2016).

Key Points

- 2.4 million rural women and their families don't have access to maternal care.
- 9% of communities are experiencing a loss in maternal care services.
- Frustration continues to grow among women after losing maternity care.
- Many people in rural communities live > 30 minutes from a hospital that performs cesarean.
- Family practice physicians are generally providing maternity care in rural settings.
- Recruitment, retention, and education are key concerns for those staffing maternal care units.

Discussion

This integrative review's purpose was to determine the setting of rural maternal health, the characteristics of rural maternal health workforce, and the care provided in rural maternal units. Wagner's Chronic Care Model (1998), which involves six fundamental areas in which

health care can be improved, was used as the theoretical framework for this review. An illustration of Wagner's model is presented in Figure 3. This framework was applied to help aid in the development of a plan through which voids in the rural maternal workforce may be filled.

Self-Management Support

This pillar of the chronic care model empowers and prepares patients to manage their health and care (Wagner, 1998). Closures of rural maternal care units mean that a disproportionate number of underserved, low-income women no longer have access to maternal care—cut off from vital support for the management of their care. When maternal care is available in rural areas, nonindicated c-section, unnecessary interventions, and induction of labor occur more frequently (Kozhimannil et al.,2016). Reduced funding, inadequate staffing, and undertrained personnel can lead to increased maternal morbidity. Rural women must travel greater distances and spend additional money to get adequate maternity care, inhibiting their ability to manage their health and care (Kozhimannil et al., 2016).

With closures of local maternal units many rural families feel frustrated, but little action has been taken to rectify this removal of care (Pearson et al., 2018). The goal of the self-management support pillar of Wagner's Chronic Care model, is to promote patient involvement. In rural communities facing maternity unit closures, a forum for goal setting and action planning could help promote maternal care—an important step toward improving patients' options for management of their care. Resources could be allocated to areas in need, and members of the community should advocate for local maternity care.

Clinical Information Systems

Clinical information systems organize community data to promote competent care (Wagner, 1998). Many rural hospitals are set in low-income areas with high levels of Medicaid

beneficiaries. Reimbursement rates for Medicaid are low compared to commercial insurance, which, combined with an overall lack of offered procedures and available funding, leads to financial burden on rural maternal care units. Staffing is problematic in many rural maternal health units. Recruitment, training, and retaining employees proves to be a challenge. Ultimately the lack of workforce and poor economics lead to closures of rural maternal care units and hospitals. Gathering reimbursement information and statistics helps the community have a better understanding of the current financial state of the communities' healthcare systems.

It is vital to consider commercial insurance, Medicare, Medicaid, and private reimbursement when considering the loss of maternity care services in rural areas. Maternal morbidity and mortality are higher in rural areas, which has a significant role in the rural community dynamic (Kozhimannil et al.,2019). An absence of maternal care services may dissuade families from seeking residency in a community without care. An ever-decreasing population continues the rural health disparity. Identifying the current data and statistics that play a role in this disparity may help community involvement.

Decision Support

Decision support involves evidence-based practices and specialized care to help promote patient health (Wagner, 1998). Unfortunately, rural areas are underserved by all specialist care, and only 6% of the United States' certified ob-gyns work in a rural location (Statz & Evers, 2020). The American College of Obstetrics and Gynecologists' (2021) recommendations should be used as an evidence-based framework for maternal care and support for rural maternal health. Health Resources and Services Administration is also an organization that promotes rural health and has guidelines on healthcare for rural underserved communities (2023). Utilizing support from organizations can help low volume rural maternal care units keep up with current evidence.

Delivery System Design and Health Care Organization

These two pillars work together to ensure safe clinical care is provided and to create a positive healthcare culture (Wagner, 1998). Limited workforce has placed a strain on rural maternal healthcare. The delivery system design pillar states that roles should be defined among healthcare members. In the rural setting, Family practice physicians are more likely to be the defined maternal care provider, while ob-gyns more frequently practice in an urban setting (Young,2017). Family practice physicians who practice obstetrics in a rural community can bring in over $400,000 in revenue (Avery et al., 2014). No similar data has been complied on the certified nurse-midwife's financial role in rural maternal care.

