



Rural Health Advisory Committee Report on Obstetric Services in Rural Minnesota

November 2013



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**Watonwan County Commissioner 5th District
33360 630th Avenue
Butterfield, Minnesota 56120**

November 18, 2013

Edward Ehlinger, M.D.
Commissioner
Minnesota Department of Health
625 North Robert Street
St. Paul, Minnesota 55155

Dear Commissioner Ehlinger:

We are pleased to present this report from the Rural Health Advisory Committee: *Obstetric Services in Rural Minnesota*. In June 2011, the Rural Health Advisory Committee formed a workgroup to assess access to obstetric services in rural areas of our state. Workgroup members and additional key informants included doulas, midwives, nurses, physicians, medical students, rural hospital administrators, a medical social worker, and rural hospital and health care workforce representatives. This report is a result of their efforts and describes the practice of obstetrics, key elements of successful models, and barriers to the availability of rural obstetrical services.

Access to local obstetric services continues to be a great challenge in small and isolated rural communities in Minnesota. The Rural Health Advisory Committee's obstetric workgroup issued 18 recommendations for improving obstetric services in rural Minnesota. It recognized workforce shortages exist in small and isolated rural areas of Minnesota. It identified educational and training challenges to having family practice physicians be better prepared for rural obstetric practices. The workgroup noted that pregnancy-related disparities exist in rural areas, especially in American Indian communities.

We appreciate the opportunity to contribute this report to the important discussion of maintaining access to health care services in rural Minnesota. Thank you for your strong support in improving rural health.

Sincerely,



John Baerg
Chair
Rural Health Advisory Committee



Tom Crowley
Chair
Rural Obstetrics Workgroup



Protecting, maintaining and improving the health of all Minnesotans

November 25, 2013

John Baerg, Chair
Rural Health Advisory Committee
33360 630th Avenue
Butterfield, Minnesota 56120

Dear Mr. Baerg:

Thank you for the Rural Health Advisory Committee's report, *Obstetric Services in Rural Minnesota*. I commend you and the entire rural obstetric work group for your efforts.

Providing quality and timely obstetric services in small and isolated rural communities is a national concern. I appreciate that the work group studied issues around the provision of obstetric care for rural residents and provided qualitative and quantitative data to support the findings. Understanding this issue in Minnesota will help identify ways to target resources and support where it is most needed.

It is exciting that action has already been taken on several recommendations, including changes in loan forgiveness program requirements and educating rural providers about the role of doulas.

The recommendations from this report highlight the need for further coordinated efforts at local, state and national levels to address these issues. The Minnesota Department of Health is currently preparing a statewide plan to reduce infant mortality working with the Region V Collaborative Improvement and Innovation Network (COIIN) and in partnership with the Association of State and Territorial Health Officials (ASTHO) and the Association of Maternal and Child Health Programs (AMCHP).

Thank you for your excellent work. The Minnesota Department of Health is committed to finding solutions to ensure access to obstetric services for rural Minnesotans. This report, with its insightful recommendations, is an important step. I look forward to working together to protect, maintain and improve the health of all Minnesotans.

Sincerely,

A handwritten signature in black ink, appearing to read "Edward P. Ehlinger".

Edward P. Ehlinger, MD, MSPH
Commissioner
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Executive Summary

Obstetric care providers are vital components of rural health care systems. Most obstetric care in rural areas is provided by family medicine physicians. Unfortunately, there has been a general decline in the number of family medicine physicians including obstetrics in their practice and a general decline in the number of rural hospitals offering obstetrical services. This is due to several factors including aging populations in rural communities, obstetric workforce shortages, and costs to implement technology or update facilities to maintain obstetric services. As a consequence, many rural areas have inadequate obstetric coverage.

A lack of local access to obstetric services is more than just an inconvenience for rural women. Extensive travel to obstetric services results in delayed initial prenatal care visits, missed return visits, and late identification of obstetric complications. The potential negative health outcomes for pregnant women and their newborns are significant and may include prematurity, perinatal mortality, and maternal morbidity and mortality.

A 2011 environmental scan of rural health issues in Minnesota by the Rural Health Advisory Committee (RHAC) identified rural obstetrics as a concern for rural consumers and health providers. RHAC formed a workgroup to investigate the current state of obstetric services in rural Minnesota. The workgroup used Rural-Urban Commuting Areas (RUCAs) to indicate the level of rurality of outstate regions. This report is a summary of the findings of the Rural Obstetric Workgroup.

Key Findings

Benefits. Strong obstetric services benefit rural areas in multiple ways:

- **Access to pregnancy planning.** Early planning before pregnancy is very important. Women who are prepared for pregnancy are more likely to have healthy babies. Obstetric providers can help women take steps to have a healthy and full-term pregnancy.
- **Access to prenatal care.** Low birth weight and preterm birth outcomes are more likely to be prevented via access to early and adequate prenatal care. Risk factors can be identified, and some addressed, through ongoing prenatal care visits.
- **Patient satisfaction.** Patients prefer local health care and are more likely to attend prenatal appointments within their own communities. Local access to obstetric services reduces stress, financial costs and transportation barriers for rural patients.
- **Coverage for high-risk and emergency obstetric care.** High-risk pregnancies can be carefully assessed and timely transfers to higher-level neonatal care facilities can be arranged when necessary. Rural obstetric teams can provide planned or emergency cesarean sections.

Barriers. Significant barriers to the provision of rural obstetrical services include:

- **Economic impact on rural hospitals.** Rural obstetric programs are costly to maintain and often need to be subsidized by other programs.
- **Rural obstetric workforce shortages.** There is a shortage of practicing obstetric providers in small and isolated rural areas of Minnesota. Fewer family medicine physicians are choosing to practice rural obstetrics due to on call demands and work-life balance circumstances.
- **Training and residency.** Rural training and residency opportunities are limited. Many training programs are not preparing students adequately for practice in rural areas. Students have difficulty identifying residency programs with a substantial rural focus and cesarean section training.
- **On-call and lifestyle considerations.** Rural obstetric providers may experience professional isolation and often lack access to emerging technologies, continuing medical education or hands-on obstetric training experiences.
- **Infrastructure needs.** Obstetric providers need modern facilities and equipment to perform a range of procedures. Rural hospitals often face challenges to updating their obstetric wards or implementing technologies to meet patient expectations.

The continued provision of obstetric services in rural Minnesota is at risk. It is imperative that all women in Minnesota have access to obstetric care, especially in emergencies, and within a reasonable distance.

Recommendations

The workgroup issued 18 recommendations for improving obstetric services in rural Minnesota. The recommendations are a call to action for rural hospitals, rural health systems, medical schools, policymakers and other stakeholders. These recommendations encompass:

- Inclusion in emerging health care delivery and payment models.
- Obstetric provider and patient education and awareness.
- Improvements in Minnesota's education, training and residency programs.
- Infrastructure components including workforce and technology needs.
- Best practices and innovative models.

The following recommendations address actions needed to achieve equal access to obstetric services throughout Minnesota.

Policy Recommendation

- A. Ensure the inclusion of obstetrics as a required service in health payment and care delivery models such as Accountable Care Organizations.** Obstetrics should be included in discussions and policies regarding core medical services made available to every rural resident. It is important to minimize the differences in standards of care based on geography while recognizing that unique challenges exist for rural obstetric programs.

Patient Recommendations

- B. Address smoking in childbearing age women in rural areas with a special focus on women who are young, uninsured or publicly insured, and those most likely to have an unintended pregnancy.** Obstetric providers can improve screening rates for smoking during prenatal visits, and during preventive health visits for women who are not pregnant. Timely referrals to tobacco cessation programs can be made for the pregnant woman and her spouse/partner, if such programs exist. Rural communities without access to smoking cessation resources may need help through family physicians, school nurses and public health nurses. Provider education is needed to increase the understanding of how smoking affects pregnancy.
- C. Encourage collaboration between rural obstetric providers and public health nurses to maximize the use of local resources available to pregnant women and new parents.** It is important for clinics, hospitals and local public health to understand the resources of each agency so pregnant women and new parents can be referred and easily access a range of support services from prenatal care to breastfeeding support.
- D. Educate rural providers and hospital staff about ways to better serve American Indian women.** American Indian communities experience the largest disparities in birth outcomes in rural Minnesota. Rural hospitals can improve cultural competencies and internal processes to address these disparities. Statewide trainings on traditional birth from an American Indian perspective should be offered in rural and underserved urban areas. More could be done to standardize the referral processes between Indian Health Service (IHS) facilities, human services, the Women, Infants and Children (WIC) food program, rural clinics and hospitals, and urban health care facilities.

Education, Training and Residency Recommendations

- E. Support a system for medical school admissions that considers rural provider perspectives and a prospective student's inclination towards a rural obstetrics practice.** Revisit the metrics used to choose and evaluate incoming medical students to ensure admissions processes do not lock out individuals with a propensity for rural family medicine and obstetrics.
- F. Provide more opportunities for rural family physicians to receive training in natural births and cesarean sections.** Expand initial training in obstetrics for family medicine medical students through rural elective courses, residency and fellowship programs. Offer

ongoing cesarean section training to rural family medicine physicians through refresher courses, intensive retraining opportunities or simulation technology.

- G. Analyze and address the impact of 2011 federal work hour restrictions on medical residents.** Residents are getting less experience overall, especially in obstetrical and surgical training areas. This policy restriction may have unintended consequences and should be studied at the state level.
- H. Support an appropriate number of new medical graduates to meet future rural obstetric care needs.** Minnesota is falling behind in the percentage of family medicine physicians who are ready to practice in rural areas. A smaller percentage of these graduates are willing to include obstetrics in a rural practice. It may be necessary to increase graduate medical education (GME) funding, change restrictions on residency slots, or direct fund rural resident slots at the state level to address these workforce challenges. A state program could designate post-graduate year one (PGY-1) slots in family medicine with obstetrics or OB/GYN dedicated to rural practice.
- I. Address regulatory barriers to practice at federal, state and hospital levels for certified nurse-midwives.** Many certified nurse-midwives are unable to practice at the top of their education and training due to federal, state, or hospital regulations. Hospital bylaws determine the extent of their privileges and sometimes require a supervisory relationship between physicians and certified nurse-midwives. Models demonstrating the best use of certified nurse-midwives in rural obstetric practices need to be identified and promoted.
- J. Support rural obstetric teams' involvement in educational offerings that supplement their labor and delivery skills.** Continuing education issues are important for all labor and delivery staff. Courses focused on high-risk pregnancies and emergency obstetric care geared towards nurses, emergency medical technicians (EMTs), and emergency room physicians may be especially helpful. Minnesota Department of Health grant programs should consider proposals for rural obstetric training and curriculum development.

Workforce Recommendations

- K. Support loan forgiveness programs for obstetric providers in small and isolated rural areas.** Recent changes to state loan forgiveness programs include the level of rurality of a future practice location as a selection factor. State legislation to increase the number of loan forgiveness opportunities for physician and midlevel providers would help small and isolated rural hospitals maintain their obstetric practices.
- L. Address ongoing challenges related to workforce shortages in rural obstetrics.** The number of certified nurse-midwives being trained in Minnesota has remained relatively flat for 15 years. Affordable training programs increase the potential for more obstetric providers and add a wider range of birth options for rural women. State-level healthcare workforce planning should include periodic assessments of all primary obstetric providers in rural Minnesota.

- M. Educate rural providers and hospital staff about the role of doulas.** Medical students are not exposed to work with doulas and may not understand their unique role during pregnancy and the birthing process. Doulas representing racial or ethnic minority populations can educate rural providers and staff about culturally-based beliefs regarding birth and related considerations for hospital settings.

Hospital Recommendations

- N. Develop and promote a set of best practices for rural hospitals that encounter obstetric emergencies with limited obstetric staff or resources.** Rural obstetric providers face difficult situations when women are unable to travel to their chosen birth location and experience complications prior to admission. A set of best practices can help providers offer the best care possible when faced with obstetric emergencies.
- O. Support improvements to Medicaid reimbursement for rural obstetrics.** Analyze the impact of new legislation regarding Medicaid payments on Critical Access Hospitals. The Minnesota Department of Health, along with rural hospital and provider stakeholders, can advocate for improvements in Medicaid reimbursement for rural obstetric programs.
- P. Protect Minnesota’s low-cost liability and malpractice insurance environment for obstetric providers.** In many parts of the U.S., obstetric providers are leaving their practices due to high malpractice and liability costs. The effects of this issue vary greatly between states. Minnesota has a relatively low-cost liability and malpractice environment that should be protected.

Collaboration Recommendations

- Q. Support collaborative efforts to maintain local obstetric services and share successful models.** Collaborative practices can fill gaps in expertise and workforce that are common in rural areas. Midlevel and primary care practice can be integrated to maximize workforce capacities. Shared care team approaches that include providers sharing patients and call schedules could be considered. Neighboring hospitals may share surgical teams and obstetric call coverage.
- R. Develop and pilot a rural obstetrics telehealth program in Minnesota.** Telehealth applications that are specifically tailored to rural obstetric practices are needed. This technology could support family medicine physicians, providers in small or remote facilities, and solo or home-based obstetric providers.

1. Rural Obstetric Workgroup

The Rural Health Advisory Committee (RHAC) is a 15-member, governor-appointed committee charged with advising the Commissioner of Health and other state agencies on rural health issues. After an environmental scan of rural health issues and concerns in Minnesota, rural obstetric services was identified as a priority issue on the 2010-2012 RHAC work plan and a statewide workgroup was formed to address this issue.

Workgroup Charge

The Rural Health Advisory Committee charged the Rural Obstetrics Workgroup with:

- Studying obstetric services in rural Minnesota.
- Developing recommendations for addressing issues and barriers.

The workgroup's initial understanding of the issues and facts were based on: (1) a perceived shortage of practicing obstetric providers in some parts of rural Minnesota; (2) access to obstetric services as imperative for women in rural Minnesota; and (3) the impact of obstetric services on the local hospital and health care system.

Workgroup Activities

The Rural Obstetric Workgroup's tasks were completed between June 2011 and May 2012. First, a workgroup composed of obstetric providers and key informants from a variety of backgrounds met several times. Four main perspectives guided the discussions:

1. **Education, Training and Residency Issues:** physician education and residencies, cesarean section training, certified nurse-midwife training.
2. **Workforce Issues:** number of practitioners, workforce and demographic concerns, scope of practice, lifestyle preferences.
3. **Patient and Community Issues:** patient travel and costs, access to prenatal care, support for high-risk pregnancies, care coordination, cultural competencies.
4. **Hospital Issues:** financial impact of obstetric services, impact on access to other health services.

Second, workgroup staff conducted interviews with key informants to gain greater awareness of the challenges to implementing and maintaining obstetric programs in rural Minnesota. Third, workgroup staff reviewed web-based and scientific literature to identify current research, programs and policies that influence the practice of obstetrics in rural areas. Fourth, staff created maps, charts and graphs to illustrate Minnesota-specific data related to rural obstetric services.

Workgroup Members

A complete list of workgroup members, additional contributors, workgroup staff and RHAC members are available in Appendix A.

2. Overview of Rural Obstetric Issues

Obstetric services are a vital component of any rural health system. Babies are born every day in rural communities through natural, assisted and surgical pathways. In 2010, 29 percent of women of childbearing age lived in rural regions and 38 percent of births occurred in rural regions of Minnesota.

Rural women face special challenges to accessing timely obstetric care. These challenges relate to patient factors and the delivery of health care. Rural women are more likely to be poor and lack health insurance, and must often travel significant distances to access the care they need. Some rural Minnesota counties, such as Houston and Fillmore, do not have any hospitals to deliver babies. Due to these barriers, rural women are at increased risk of poor prenatal care and are less likely to receive yearly family planning services.¹

National Rural Obstetrics Crisis

There has been a steady decline in access to hospital-based obstetric services in rural areas of the United States. Rural counties with significant poor and uninsured populations already face challenges to accessing available health care services. When hospital delivery rooms close, women must travel farther distances to meet their prenatal and perinatal health care needs. Most hospitals that discontinue obstetric services are in U.S. rural counties with higher-than-average infant mortality rates.²

Failure to address the rural obstetrics crisis creates a wide array of negative consequences for patients and health systems. Multiple studies link a lack of local rural obstetrical services with increased preterm delivery and infant mortality.³ One study found that infant mortality increased by 2.3 percent when a community lost a family physician providing maternity care.⁴ Due to a lack of prenatal care, women may end up delivering at hospitals unequipped to deal with high-risk patients. The loss of obstetric programs can lead to additional losses of health professionals in underserved rural areas.

Federal and State Policies Affecting Obstetric Services

The Affordable Care Act (ACA) passed in March 2010 offers several opportunities to support rural obstetric services. First, young adults may stay on family insurance plans until they are 26 years old, providing insurance coverage for many young women of childbearing age. Second, increased numbers of women are now eligible for Medicaid (if their state has chosen to expand its Medicaid program).⁵ Third, the law establishes equitable reimbursement rates between

¹ Health Disparities for Rural Women. ACOG Committee Opinion No. 429. American College of Obstetricians and Gynecology, 2009; 113: 762-765.

² Lutz A. Maternity Care Scare in Rural South Carolina. Rural Roads, National Rural Health Association, 2011.

³ Dresang L, Koch P. (2009) The Need for Rural Family Physicians Who Can Perform Cesareans. American Journal of Clinical Medicine, 6(2).

⁴ Larimore W, Davis A. (1995) Relation of infant mortality to the availability of maternity care in rural Florida. Journal of American Board of Family Practice, 8: 392-399.

⁵ Medicaid expansion was passed in Minnesota in February 2013.

physicians and certified nurse-midwives.

As of January 1, 2014, there will be changes to the MinnesotaCare program to comply with the requirements for Basic Health Plan (BHP) funding under the ACA. Pregnant women with incomes at or below 275 percent of federal poverty guidelines will remain covered under MinnesotaCare. Comprehensive coverage includes maternity and newborn care as an essential health benefit.

Minnesota passed recent legislation that will affect rural obstetric services. Minnesota's Birth Center Law was passed in May 2010 (M.S. 144.615), making Minnesota the first to have equal reimbursement for certified nurse-midwives written into state law. It designates certified nurse-midwives as Medicaid provider types and expands birth options for women on Medical Assistance. It also establishes licensing standards for birth centers and Medical Assistance coverage of services provided at licensed birth centers.

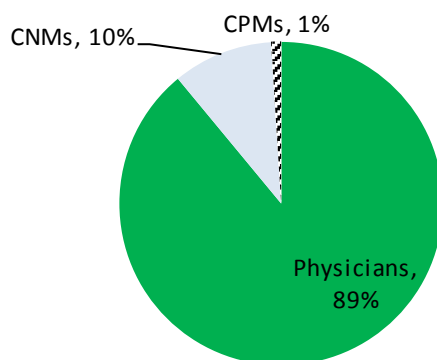
A second policy lever in place in Minnesota is the state's law to reduce early births and costs, which was passed in 2011 (M.S. 256B.0625). It creates a mechanism to deny Medicaid payment for elective deliveries before 39 weeks. The goal is to prevent early inductions or inductions for non-medical reasons. It aims to improve infant outcomes and reduce state health care costs.

Accountable Care Organizations (ACOs) are health care provider groups that contract with payers to provide high clinical quality and positive patient experience at reduced cost. As ACOs and other areas of state and federal health care reform proceed, RHAC believes it is important that obstetrics be considered a fundamental health care service. Discussions on health care homes, health information exchanges, health insurance exchanges, and Accountable Care Organizations should consider the need for high quality, accessible obstetric care in rural communities.

Recommendation A: Ensure the inclusion of obstetrics as a required service in health payment and care delivery models such as Accountable Care Organizations. Obstetrics should be included in discussions and policies regarding core medical services made available to every rural resident. It is important to minimize the differences in standards of care based on geography while recognizing that unique challenges exist for rural obstetric programs.

Birthing Options

Physicians in hospitals deliver the majority of babies in Minnesota. In 2010, physicians delivered 60,529 babies (89 percent) while certified nurse-midwives (CNMs) delivered 6,714 babies (10 percent) and non-nurse certified professional midwives (CPMs) delivered 400 babies (<1 percent) (Figure 1).