A collaborative culture should be established between interdisciplinary members of a hospital's healthcare team to create a safe maternal care environment. Change should be encouraged, and complacency in maternity care should not be tolerated. Research and recruitment efforts are a mainstay in developing a well-established maternal care workforce.

Community

Community resources should come together to meet the current needs of patients (Wagner, 1998). Rural communities without adequate maternity care should come together to discuss recent closures and the risk for future closures. While recruiting and retaining a trained workforce has proven challenge enough for rural providers of general healthcare, providing rural maternity care has become a crisis.

This lack of maternity care in rural settings is a multifaceted problem but advocating for fair Medicaid reimbursement rates could be a key component, since most of the people served in these communities are low-income and paying with Medicare. Encouraging involvement from people within the community helps to keep any small business thriving, healthcare included.

Additional efforts to recruit, train, and retain members of the maternal health team should be a top priority for any rural community. Local OB-GYN care may not be a possibility in a rural area given its specialized nature, but family practice physicians or midwifery care are two great alternatives. Very little evidence in this review incorporated certified nurse-midwives in the rural maternal workforce, and only one third of all hospital births are attended by certified nurse-midwives. Autonomous practice regulations, or when CNMs have independent practice authority, play a significant role in CNMs gaining practice privileges (Kozhimannil et al., 2016).

Certified nurse-midwives are underutilized in the United States and limited research is available on implementing midwifery into broader healthcare practice. Certified nurse-midwives are experts in normal maternity care, requiring less time to be educated than an ob-gyn. Midwives are also less expensive to employ but can bill for the same nonsurgical services. Midwifery was intended to provide holistic care to women and their families and can help fill gaps in the provision of rural maternal care.

Limitations

The primary limitation of this review was that there was only one researcher conducting the search, reviewing inclusion and exclusion criteria, and reviewing article relevance. Diligence was used to make this integrative review nonbiased, including use of the following measures to reduce biases—a librarian consultation, an integrative review framework, a PRISMA flow chart, and a consultation with senior investigators.

Conclusion

Rural families are underserved by medical care and maternal mortality and morbidity is higher among rural populations. Unfortunately, maternal care units in rural communities are closing at a staggering rate and—with limited resources available for rural care providers to

attract and retain staff specializing in obstetric care—the rural maternal workforce is inadequate. Certified nurse-midwives are an excellent resource in the rural maternal health crisis.

The addition of certified nurse-midwives in rural settings can solve the both the financial and workforce burden that occurs in these locations. In addition to CNMs, community involvement in healthcare advocacy can help promote fair Medicaid reimbursement rates. Adding maternity care in underserved rural areas improves the quality of life for all community members for generations to come.

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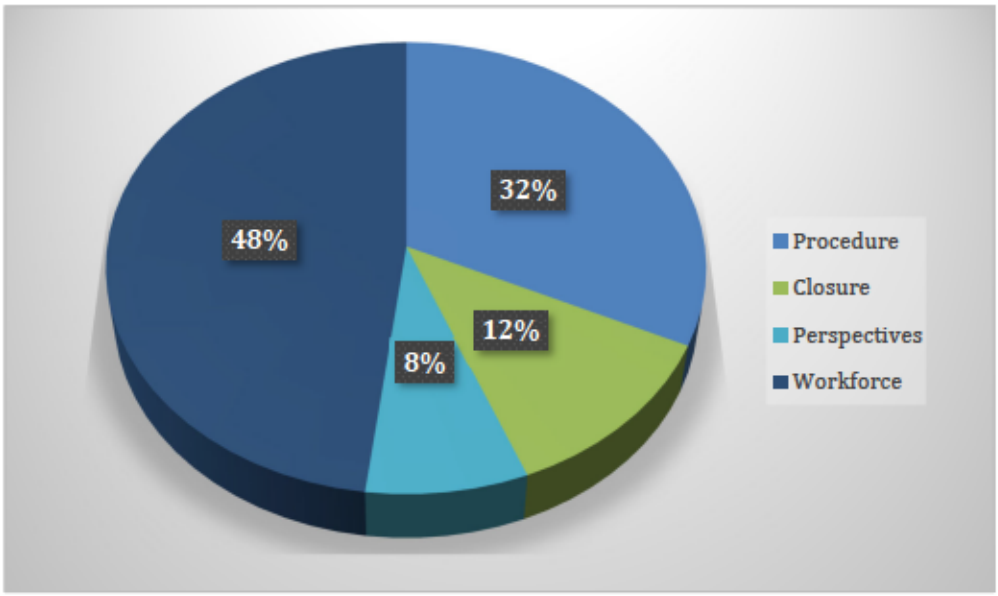
Figure 1

PRISMA

Figure 2

Rural Maternal Workforce Study Categories



Note. The above pie chart depicts the percent share of each category in the integrative review.

Figure 3

Wagner's Chronic Care Model

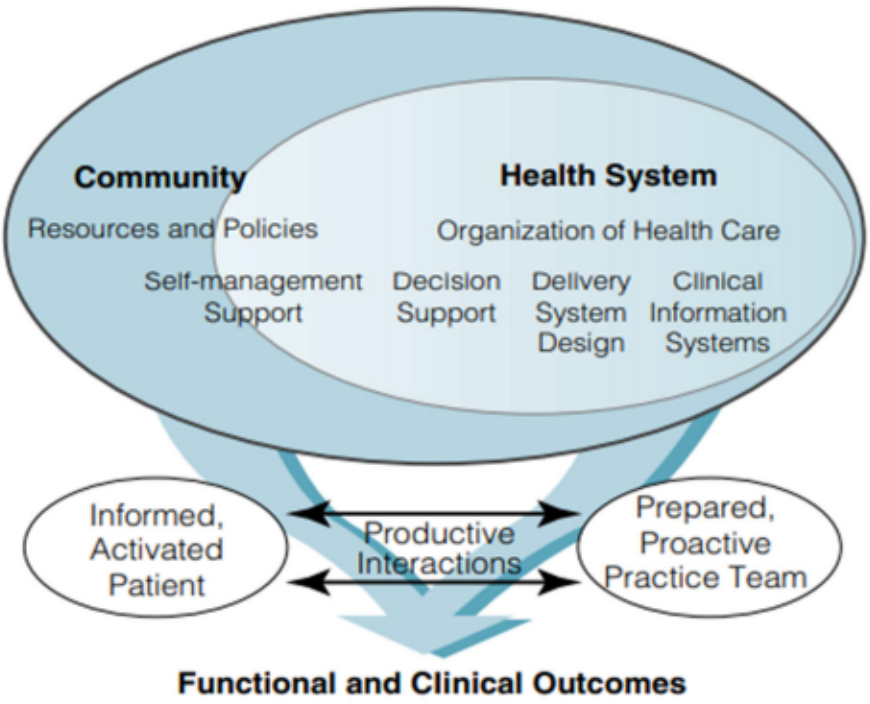


Table 1

Literature Review Matrix

#	Characteristics	Findings
1.		
	Author (Date)	Daniel et al. (2014)
	Title	The economic impact of rural family physicians practicing obstetrics
	Purpose	Determine whether there was any added economic benefit of family physicians practicing OB in rural, underserved Alabama
	Type	Qualitative study
	Quality	A/B
	Sample Size (*n =)*	13
	Location	Rural Alabama
	Results	Rural family physicians who provide OB services add an additional $488,560 to the community served.
	Outcomes and Factors Evaluated	Economic benefit of the rural family physician who provides OB services
	Category	Workforce
2.		
	Author (Date)	Deutchman et al. (2021)
	Title	The impact of family physicians in rural maternity care
	Purpose	Estimate the impact of family physicians on access to maternity care in the United States
	Type	Quantitative study
	Quality	A
	Sample Size (*n =)*	216
	Location	United States
	Results	42% of hospitals offered VBAC. Family practice providers performed VBAC at about 18% of hospitals. 92% performed c-section. 46% of these hospitals had the family physician perform