Figure 1: Birth Attendants, Minnesota 2010

The average charges for labor and deliveries are dependent on location of delivery, type of birth and level of complication (Table 1).

Birth Center – Vaginal, no complications	\$2,650
Hospital – Vaginal, no complications	\$8,671
Hospital – Vaginal, with complications	\$11,288
Hospital – Cesarean, no complications	\$15,442
Hospital – Cesarean, with complications	\$21,040

Hospitals

Most births in the United States today occur in hospitals with OB/GYNs or family medicine physicians as attendants at birth. This care setting provides advanced options for obstetric patients including anesthesia and cesarean sections. In 2010, there were 67,733 births in hospitals in Minnesota.⁷ (See the Rural Hospital Issues chapter for more detail.)

Freestanding Birth Centers

Freestanding birth centers employ midwives to provide the majority of their obstetric care. This care model focuses on protecting, supporting and avoiding interference with the natural course of labor for uncomplicated births. Medical interventions are used if necessary, but are not widely employed. A review of studies comparing births attended by certified nurse-midwives or physicians found no difference in infant outcomes, and less use of interventions such as labor induction, episiotomy and epidurals by certified nurse-midwives.⁸

Midwives utilize proven practices to improve birth outcomes that are often underused in hospital settings. These include one-on-one support, movement during labor, and comforting laboring women through baths and massage. There were 68 births in freestanding birth centers in

⁶ U.S. Agency for Healthcare Research and Quality, *HCUPnet, Healthcare Cost and Utilization Project*. Rockville, MD: AHRQ. <http://hcupnet.ahrq.gov/> American Association of Birth Centers. *Uniform Data Set*. Perkiomenville, PA: AABC, 2010.

⁷ Center for Health Statistics, Minnesota Department of Health.

⁸ Women's Health Issues, 2012; 22; p.73-81.

Minnesota in 2010.⁹ Minnesota’s Birth Center Law passed in 2010, so the occurrence of births in this setting is increasing as this service becomes more widely available. Currently there are four freestanding birth centers in Minnesota, including one in rural Todd County.

Home Births

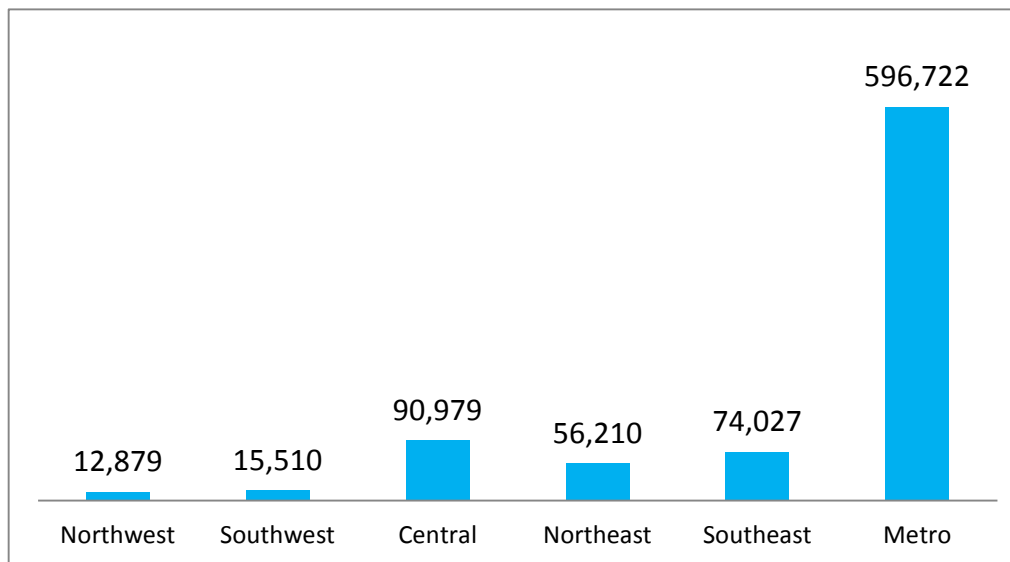
Home births are rare in the United States, comprising less than 1 percent of births. However, the percentage of home births has increased 29 percent since 2004. Home births are most common among Caucasian women, women aged 35 and older, and women with several previous children. Home births have a lower risk profile than hospital births, with fewer births to teenagers and fewer preterm, low birth weight or multiple births.¹⁰ In 2010, Minnesota had 605 home births.¹¹

The majority of home births in 2009 in the U.S. were attended by certified professional midwives (43 percent) and CNMs (19 percent). “Other” attendants, such as family members or emergency medical technicians, attended 33 percent of home births. Only 5 percent were attended by physicians. A recent study found that 87 percent of home births were planned.¹²

Number of Births

To describe the demand for obstetric care providers in rural Minnesota, it is helpful to examine the distribution of women of childbearing age (ages 15-44). In 2010, 846,327 women of childbearing age lived in Minnesota, with 596,722 (71 percent) in the metro region and 249,605 (29 percent) in rural regions (Figure 2).

Figure 2. Number of Women Ages 15-44, by Minnesota Region, 2010



There were a total of 67,752 live births among all women in Minnesota in 2010. The majority of these births occurred among women residing in the Metro region (41,465 or 61 percent), with the

⁹ Center for Health Statistics, Minnesota Department of Health.

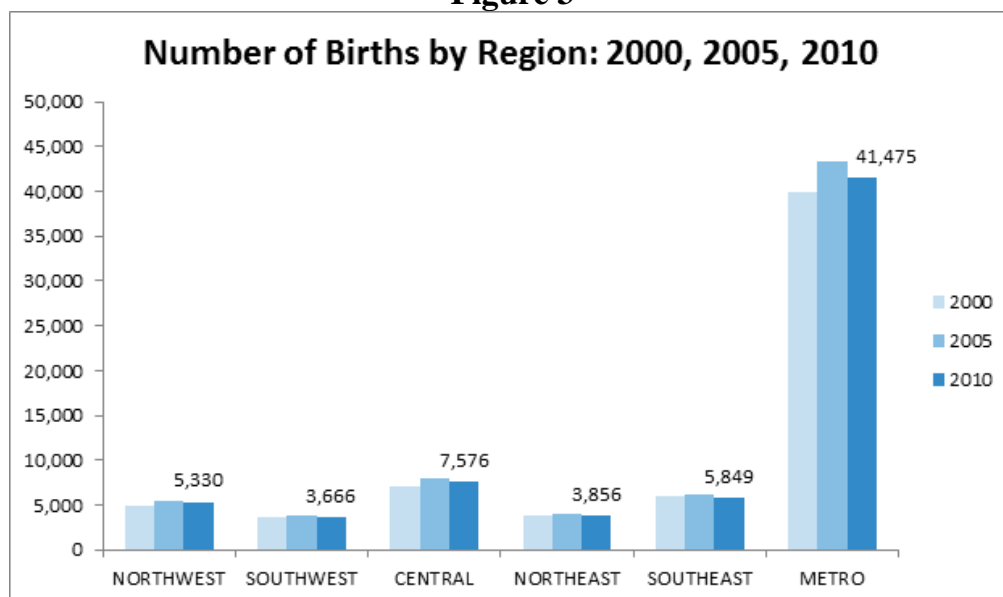
¹⁰ MacDorman M. Home Births in the United States, 1990-2009. National Center for Health Statistics; 84: 2012.

¹¹ Center for Health Statistics, Minnesota Department of Health.

¹² National Center for Health Statistics. VitalStats: Birth Data for 2009. www.cdc.gov/nchs/vitalstats.htm. Accessed 7/25/12.

remaining 26,277 (39 percent) distributed throughout rural regions of the state. This distribution is similar to that observed in 2000 and 2005. While there were small fluctuations in the number of births in each region over these three years, the number of births over time has been relatively consistent (Figure 3).

Figure 3



Obstetric Providers

Primary obstetric providers include family practice physicians, obstetrician/gynecologists and certified nurse-midwives. Certified nurse-midwives are primary health care providers to women throughout the lifespan. Medical staff involved in obstetric patient care may include general surgeons, anesthesiologists, certified nurse anesthetists, emergency room physicians and emergency medical technicians. Additional care providers for obstetric patients may include doulas, family members and certified professional midwives. Certified professional midwives are non-nurse midwives who mainly work in birth centers or home settings.

Family physicians in rural areas were more likely to deliver babies than urban family physicians and averaged a lower number of deliveries than their urban counterparts. The number of babies delivered by family physicians tends to peak in mid-career and decrease over time (Table 2).

Table 2: Number of Babies Delivered by Family Physicians in U.S. (2009)¹³

	Percent of Family Physicians Delivering One or More Babies	Mean Number of Babies Delivered	N
All Respondents	10.1%	49	655
Practice Location			
Metropolitan Area	8.2%	51	476
Non-Metro Area	17.0%	37	135

¹³American Academy of Family Physicians, Practice Profile I Survey, April 2011.

Table 2: Number of Babies Delivered by Family Physicians in U.S. (2009)¹³

	Percent of Family Physicians Delivering One or More Babies	Mean Number of Babies Delivered	N
Years Since Residency			
7 or Fewer Years	12.1%	42	190
8-14 Years	12.2%	72	148
15-21 Years	9.2%	50	98
22 or More Years	7.4%	33	215

Access to Prenatal Care

Prenatal care is the health care women receive when they are pregnant. Differences in key indicators of maternal and infant health, including prenatal care access, have been observed between urban and rural locations. Lack of prenatal care in rural areas has been associated with higher rates of preterm delivery, infant mortality and complications during delivery.¹⁴ Barriers to prenatal care for rural women include less access to health insurance, greater distance and travel time to providers, transportation problems and child-care difficulties for larger families.¹⁵ Pregnant women in isolated rural regions face the greatest challenges to early and regular prenatal care.

It is important to analyze prenatal care access for rural women. Early and regular prenatal care is linked to better pregnancy outcomes and allows health care providers to diagnose, treat or prevent problems. Babies of mothers who do not get prenatal care are three times more likely to have a low birth weight and five times more likely to die than those born to mothers who do get care.¹⁶ Rural physicians and midwives can spot health problems early or prevent additional health problems when mothers receive ongoing prenatal care.