#	Characteristics	Findings
		c-sections. In hospitals that did not offer c-section, 80% were 100 miles or more away from the nearest hospital that did provide them.
	Outcomes and Factors Evaluated	Vaginal deliveries, -c-sections, and VBAC offered in rural hospitals
	Category	Workforce
3.		
	Author (Date)	Efird, C. R., Dry, D., & Seidman, R. F. (2021).
	Title	Loss of obstetric services in rural Appalachia a qualitative study of community perceptions
	Purpose	Explain how the loss of local obstetric units affects perceptions of healthcare among multi-generational residents of remote, rural Appalachia
	Type	Qualitative study
	Quality	A/B
	Sample Size ($n =$)	14
	Location	Western North Carolina
	Results	Documented frustration with decline in hospital services, perceived increases in barriers to accessing health care, and medical mistrust.
	Outcomes and Factors Evaluated	Perceived and actual increases in barriers to accessing care
	Category	Perceptions
4.		
	Author (Date)	Henning-Smith et al. (2017)
	Title	The maternity care nurse workforce in rural U.S. hospitals
	Purpose	To assess maternity care nurse staffing in rural hospitals
	Type	Mixed methods study
	Quality	B
	Sample Size ($n =$)	263
	Location	Rural Colorado, Iowa, Kentucky, New York, North Carolina, Oregon, Vermont, Washington, and Wisconsin

#	Characteristics	Findings
	Results	In low volume hospitals, 78% of OB departments nurse-shared. In large volume hospitals only 31% of OB departments shared staff.
	Outcomes and Factors Evaluated	Maternity staffing needs
	Category	Workforce
5.		
	Author (Date)	Hung et al. (2016)
	Title	Why are obstetric units in rural hospitals closing their doors?
	Purpose	Determine hospital and county level factors for obstetric unit closures.
	Type	Mixed methods study
	Quality	B
	Sample Size (*n =)*	263
	Location	Colorado, Iowa, Kentucky, New York, North Carolina, Oregon, Vermont, Washington, and Wisconsin hospitals with OB services
	Results	Out of the surveyed hospitals, 7.2% closed their OB units between 2010-2014. This was due to several key factors.
	Outcomes and Factors Evaluated	The impact of staffing, birth volume, and reimbursement rate on the closure of OB units
	Category	Closure
6.		
	Author (Date)	Hung, P., Henning-Smith, C. E., Casey, M. M., & Kozhimannil, K. B. (2017)
	Title	Access to obstetric services in rural counties still declining with 9 percent losing services, 2004-2014
	Purpose	Examine the scope of obstetric unit and hospital closures that resulted in loss of obstetric services in rural US between 2004-2014
	Type	Qualitative study
	Quality	A/B
	Sample Size (*n =)*	1,249
	Location	Rural US hospitals

#	Characteristics	Findings
	Results	9% of rural OB units closed, while another 45% of rural counties had no hospital OB services.
	Outcomes and Factors Evaluated	Identified gaps in availability of hospital-based OB services across rural America
	Category	Closure
7.		
	Author (Date)	Koschwanez, H., Harrington, J., Fischer, M. L., Beck, E., & Kennedy, M. (2021)
	Title	Certified nurse-midwives in rural Kansas hospitals: A survey of senior hospital administrators
	Purpose	To study CNMs in rural Kansas Hospitals with privileges
	Type	Qualitative study
	Quality	A/B
	Sample Size (*n* =)	46
	Location	Rural Kansas hospitals with OB units
	Results	Only 1 rural hospital had CNMs practicing. Most administrators believed that CNMs should have collaborative agreements in place. Most hospitals don't anticipate CNMs gaining more privileges in Kansas.
	Outcomes and Factors Evaluated	Administrators' views on CNMs scope of practice and plans for adding CNMs into future practice
	Category	Workforce
8.		
	Author (Date)	Kozhimannil, K. B., Casey, M. M., Hung, P., Han, X., Prasad, S., & Moscovice, I. S. (2015)
	Title	The rural obstetric workforce in US hospitals: Challenges and opportunities
	Purpose	To assess the types and combinations of providers who deliver babies in rural hospitals
	Type	Qualitative study
	Quality	A/B
	Sample Size (*n* =)	263
	Location	Rural Colorado, Iowa, Kentucky, New York, North Carolina, Oregon, Vermont, Washington, and Wisconsin