PRAMS (Pregnancy Risk Assessment Monitoring System)¹⁷ is a national effort to produce information used to address infant mortality and low birth weight issues. PRAMS conducts a survey of a sample of mothers who have recently had a baby to assess attitudes and feelings related to pregnancy, prenatal care and experiences before, during and after pregnancy. Minnesota PRAMS gathers state-specific information used to improve the health of mothers and babies. Data used in this report will focus on mothers from Greater Minnesota who completed the PRAMS survey in 2009-2010.

PRAMS asked mothers the question “*Did you get prenatal care as early in your pregnancy as you wanted?*” Approximately 1 in 10 respondents in Greater Minnesota reported they did not receive prenatal care as early in their pregnancy as they wanted. Of these women, 44 percent encountered at least one barrier to getting prenatal care, while 19 percent indicated they encountered three or more barriers (Figure 4).

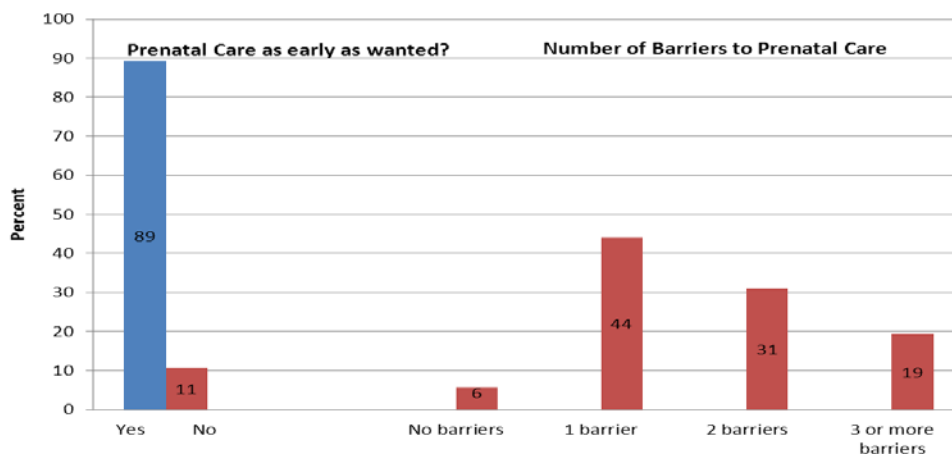
¹⁴ Rural Policy Implications for Maternal, Infant and Early Childhood Home Visitation Program, National Advisory Committee on Rural Health and Human Services, 2011.

¹⁵ CDC. Entry into prenatal care in the U.S., 1989-1997. *Morbidity and Mortality Weekly Report* 58 (7); 2009

¹⁶ Prenatal Care FAQ, Office on Women’s Health, U.S. Department of Health and Human Services, 2009.

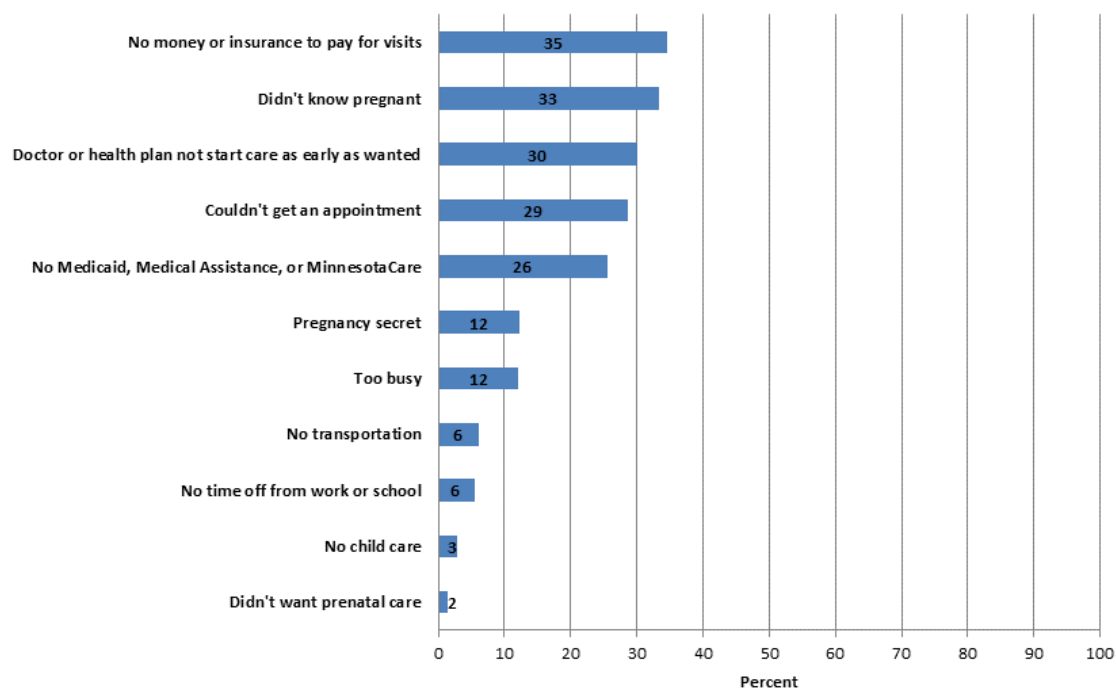
¹⁷ Minnesota Pregnancy Risk Assessment Monitoring System, Minnesota Department of Health. This data was made possible by grant number IU10DP003117-01 from the Centers for Disease Control and Prevention.

Figure 4: Number of Barriers to Prenatal Care in Greater Minnesota, 2009-2010¹⁸



Mothers who answered “no” to the question “*Did you get prenatal care as early in your pregnancy as you wanted?*” were asked to select items from a list of barriers to getting prenatal care. More than one in three mothers attributed the delay to financial incapability to pay for visits. Other mothers indicated not knowing they were pregnant and delays due to physicians or health plans were barriers to timely prenatal care. More than one in four PRAMS mothers attributed the delay in prenatal care to lacking insurance, or an inability to schedule prenatal appointments (Figure 5).

Figure 5: Barriers to Prenatal Care in Greater Minnesota, 2009-2010¹⁹



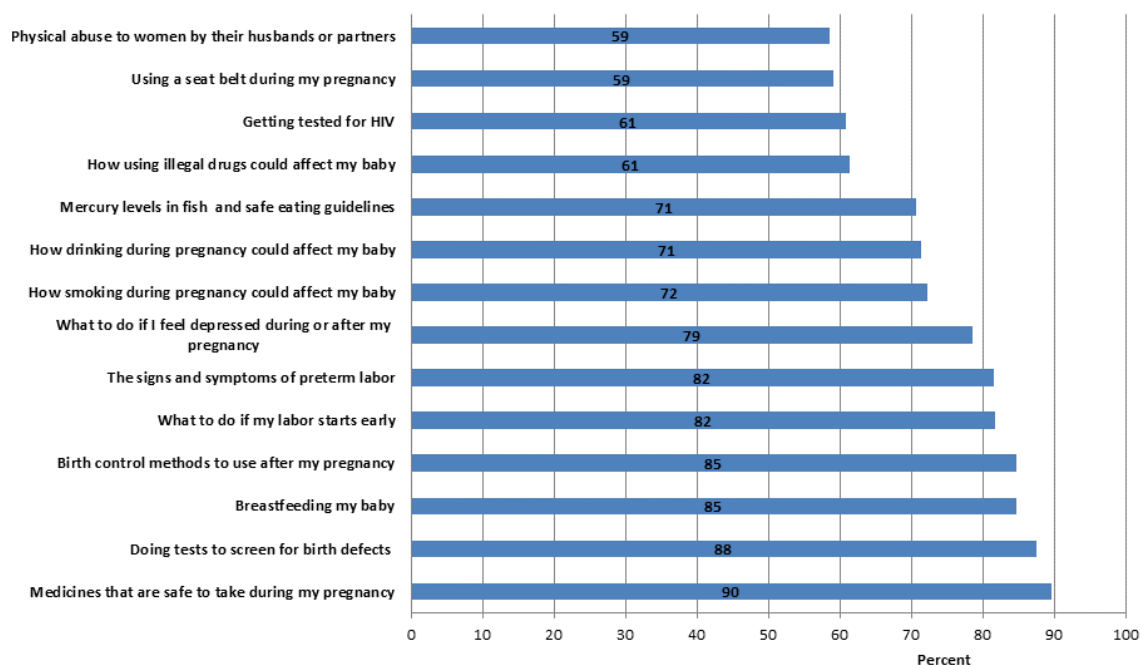
¹⁸ Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), 2009-2010.

¹⁹ Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), 2009-2010.

The percent of PRAMS mothers who indicated that “I couldn’t get an appointment when I wanted one” and “I didn’t have enough money or insurance to pay for my visit” was higher in Greater Minnesota as compared to the Twin Cities Metro Region (nine and six percentage points higher respectively). In contrast, PRAMS mothers who indicated that “I had too many other things going on,” “I couldn’t take time off from work or school,” and “I had no one to take care of my children” was lower in Greater Minnesota as compared to the Twin Cities metropolitan region (by 11, 7 and 7 percentage points lower, respectively).

PRAMS asked mothers “During any of your prenatal care visits, did a doctor, nurse or other health care worker talk with you about any of the things listed below?” Respondents were asked to count discussions, not reading material or videos. More than four in five women said that during their prenatal care visits, their doctor had discussed breastfeeding, birth defect screening tests, postpartum birth control methods, preterm labor indicators and instruction, and medications that are safe to take during pregnancy. Less likely to be discussed were issues related to smoking, alcohol use, illegal drugs, HIV status, physical abuse, seat belt usage and safe eating guidelines (Figure 6).