#	Characteristics	Findings
	Results	Rural hospitals are more likely to have family practice physicians and general surgeons attend deliveries. Hospitals with higher birth volumes typically have more OBs and midwives. Low volume hospitals struggle with staffing.
	Outcomes and Factors Evaluated	Types of clinicians, maintaining OB skills, and staffing of low volume birth hospitals
	Category	Workforce
9.		
	Author (Date)	Kozhimannil, K. B., Casey, M. M., Hung, P., Prasad, S., & Moscovice, I. S. (2016)
	Title	Location of childbirth for rural women: Implications for maternal levels of care
	Purpose	Characterize women who give birth in nonlocal hospitals and measure local hospital characteristics and maternal diagnoses present at childbirth that are associated with nonlocal childbirth
	Type	Quantitative study
	Quality	A/B
	Sample Size (*n* =)	2,931
	Location	Rural Colorado, Iowa, Kentucky, New York, North Carolina, Oregon, Vermont, Washington, and Wisconsin
	Results	75% of rural women gave birth at local hospitals. Women with complications or preterm births were more likely to deliver at nonlocal hospitals.
	Outcomes and Factors Evaluated	Patient demographics, hospital obstetric history, and local hospital characteristics
	Category	Procedure
10.		
	Author (Date)	Kozhimannil, K. B., Hung, P., Casey, M. M., Henning-Smith, C., Prasad, S., & Moscovice, I. S. (2016)
	Title	Relationship between hospital policies for labor induction and cesarean delivery and perinatal care quality among rural U.S. hospitals
	Purpose	Provide information about rural US hospitals with OB services
	Type	Qualitative study
	Quality	A/B
	Sample Size (*n* =)	306

#	Characteristics	Findings
	Location	Colorado, Iowa, Kentucky, New York, North Carolina, Oregon, Vermont, Washington, and Wisconsin hospitals with OB services
	Results	Staffing policies are common, but not universal. Staffing policies were more common in low volume facilities.
	Outcomes and Factors Evaluated	Relationship between staffing and clinical management policies for the use of labor induction and cesarean delivery. Hospital rates of nonindicated cesarean, nonindicated labor induction, and low risk c-section.
	Category	Procedure
11.		
	Author (Date)	Kozhimannil, K. B., Hung, P., Prasad, S., Casey, M., McClellan, M., & Moscovice, I. S. (2014)
	Title	Birth volume and the quality of obstetric care in rural hospitals
	Purpose	Measure the relationship between hospital birth volume and OB care qualities among rural hospitals
	Type	Quantitative study
	Quality	A
	Sample Size (*n* =)	198,236
	Location	Colorado, Iowa, Kentucky, New York, North Carolina, Oregon, Vermont, Washington, and Wisconsin hospitals with obstetric services
	Results	Quality and safety vary across rural hospitals by birth volume. High birth volume does not always lead to superior outcomes.
	Outcomes and Factors Evaluated	Cesarean section rates, episiotomy, perineal lacerations, nonindicated induction of labor
	Category	Procedure
12.		
	Author (Date)	Kozhimannil, K. B., Interrante, J. D., Admon, L. K., & Basile Ibrahim, B. L. (2022)
	Title	Rural hospital administrators' beliefs about safety, financial viability, and community need for offering obstetric care
	Purpose	Assess rural hospital administrators' beliefs about safety, financial viability, and community need for offering obstetric care

#	Characteristics	Findings
	Type	Qualitative study
	Quality	A/B
	Sample Size (*n* =)	292
	Location	Rural US hospitals
	Results	Rural counties have seen a decline in recent births. The minimum number OB units felt they needed to remain safe was 200 annual births. Hospitals' highest priority was meeting local needs.
	Outcomes and Factors Evaluated	Types of hospitals providing OB care, number of deliveries per year, decision on maintaining or dropping obstetric care
	Category	Closure
13.	Author (Date)	Kozhimannil et al. (2016)
	Title	The practice of midwifery in US hospitals
	Purpose	Describe the role of CNMs in providing maternity care in rural US hospitals and examine state level variation in rural CNM practice
	Type	Qualitative study
	Quality	A/B
	Sample Size (*n* =)	244
	Location	Rural US hospitals
	Results	CNMs attend births at one third of hospitals across the US. Autonomous practice regulations play a significant role in discrepancies between CNM practice privileges from one state to the next. 14% of hospitals planned to recruit CNMs.
	Outcomes and Factors Evaluated	The role of the CNM providing care in rural US hospitals and state-level variations in practice
	Category	Workforce
14.	Author (Date)	Kozhimannil, K. B., Interrante, J. D., Tuttle, M. S., Gilbertson, M., & Wharton, K. D. A. (2020)
	Title	Local capacity for emergency births in rural hospitals without obstetrics services

#	Characteristics	Findings
	Purpose	Describe the capacity for emergency OB procedures at rural US hospitals that do not routinely offer childbirth services
	Type	Qualitative study
	Quality	A/B
	Sample Size (*n* =)	200
	Location	United States hospitals
	Results	Many rural hospitals don't have capacity, training, staff, or equipment for OB emergencies
	Outcomes and Factors Evaluated	Location from hospital with OB. ER births, adverse outcomes, delay in transport, and capacity for surgery.
	Category	Procedure
15.	Author (Date)	Leitz et al. (2022)
	Title	Geospatial analysis of access to emergency cesarean delivery for military and civilian populations in the US
	Purpose	To assess rural access to c-sections both civilian and military
	Type	Quantitative study
	Quality	A
	Sample Size (*n* =)	2,392
	Location	Civilian and military US hospitals
	Results	29 military and 2,363 civilian hospitals were found to have c-section capabilities
	Outcomes and Factors Evaluated	Identify military hospitals within 30 minutes of hospitals that perform c-sections
	Category	Procedure
16.	Author (Date)	Pearson, J., Anderholm, K., Bettermann, M., Friedrichsen, S., Mateo, C. D., Richter, S., & Onello, E. (2020)
	Title	Obstetrical care in rural Minnesota: Family physician perspectives on factors affecting the ability to provide prenatal, labor, and delivery care

#	Characteristics	Findings
	Purpose	Identify factors that contribute to the ability of Minnesota to continue to offer OB services locally
	Type	Mixed methods study
	Quality	B
	Sample Size (n =)	25
	Location	Rural Minnesota
	Results	Family physicians in rural communities are providing essential maternity care to patients.
	Outcomes and Factors Evaluated	Delivering providers, surgical backup, administrative support
	Category	Workforce
17.	Author (Date)	Pearson, J., Siebert, K., Carlson, S., & Ratner, N. (2018)
	Title	Patient perspectives on loss of local obstetrical services in rural northern Minnesota
	Purpose	Characterize obstetrical use patterns through the years leading to and following the closure and to explore the effects of the closure on the communities
	Type	Mixed methods study
	Quality	A
	Sample Size (*n =)*	356
	Location	Rural Northern Minnesota
	Results	Prior to local OB unit closures women tended to choose regional delivery. After OB unit closures women were more likely to choose local delivery, although this was no longer an option.
	Outcomes and Factors Evaluated	Choices and opinions in OB care
	Category	Perceptions
18.	Author (Date)	Smith, D. C., Anderson, J. L., Carrington, S., Nacht, A., Nodine, P. M., & Barton, A. J. (2023)
	Title	Contemporary nurse-midwifery care in Colorado: A survey in hospital and community settings
	Purpose	Describes the environment for midwifery practice as practiced by CNMs in Colorado
	Type	Qualitative study