Figure 6: Health Care Provider Discussion During Prenatal Visits in Greater Minnesota, 2009-2010²⁰



Risk Factors during Pregnancy

There are many risk factors that can affect the course of pregnancy. Pre-existing medical conditions, body weight and multivitamin use are important considerations prior to pregnancy. Smoking, alcohol use, illegal drug use, violence, use of seat belts, adequate nutrition, social supports and secondhand smoke exposure are important considerations during pregnancy. (See

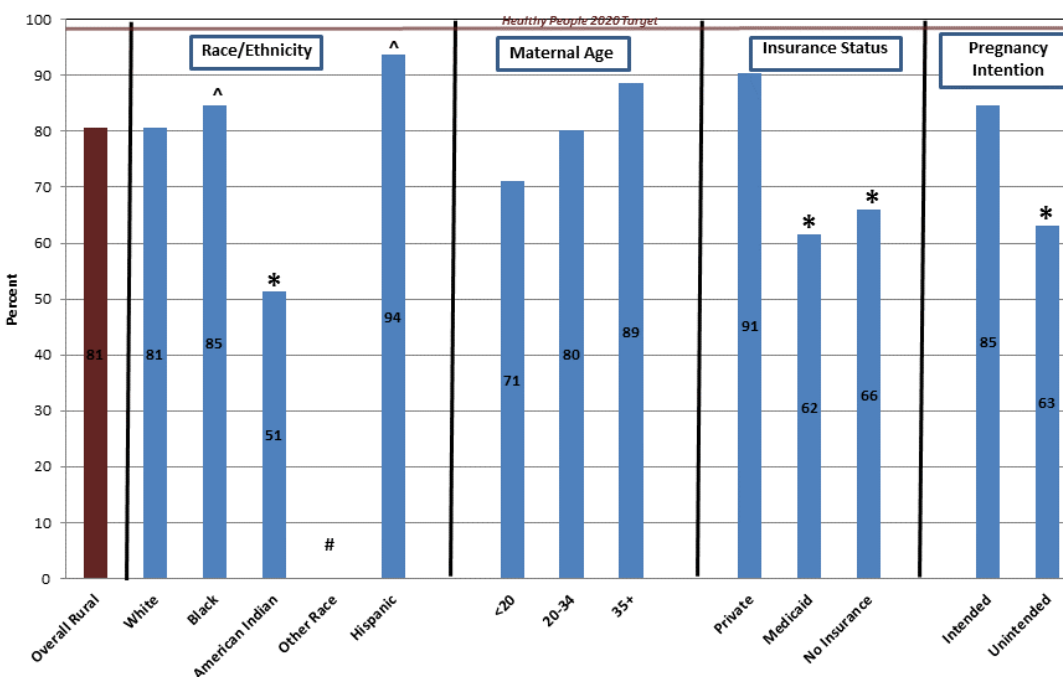
²⁰ Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), 2009-2010.

Appendix B: Healthy People 2020: Preconception Health and Behavior Indicators in Greater Minnesota.)

Differences in preconception health indicators shed light on pregnancy-related health disparities in rural Minnesota. Multivitamin use is less common among American Indian women, those younger than 20 years of age, women whose pregnancies were unintended, and women without private insurance. American Indian women are less likely to maintain a healthy weight prior to pregnancy compared to other pregnant women in Greater Minnesota.

Rural-urban differences in smoking were pronounced. Preconception health data from 2009-2010 shows 34 percent of rural Minnesota mothers were smoking three months prior to pregnancy compared with 20 percent of mothers in the metro area.²¹ Nearly half of rural American Indian women reported smoking in the last three months of pregnancy. Smoking was more frequently reported by women whose pregnancies were unintended and those without private insurance (Figure 7).

Figure 7: No Smoking Last 3 Months during Pregnancy in Greater Minnesota, 2009-2010²²



* Statistically below overall rural 2009-2010.

^ Represents < 60 respondents; data might not be reliable.

Represents < 30 respondents; data not reported.

Of women in the U.S. who delivered infants who died of Sudden Unexplained Infant Death Syndrome (SUIDS), 37 percent smoked during pregnancy.²³ Even if a pregnant woman decides to quit smoking, a spouse or partner's tobacco use may be a trigger for the woman to continue

²¹ Minnesota Preconception Health Data Book, 2010.

²² Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), 2009-2010.

²³ Dietz P. et al. Infant Morbidity and Mortality Attributable to Prenatal Smoking in the U.S. American Journal of Preventative Medicine, 2010; 39 (1): p.45-52.

smoking during pregnancy, or a trigger to relapse to tobacco use after delivery. If the pregnant woman does not smoke, her partner's tobacco smoke may be a source of secondhand (and thirdhand) smoke in the home. Addressing tobacco use for women of childbearing age in rural areas is complicated by a lack of access to certified smoking cessation counselors.

Since only 72 percent of providers ask about smoking in prenatal visits, RHAC believes this may be an area for better screening tools, timely interventions or provider education. Referrals to tobacco cessation programs can be made for the pregnant woman and her spouse/partner, if such programs exist. Pediatricians, school nurses, public health nurses, and obstetric discharge planning nurses may also serve as prenatal and postpartum smoking cessation resources.

Recommendation B: Address smoking in childbearing age women in rural areas, with a special focus on women who are young, uninsured or publicly insured, and those most likely to have an unintended pregnancy. Obstetric providers can improve screening rates for smoking during prenatal visits, and during preventive health visits for women who are not pregnant. Rural communities without access to smoking cessation resources may need to access help through family physicians. Provider education is needed to increase the understanding of how smoking affects pregnancy.

The Rural Health Advisory Committee believes collaboration between obstetric providers and local public health is important for healthy birth outcomes. Multivitamin use and healthy weight can be addressed prior to pregnancy through nutrition education. Smoking cessation can be supported by prenatal care providers who assess smoking status, offer interventions or refer patients to effective cessation services. Alcohol use can be reduced through support groups for pregnant women. Referrals to a range of local services will help pregnant women and new parents access the support and education they need.

Recommendation C: Encourage collaboration between rural obstetric providers and public health nurses to maximize the use of local resources available to pregnant women and new parents. It is important for clinics, hospitals and local public health to understand the resources of each agency so pregnant women can be referred and easily access a range of local services (prenatal care, obstetric options, postpartum care and breastfeeding support). Support services are especially important for new and first time parents. The process of checking in to update this information across the health provider continuum helps to identify gaps at the local level.

Cultural Considerations

Rural Minnesota is becoming more culturally diverse. The number of births to populations of color and American Indians in rural counties has increased over the past decade. Hispanics and American Indians have the highest number of births followed by those identifying as "Other Race." The number of births to African Americans/Africans and Asians/Pacific Islanders remains low in rural counties in Minnesota (Table 3).

Table 3: Number of Births to Populations of Color and American Indians in Rural Counties*, Minnesota 2001-2010²⁴											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	TOTALS
African American/African	32	35	45	40	46	34	43	45	53	40	413
American Indian	285	265	306	299	311	375	348	350	347	357	3,243
Asian/Pacific Islander	72	69	67	71	67	68	77	70	68	95	724
Hispanic	367	361	384	369	403	448	443	393	389	414	3,971
Other Race**	16	11	19	238	283	297	269	249	262	246	1,890
TOTALS	772	741	821	1,017	1,110	1,222	1,180	1,107	1,119	1,152	10,241

***Rural Counties include:** Aitkin, Becker, Big Stone, Chippewa, Clearwater, Cook, Cottonwood, Faribault, Fillmore, Grant, Hubbard, Itasca, Jackson, Kanabec, Kittson, Koochiching, Lac qui Parle, Lake, Lake of the Woods, Le Sueur, Lincoln, Mahanomen, Marshall, Meeker, Mille Lacs, Morrison, Murray, Norman, Pennington, Pine, Pipestone, Pope, Red Lake, Redwood, Renville, Rock, Roseau, Sibley, Stevens, Swift, Todd, Traverse, Wadena, Waseca, Watonwan, Yellow Medicine

****Other Race includes:** Bi-racial and races not listed for 2001-2003; races not listed and more than one category option for 2004-2010.

Sensitivity to cultural differences and belief systems about birth is the first step toward cultural competence for obstetric providers. Understanding the cultural context of obstetric patients can improve patient communication and care.²⁵ Obstetric provider education may increase understanding and awareness of the cultures served, or promote curiosity and open-mindedness regarding cultures they do not understand.

Many non-Western cultures share common beliefs and practices related to childbirth. First, there is often an emphasis on hot and cold. The goal is to maintain a hot-cold balance within the body and environment after the birth. In many cultures, specific diets to achieve a hot-cold balance are common for new mothers.

For example, Hmong traditions suggest that because women lose a lot of blood during childbirth, she may feel cold. It is her responsibility to keep herself warm by sleeping by a fireplace or space heater. The new mother wears a hat or head scarf and does not let wind or air blow on her hair. She also wears long-sleeved shirts and long pants to cover up. A strict diet of warm rice and boiled chicken with special herbs is often followed. The new mother drinks hot or warm water while icy cold water is not recommended.²⁶

²⁴ Center for Health Statistics, Minnesota Department of Health.

²⁵ Effective patient-physician communication. Committee Opinion No. 492. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2011; 117:1254-7.

²⁶ Npauj, M. Hmong postpartum care. <http://ahmongwoman.com/2012/03/10/hmong-postpartum-care/> Accessed 2/25/13

A second culture-based belief is the need for confinement during a specific period of time following childbirth. A 20-40 day period of postpartum rest is routine in many cultures.²⁷ Full attention is given to new mothers following birth. Seclusion is viewed as necessary to recover the mother's health and to protect mother and infant from illness. Consideration for maternal rest and recovery is necessary to avoid misunderstandings.

For example, the Somali tradition of supporting the ummul (new mother) includes relatives and extended family caring for the mother and baby, keeping them company, watching other children, and providing meals to restore the mother's energy. At the end of a 40-day period, there is a celebration or "coming out" with the baby. The mother is well rested and has benefitted from the moral, physical and emotional support she has received. Many Somali women do not experience this tradition while living in the U.S.²⁸

Pregnancy-Related Health Disparities

Another important reason to consider culture is that geographic and racial/ethnic pregnancy-related health disparities exist in rural Minnesota. The northwest region had the highest infant mortality rate in 2010 at 6.1 per 1000 births. This can be compared to a range of 4.4 to 4.9 per 1,000 births for other rural regions and 5.6 per 1,000 births statewide. All rural regions in Minnesota had infant mortality rates lower than the national average of 6.7 per 1000 births.²⁹

Latinos have the largest number of births of any racial or ethnic minority in rural Minnesota. Infant mortality rates for Hispanics in Minnesota are significantly lower than the national average and are currently equal to white infants in Minnesota at 4.3 deaths per 1,000 births from 2005-2009. This demonstrates substantial improvements in the infant mortality rate for Hispanics from 4.9 deaths per 1,000 births from 2001-2005 and 7.0 deaths per 1,000 births from 1995-1999. Consistent with national trends, U.S.-born Hispanic mothers experience higher infant mortality rates than foreign-born Hispanic mothers in Minnesota.³⁰

Disparities in the American Indian population are especially significant in Minnesota. The infant mortality rate for American Indian infants was 9.4 per 1,000 births from 2005-2009.³¹ This represents an improvement from 10.3 per 1,000 births from 2001-2005 and 13.5 per 1,000 births from 1995-1999. A [2008 study](#) assessed Minnesota's longstanding disparity in American Indian infant mortality. Major factors contributing to infant deaths included late or inadequate prenatal care, use of substances and unsafe sleep environments.³² These deaths may be prevented through access to education, health care and social support services.

²⁷ Kim-Godwin Y. Postpartum Beliefs and Practices Among Non-Western Cultures, *The American Journal of Maternal and Child Nursing*, 2003; 28 (2); p. 74-78.

²⁸ Dayo, N. (2013) Cultural Traditions and the Reproductive Health of Somali Women.

²⁹ Disparities in Infant Mortality, 2009. Minnesota Department of Health.

³⁰ Disparities in Infant Mortality, 2009. Minnesota Department of Health.

³¹ Disparities in Infant Mortality, 2009. Minnesota Department of Health.

³² American Indian Infant Mortality Review Project, Minnesota 2005-2007. Minnesota Department of Health.

Approximately 61 percent of all American Indians in Minnesota lived outside the Twin Cities in 2010.³³ The infant mortality rate for American Indians was actually lower in rural regions (8.9 per 1,000 births) when compared to the metro area (10.4 per 1,000 births).³⁴ However, both rates are significantly above the statewide average infant mortality rate of 5.6 per 1,000 births. While the degree of migration between reservation communities and metro areas for obstetric care is unknown, a recent study cited lack of insurance or underinsurance and the desire to seek care from trusted, culturally responsive providers as main reasons for migration.³⁵

A better system of referrals between rural and urban health care systems could improve coordination of care for American Indian women. Many American Indian women are not able to access hospitals, health clinics, or contract health services administered by the Indian Health Service (IHS) or tribal health programs because they either do not meet IHS eligibility criteria or reside outside of IHS and tribal service areas. Other American Indian women in rural areas obtain prenatal care at IHS facilities or local clinics, but are referred to regional or urban hospitals for deliveries. The Rural Health Advisory Committee believes there is a need to standardize the referral processes between IHS facilities, clinics, human services, tribal doulas, rural hospitals and urban health facilities to improve coordination of care.

Anishinaabe Perspectives: Tribal Doula Roundtable

Tribal doulas were invited to discuss their work to restore traditional birth knowledge to their communities. In January 2012, RHAC workgroup staff held a roundtable discussion with Anishinaabe (also known as Ojibwe or Chippewa) doulas and nurses from three northern Minnesota reservation communities (Leech Lake, Red Lake and Bois Forte). This section summarizes the discussion.

The role of birth supporter, whether she is a mother, aunt, sister or a certified professional can be described in one word: doula. The tribal doulas included in this roundtable discussion are working to revitalize Anishinaabe birth traditions. They possess knowledge regarding birth that is meant to be passed from generation to generation. Tribal doulas are willing to share their perspectives and knowledge with the hope that Anishinaabe women will help each other return to their traditional birthing roots.

Tribal doulas want to see patients as soon as possible once a pregnancy is confirmed. They make home visits to educate women about the importance of prenatal care. They help pregnant women seek additional services to address addiction, poverty or social isolation. They educate women about the importance of a birth plan and how to incorporate spiritual or cultural aspects into the birth process. Following the birth, they help the mother with breastfeeding and other challenges as they arise. They document the birth story and support women in recalling the powerful nature of their birth experience.

³³ Health Care Needs Assessment: White Earth Nation Members and other American Indians in the Twin Cities, Minnesota Department of Health, 2012. www.health.state.mn.us/divs/orhpc/pubs/legislative/whiteearthneedsassmt.pdf Accessed 2/25/13.

³⁴ Center for Health Statistics, Minnesota Department of Health.

³⁵ Health Care Needs Assessment: White Earth Nation Members and other American Indians in the Twin Cities, Minnesota Department of Health, 2012. www.health.state.mn.us/divs/orhpc/pubs/legislative/whiteearthneedsassmt.pdf Accessed 2/25/13.

Natural birth is regarded as traditional for Anishinaabe women. Tribal doulas feel there is not enough culturally relevant birth education accessible to American Indian women in Minnesota. But in today's modern world, many young American Indian women do not want to experience the natural birth process. Tribal doulas believe this is related to a fear of pain, loss of strength of family ties, and lack of education about traditional births. Tribal doulas feel a return to well-being on individual and community levels requires a spiritual movement to reclaim traditional Anishinaabe birthing practices.

Traditional births are spiritual events that take place in a woman's home, birth lodge or a hospital setting. A main characteristic of a traditional Anishinaabe birth is family presence in the birthing space. Grandmothers, mothers, aunts, sisters and other women support the pregnant woman and hold the birth space for her. Men build the birth lodge, tend a birth fire and offer tobacco for a safe birth journey.

The birth room is a sacred space that is purified with cedar or sweet grass throughout the labor process. Raspberry leaf tea is often used as medicine during pregnancy and delivery. The woman in labor engages in breathing, vocalizing and walking to get through the pain with the support of her doulas. As the baby enters the world, tribal doulas believe the first person to touch the infant should be a person of good character.

After a traditional Anishinaabe birth, the umbilical cord remains intact to prolong the physical connection between mother and baby. The baby receives the last nutrients and blood from the mother and when the time is right, sinew is used to tie off the cord. When the cord falls off, it is saved and placed in a leather pouch. After the baby walks, the cord is buried close to home. The placenta is viewed as a living organ and is buried to thank Mother Earth for nurturing the new life. Aftercare support for the mother includes visiting, sharing and encouraging breastfeeding. Sturgeon broth is used to bring in the mother's milk after the delivery.

When Anishinaabe women do not utilize a traditional birth process, tribal doulas believe they may experience a lack of personal power throughout the pregnancy and birthing process. Birth within a hospital setting increases the odds of medical interventions, including cesarean sections. Many Anishinaabe women believe cesarean sections limit the number of babies a woman can have in her lifetime. It recalls past historical trauma around forced sterilization in American Indian communities. Discussions of the risks and benefits of cesarean delivery can be sensitive to this cultural context.

When Anishinaabe women attempt to incorporate traditional practices into births in a hospital setting, they may encounter challenges. Most hospitals limit the number of people allowed in the birthing room and women are forced to choose which family members will be present during the birth. Fetal monitors and IVs are standard practices that bind the laboring woman to machines and makes her less mobile. After the birth, babies may be rushed away to be cleaned and tested instead of being allowed traditional skin-to-skin contact with their mothers. When leaving the hospital setting, policies may not allow Anishinaabe women to take home their placentas for burial during a ceremony.

Tribal doulas wish to address the following policies at the hospital level:

1. Limitations on the number of family members in the birth space.

2. Minimization of interventions unless they are medically necessary.
3. Placement of the baby on the mother immediately following birth.
4. Ability to obtain the placenta for burial.
5. Respect for traditional healers, spiritual guides and doulas.

Tribal doulas believe education is beneficial both for women who birth in hospital settings and for health care professionals, for the following reasons:

1. American Indian women are empowered by information on what to expect when giving birth in a hospital setting. Subjects to address include risks to the baby or mother posed by medical procedures, permissions for medical interventions, and parameters around the length of stay following the birth.
2. Obstetric providers need information about traditional birth practices and beliefs. This will help them understand cultural practices incorporated into a birth plan.
3. Rural hospital staff can benefit from cultural competency training on interpersonal (bedside manner) and contextual (cultural) issues. This can lead to better patient services and achieve higher levels of patient engagement and satisfaction.

Recommendation D: Educate rural providers and hospital staff about ways to better serve American Indian women. American Indian communities experience the largest disparities in birth outcomes in rural Minnesota. Rural hospitals can improve cultural competencies and internal processes to address these disparities. Statewide trainings to improve cultural competencies could be offered in rural and underserved urban areas. More could be done to standardize the referral processes between Indian Health Service facilities, human services, the Women, Infants and Children (WIC) food program, rural clinics and hospitals, and urban health care facilities.

3. Rural Obstetric Education, Training and Residency

The majority of obstetric providers in rural areas are family medicine physicians. They are trained to provide care to people of all ages and to approach care from a family-oriented perspective. In the U.S., roughly 25 percent of family medicine physicians provide maternity care and attend births.³⁶

Minnesota had 51 active family medicine physicians per 100,000 rural residents in 2010. This rural rate was higher than the urban rate of 43 active family medicine physicians per 100,000 residents in Minnesota. This section highlights several rural obstetric training and residency programs for family medicine physicians and certified nurse-midwives in Minnesota.

Choosing Rural Practice

The specialty, location and career choices of physicians graduating from medical schools can largely be predicted based upon characteristics known at admission. Some of the most predictable workforce outcomes include choice of family medicine and choice of rural location. A primary focus on academic records of performance during admission to medical school may distort the workforce toward specialization and away from family medicine. Trends toward admissions of students with advanced intellect, younger age, more urban experience, and higher social status may reduce the numbers and distribution of physicians most responsible for access to prenatal care and other primary care services.³⁷

The Rural Health Advisory Committee believes a better system for selection of medical students may be needed in Minnesota to ensure rural facilities have an adequate obstetric workforce in the future. Currently, academicians assess how well applicants will handle the educational components in medical school. Workgroup members noted that other states (Iowa and South Dakota) involve rural medical students and family medicine providers in interviews with applicants to assess their experience in rural communities and intentions for rural practice. More emphasis on the environments of students before admission could remedy the urban leanings of current admission processes.

Recommendation E: Support a system for medical school admissions that considers rural medical student and provider perspectives, and a prospective student's inclination towards a rural obstetrics practice. Revisit the metrics used to choose and evaluate medical school applicants to ensure admissions processes do not overlook individuals interested in rural obstetrics and family medicine. Consider an additional focus on obstetrics and family practice during the interview process.