#	Characteristics	Findings
	Quality	B
	Sample Size (*n* =)	40
	Location	Rural Colorado hospitals
	Results	Regionalization and expansion of Medicaid can enhance the quality of health care.
	Outcomes and Factors Evaluated	Autonomy of CNMS in rural Colorado and Medicaid coverage
	Category	Workforce
19.	Author (Date)	Smulian, E. A., Zahedi, L., Hurvitz, J., Talbot, A., Williams, A., Julian, Z., Zertuche, A. D., & Rochat, R. (2016)
	Title	Obstetric provider trainees in Georgia: Characteristics and attitudes about practice in obstetric provider shortage areas
	Purpose	Factors associated with the likelihood of Georgia's OB trainees to practice in areas that lack OB services
	Type	Qualitative study
	Quality	A/B
	Sample Size (*n* =)	80
	Location	Rural Georgia
	Results	Financial incentives significantly enhance the likelihood of a physician or CNM practicing in a rural community.
	Outcomes and Factors Evaluated	Trainee characteristics, attitudes toward practice, and attitudes toward practices with financial incentives
	Category	Workforce
20.	Author (Date)	Taporco, J., Wolfe, E., Chavez, G., Allen, Z., Estrada, J., Thomson, K., Mettling, J., & Kennedy, M. (2021)
	Title	Kansas maternity deserts: A cross-sectional study of rural obstetric providers
	Purpose	Identify who currently delivers babies in Kansas, map their location, and determine future plans for maternity services

#	Characteristics	Findings
	Type	Mixed methods study
	Quality	B
	Sample Size (*n* =)	869
	Location	Rural Kansas hospitals with OB providers
	Results	The distribution of maternity care providers in Kansas is not evenly proportioned. There are numerous areas considered maternity deserts, with more predicted by 2030.
	Outcomes and Factors Evaluated	Type and location of maternity care providers in rural Kansas
	Category	Workforce
21.	Author (Date)	Tong et al. (2021)
	Title	The essential role of family physicians in providing cesarean sections in rural communities
	Purpose	To assess the role of family practice physicians who provide c-sections in rural US
	Type	Quantitative study
	Quality	A
	Sample Size (*n* =)	17,171
	Location	Rural US hospitals
	Results	Many family practice physicians who perform c-sections do so in rural communities.
	Outcomes and Factors Evaluated	Rural family practice physicians who perform c-sections
	Category	Procedure
22.	Author (Date)	Wendling, A., Taglione, V., Rezmer, R., Lwin, P., Frost, J., Terhune, J., & Kerver, J. (2021)
	Title	Access to maternity and prenatal care services in rural Michigan
	Purpose	Identify and characterize prenatal and delivery care in Michigan's rural counties and to explore access to TOLAC.
	Type	Qualitative study
	Quality	A/B

#	Characteristics	Findings
	Sample Size (*n* =)	57
	Location	Rural Michigan counties
	Results	29 hospitals in 57 counties provide OB services. TOLAC deliveries were decreased in nearly all counties, while c-sections were increased.
	Outcomes and Factors Evaluated	TOLAC rate, c-section rate, distance traveled
	Category	Procedure
23.	Author (Date)	Waits, J. B., Smith, L., & Hurst, D. (2020)
	Title	Effect of access to obstetrics care in rural Alabama on perinatal, neonatal, and infant outcomes: 2003–2017
	Purpose	Evaluate differential mortality outcomes in rural Alabama counties with or without access to a local labor and delivery unit
	Type	Qualitative study
	Quality	B
	Sample Size (*n* =)	36
	Location	Rural Alabama counties
	Results	The infant mortality rate from 2003–2017 in counties with no OB care was 9.23%. The mortality rate in counties with access to OB care was 7.89%. This study supports that there is strong evidence that areas without access to OB care have higher adverse perinatal outcomes and increased mortality rates.
	Outcomes and Factors Evaluated	Infant mortality and morbidity, perinatal mortality and morbidity, access to OB units
	Category	Procedure
24.	Author (Date)	Young, R. A. (2017)
	Title	Maternity care services provided by family physicians in rural hospitals
	Purpose	Describe how many rural family physician and other types of providers currently provide maternity care services and the requirements to obtain privileges.
	Type	Qualitative study

#	Characteristics	Findings
	Quality	A/B
	Sample Size (*n* =)	854
	Location	Rural US hospitals
	Results	Family practice physicians provide the majority of OB care in rural hospitals. There is no standard of training.
	Outcomes and Factors Evaluated	Provisions of maternity care, providers who perform them, and qualifications to maintain privileges
	Category	Workforce

Note: Vaginal birth after cesarean (VBAC); trial of labor after cesarean (TOLAC); obstetrics (OB); certified nurse-midwife (CNM)