³⁶ www.childbirthconnection.org. Accessed 2/24/2013.

³⁷ Bowman, R. Before Admissions: Physician Career Predictions. www.ruralmedicaleducation.org/before_admissions.htm Accessed 2/25/13

The decision to practice medicine in a rural community is largely based on quality of life perceptions. Completion of medical school and selection of a residency program focused on rural competencies are strongly correlated with practicing in a rural area.³⁸ Physicians with exposure to small towns or rural communities during their training or residency are more likely to build and sustain a rural practice.³⁹

Current Physician Training and Residency Programs in Minnesota

The University of Minnesota-Twin Cities does not train first- and second-year medical students in obstetrics. Students may choose rural and international electives with obstetric components in years three and four. Some family medicine and OB/GYN students extend their medical school experience another year for additional training in obstetrics.

The University of Minnesota-Duluth campus offers first-year medical students an elective obstetrics longitudinal course. The student follows an obstetric patient during their prenatal care, labor and delivery, and postpartum care. Students can also choose to see obstetric patients through the Summer Internship in Medicine (SIM) and the Rural Family Medicine, Native American, and Minority Medical Scholars Program (RMSP).

University of Minnesota medical students interested in rural practice may enroll in the Rural Physician Associate Program (RPAP). The number of RPAP students has declined in recent years from 25 students in 2008 to 17 students in 2010. Typically half of the RPAP students take obstetrics each year, and according to program administrators, more would do obstetrics if there were additional rural hospital sites in which to train. It is increasingly difficult to find rural preceptors who practice obstetrics and also have time to oversee students.

There are 11 family medicine residency programs in Minnesota. Of the University of Minnesota's eight family medicine residency programs, three are in greater Minnesota. The Mayo Medical School, Hennepin County Medical Center, and United Hospital offer the other residency programs in Minnesota. In 2012, there were a total of 70 family medicine residents in Minnesota (Table 4).

Family medicine residents who wish to train in obstetrics need to secure hospital privileges to gain cesarean section experience. The ease of securing these slots varies. (See Appendix C: Family Medicine Residencies with Obstetrics – Midwest States Only.)

A notable family medicine residency program is offered at St. Mary's and St. Luke's hospitals in Duluth. Three third-year residents engage in advanced cesarean section training each year. These residents finish their training having performed 60-70 cesarean sections and are able to enter a rural practice with the ability to perform cesarean sections independently. One fourth year resident is involved in an obstetric procedural fellowship each year. This provides five months of concentrated high-risk obstetrics and cesarean section training. The fellow is ideally trained to do high-risk obstetrics in a rural facility.

³⁸ Jarman, BT et al. (2009). Factors correlated with surgery resident choice to practice general surgery in a rural area. *Journal of Surgical Education*; 6(3): 319-324.

³⁹ LaRavia, D., et al. (2002). Keeping Physicians in Rural Practice, American Academy of Family Physicians.

Table 4: Family Medicine Residency Participants, Minnesota 2012⁴⁰

Family Medicine Residency Program	Matched Slots	Setting
UMN – Methodist	6	Metropolitan
UMN – North Memorial	10	Metropolitan
UMN – Smileys	4	Metropolitan
UMN – St. Johns	6	Metropolitan
UMN – St. Josephs	8	Metropolitan
Hennepin County Medical Center	6	Metropolitan
United Hospital/Allina	6	Metropolitan
TOTAL METRO PARTICIPANTS	46	
Greater Minnesota		
UMN – St. Cloud	4	Greater Minnesota
UMN – Mankato	3	Greater Minnesota
UMN – Duluth	9	Greater Minnesota
Mayo Medical School - Rochester	8	Greater Minnesota
TOTAL GREATER MN PARTICIPANTS	24	
TOTAL FM RESIDENCY PARTICIPANTS		
	70	

Challenges for Family Medicine Residency Programs

With no funding for additional residencies, Minnesota has increasingly fewer family medicine physicians ready for rural practice. Family medicine residency sponsors report it is difficult to maintain family medicine residency slots. Many rural hospitals do not have sufficient cash on hand to support the cost of hiring residents. Additional challenges for family medicine residency programs, on which rural Minnesota depends to produce its primary care workforce, include work hour restrictions, lack of reimbursement for staff involved in residency training, and the need for ongoing commitment of hospital obstetric staff.

Accreditation Council for Graduate Medical Education (ACGME) residency review committees are responsible for setting requirements for post-graduate training programs. New rules require 80 deliveries for a physician to be considered sufficiently trained in obstetrics; old rules required 40 deliveries for a physician to meet the competency standard. At least 50 deliveries are required to gain competence in cesarean section.

Reductions in financial support for federal Graduate Medical Education (GME) programs indicate residency programs may be at risk. University of Minnesota medical school faculty believe the Rural Physician Associate Program (RPAP) is also vulnerable. These programs are essential components of Minnesota's rural family physician pipeline.

New programs or ways of thinking may be needed to address these challenges. It may be advantageous to access the knowledge of experienced semi-retired or retired family physicians to train residents in rural obstetrics. Ireland and Canada have residency training models that use this

⁴⁰ National Resident Matching Program (NRMP) Results, 2008-2012 Main Residency Match.

approach. In the past, "board certified" physicians were certified for life. Now recent graduates and retirees must undergo periodic or even continuous re-evaluation for maintenance of certification. This may complicate arrangements for retired physicians to mentor or train residents.

Canada provides two-year training for family medicine physicians. This model for training shortens the amount of time spent in medical school versus residency in a rural practice environment. This model would also address medical school debt loads for generalists. The Rural Health Advisory Committee recommends considering the feasibility of this and other medical training models.

Recommendation F: Provide more opportunities for rural family physicians doctors to receive training in rural obstetric practices, including natural births and cesarean sections.

Expand initial training in obstetrics for medical students through rural elective courses, residency and fellowship programs. Actively recruit and track preceptors willing to mentor students. Utilize experienced and retired physicians as trainers and mentors for residents. Ensure residents perform an adequate number of cesarean sections to qualify for hospital privileges.

Due to work-hour restrictions implemented in July 2011, residents have fewer opportunities to do deliveries and are less able to support their own patient base through the course of pregnancy. Key informants report these restrictions have resulted in new graduates not getting the same amount of experience as previous graduates. Work hour restrictions may lead to an inability to get case volumes or delivery volumes required to become competent for rural practices. In some cases, an additional year of residency is needed to meet obstetric training requirements. The Rural Health Advisory Committee believes this is an important issue which will require additional analysis.

Recommendation G: Analyze and address the impact of 2011 federal work hour restrictions on medical residents. Residents are getting less experience overall, especially in obstetrical and surgical training areas. This requires more family medicine physicians to consider a fellowship year in obstetrics to firm up their skills for rural practice. This policy restriction may have unintended consequences and should be studied at the state level.

Higher education must continually update medical training programs to meet current and future needs. Medical students are immersed in new health information technologies, and curricula must incorporate this new aspect of medical practice. Distance learning technologies may also provide ways to increase the number of medical graduates.

The Rural Health Advisory Committee believes broad changes in funding for medical education are needed so graduates are financially able to pursue a career in primary care, if that is the path they choose. The cost of public medical schools has gone up 312 percent over the last 20 years.⁴¹ Medical students are essentially forced into specialty fields to earn a salary high enough to repay their medical school debt. Health care workforce analysis projects have the potential to help policy makers understand this dynamic better.

⁴¹ Association of American Medical Colleges. Medical school tuition and young physician indebtedness. March 23, 2004.

Health professions education proponents believe greater public funding of medical education is warranted, especially to maintain the rural health care safety net. Without it, Minnesota will continue to bear increasing costs and the health care workforce needs - particularly for greater Minnesota - will become more difficult to meet. It may be necessary to increase GME funding, change restrictions on residency slots, or direct fund rural resident slots at the state level to address these workforce challenges. A state program could designate post-graduate year one (PGY-1) slots in family medicine with obstetrics or OB/GYN dedicated to rural practice.

Recommendation H: Support an appropriate number of new medical graduates to meet future rural obstetric care needs. Minnesota is falling behind in the percentage of family medicine physicians who are ready to practice in rural areas. A smaller percentage of these graduates are willing to include obstetrics in a rural practice. The consequences of these trends must be made clear to legislators using data and workforce projections.

Obstetrics/Gynecology Training

The University of Minnesota and Mayo Clinic medical schools offer specialization in obstetrics/gynecology (OB/GYN). The four-year residency training programs are designed to provide broad exposure to many aspects of women's health care. OB/GYN physicians provide cancer screenings, emergency, surgical and ongoing well women care. The majority of physicians who specialize in OB/GYN in Minnesota will practice in urban or large rural settings.

The majority of physicians in OB/GYN residency programs are female. In Minnesota, 31 of 35 residents in the University of Minnesota program are female and 75 percent of residents in the Mayo Clinic program are female. Nationally, 90 percent of physicians specializing in OB/GYN are female.⁴² These trends are due to patient preferences and more women entering the field of medicine in general.

General Surgeon Training

Roughly 33 percent of rural Minnesota's general surgeons completed medical school and residency in Minnesota. Currently, 85 percent of general surgeons subspecialize and only 15 percent remain as generalists. Many choose a sub-specialty training program to gain additional surgical competencies.

Twenty years ago, general surgery residents trained in OB/GYN and emergency medicine. Today they have no training in obstetrics. General surgeon training does not include C-section training. It must be an elective or part of rural training opportunities.

There are three general surgery training programs in Minnesota (Mayo Clinic, Hennepin County Medical Center and the University of Minnesota) offering 24 residency slots in total. Currently no programs offer experience in a rural setting. The University of Minnesota is considering creating a two-year rural track for general surgery. Essentia Health System is also planning to develop a rural general surgery residency program with the goal of offering two residency slots per year starting in 2014.

⁴² Peota, C. "Women's Work? Obstetrics/gynecology struggles with the gender question." Minnesota Medicine, March 2012.

Certified Nurse-Midwife Training

There is one certified nurse-midwife (CNM) program at the University of Minnesota and one additional program in the upper Midwest region offered by Marquette University in Milwaukee, Wisconsin. Several distance learning programs are available for CNM degrees. The University of Minnesota has eight to ten CNM graduates each year with approximately 90 percent of graduates practicing in Minnesota.

The University of Minnesota has experienced a recent decline in the number of applicants to its CNM program as the curriculum changed from a master's level to a doctoral level program. Most applicants have years of experience as registered nurses before they seek CNM specialization. CNMs must participate in at least 50 deliveries and participation in high-risk pregnancies is included. CNMs' first cesarean section assist occurs post-graduation. According to recent graduates of the University of Minnesota program, the majority of CNM graduates from rural areas intend to return to a rural practice location.

Hospital bylaws determine the extent of CNM privileges and sometimes require a supervisory relationship between physicians and certified nurse-midwives. The Rural Health Advisory Committee believes the reluctance of some physicians to enter into supervisory agreements with CNMs acts as a practice barrier in rural settings. The Accreditation Council for Graduate Medical Education does not allow CNMs to supervise medical residents. This also may act as a deterrent to hire CNMs in some large rural facilities.

Recommendation I: Address regulatory barriers to practice at federal, state and hospital levels for certified nurse-midwives. Many certified nurse-midwives are unable to practice at the top of their education and training due to federal, state or hospital regulations. Their scope of practice is different in each state. Models demonstrating the best use of certified nurse-midwives in rural obstetric practices should be considered.

Continuing Education for Rural Obstetric Providers

Rural obstetric providers are faced with the challenge of a lower volume of deliveries. Over time, their competencies and skills may decline. Many family medicine physicians choose to stop doing cesarean sections after two or three years of practice. This may be a good choice for safety or quality reasons, but it contributes to a growing gap in rural obstetric services.

Cesarean section techniques and advanced neo-natal skills are especially hard to maintain in a low-volume environment. Refresher courses or intensive retraining opportunities, especially for cesarean section providers, are needed to maintain skills and proper judgment to provide quality obstetric care. Provider education via telehealth or simulation technologies is available. (See Appendix D: Obstetric Team Training Programs.)

Additional courses may be offered by local providers or through partnerships between rural facilities. Training opportunities in neighboring states require nurses and physicians to be licensed in that state for liability purposes. The Rural Health Advisory Committee believes a

special interstate compact for licensing nurses or family medicine physicians may be needed for obstetric training purposes.

Recommendation J: Support rural obstetric teams' involvement in educational offerings that supplement their labor and delivery skills. Continuing education issues are important for all labor and delivery staff. Courses focused on high-risk pregnancies and emergency obstetric care geared towards nurses, EMTs, and emergency room physicians may be especially helpful. Minnesota Department of Health grant programs should give consideration to proposals to fund rural obstetric training and curriculum development.

Medical Student Perspectives: Aspiring Obstetrics Provider Roundtable

In February 2012, RHAC staff convened a roundtable of nine second-year medical students at the University of Minnesota-Duluth medical school to determine what drew them to the field of obstetrics and their expectations for training, recruitment and future practice settings. The students planned to include rural obstetrics as a part of their future practice. Most students had exposure to obstetrics in a rural setting through university programs. The majority of students (89 percent) planned to participate in additional obstetric training opportunities in rural areas. All students planned to participate in cesarean section training and eventually practice in small (67 percent) or large (33 percent) rural settings (Table 5).

Table 5: Aspiring Rural Obstetric Providers Survey Results (n=9)	
From a rural area in Minnesota	100%
Exposure to obstetrics in a rural setting	
Preceptor-ship or shadow program	78%
Obstetrics Longitudinal Course (MS1)	56%
Summer Internship in Medicine (SIM)	56%
Rural Family Medicine & Minority Medical Scholars	56%
Plan to receive training in cesarean sections	100%
Future training opportunities in a rural setting	
Rural Physician Associate Program (RPAP)	89%
Duluth Clinic Obstetrical/Procedural Fellowship	33%
Women's health related externship/fellowship	22%
Source of information for rural obstetric training options	
Medical school staff	78%
Medical school students	78%
Conferences	33%
Career fairs	33%
Preceptor	11%
Preferred time for recruiters to establish contact regarding practicing opportunities in rural obstetrics	
Years 1&2 of medical school	78%
Years 3&4 of medical school	67%
During residency program	44%

Future preferred practice location	Small or isolated rural	67%
	Mid-sized rural	33%
Top factors to determine future practice location (ranked with “1” as top factor and “6” as lowest factor)	Area amenities	2
	Family lives nearby	2.25
	Quality of schools	3.25
	Loan repayment/forgiveness	4
	Sign on bonus	4.5
	Partner preference/employment	5.5
Expected technology and infrastructure in a rural obstetrics practice	Ultrasound machine	100%
	Anesthesia providers/Epidural capability	100%
	Electronic health records	89%
	Telemedicine/Remote consults with specialists	44%
	Telemedicine/Remote monitoring of patients	22%
Expected starting salary range for a family medicine physician doing obstetrics in a rural community	\$90,000 - \$120,000	11%
	\$120,001 - \$150,000	11%
	\$150,001 - \$180,000	67%
	\$180,001 - \$210,000	11%

Following the survey, participants were asked a series of questions about their perceptions of the field of obstetrics. These students’ views support the need for family medicine physicians to receive additional training in obstetrics. This includes team training with doulas, certified nurse-midwives and emergency room physicians. Student views support the need for flexible obstetric team models in rural areas, as future physicians seek an acceptable work-life balance. For a full summary of participants’ responses, see Appendix E: Aspiring Obstetric Provider Roundtable Discussion.

4. Rural Obstetric Workforce

Obstetrical care includes a broad spectrum of services for pregnant women including prenatal care visits, delivery, postnatal care and follow-up visits. The provision of these services depends on qualified health care providers with varying degrees of specialized training in obstetrics. The following sections describe the current status of the obstetrical workforce in rural Minnesota, with a focus on providers trained to perform deliveries.

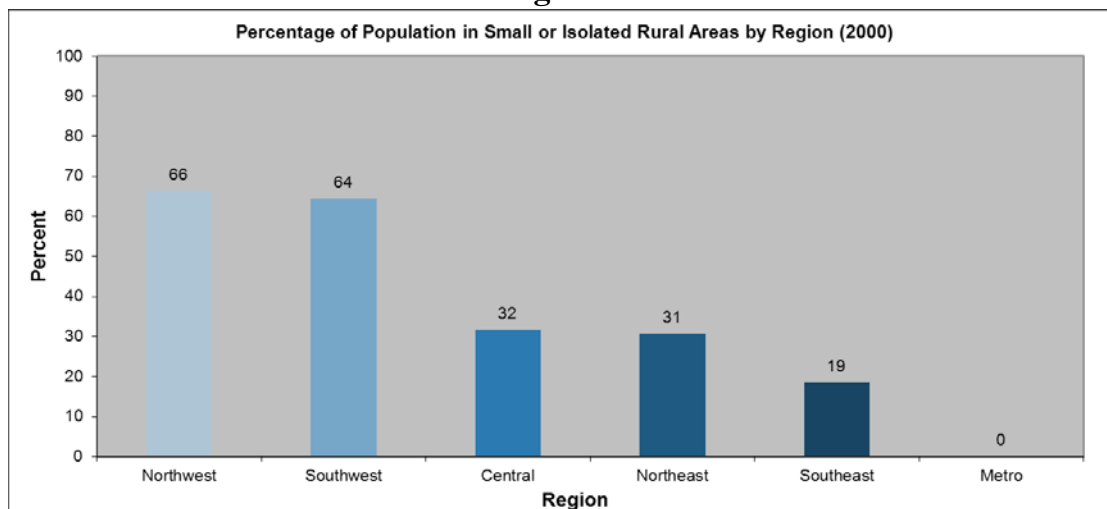
“Rural” Definitions and Rural-Urban Commuting Areas

Rural obstetric workforce analysis requires a clearly defined use of the term “rural,” which has many definitions and can be interpreted in different ways depending on the context or discipline in which it is being used. Historically, Greater Minnesota has been used as a surrogate measure for “rural” Minnesota. However, many people in Greater Minnesota are concentrated in close proximity to urban centers.

Rural-Urban Commuting Areas (RUCAs) are a measure of the rurality of a geographic area. RUCAs categorize rurality based on measures of urbanization, population density and daily commuting.⁴³ RUCAs are often divided into four categories: Urban, Large Rural, Small Rural and Isolated Rural (see Appendix F: Minnesota Maps.)

To approximate rurality, this report uses the Minnesota Department of Employment and Economic Development (DEED) classifications of Central, Metro, Northeast, Northwest, Southeast and Southwest regions (see Appendix G: DEED Planning Areas). These regions were characterized by the percent of residents living in small or isolated rural RUCAs in (Figure 8).⁴⁴

Figure 8



⁴³ Hart GL, Larson EH, Lishner DM. (2005). Rural Definitions for Health Policy and Research. *American Journal of Public Health*. 2005; 95(7):1149-1155.

⁴⁴ U.S. Census Data, 2000.

RUCAs provide an opportunity to redesign financial and technical assistance programs to assist the most rural areas of Minnesota. For example, larger rural facilities are more likely to provide sign-on bonuses and higher salaries compared to small or isolated rural facilities. Loan forgiveness programs are one approach to rebalancing this recruiting advantage and allowing obstetric providers to choose from a range of rural practice settings.

State loan forgiveness programs for physicians and advanced practice nurses now use RUCAs to determine program eligibility. For hospitals in small or isolated RUCAs, The Rural Health Advisory Committee believes loan forgiveness programs are essential. The recruitment and retention of one obstetric provider can be the deciding factor as to whether to maintain or discontinue their obstetric services.

Recommendation K: Support loan forgiveness programs for obstetric providers in small and isolated rural areas. Recent changes to state loan forgiveness programs include the level of rurality of a future practice location as a selection factor. State legislation to increase the number of loan forgiveness opportunities for physician and midlevel providers would help small and isolated rural hospitals maintain their obstetric practices.

The Obstetrical Care Team

Prenatal care is provided by family medicine physicians, OB/GYNs, certified nurse-midwives or nurse practitioners. Deliveries are performed by many types of providers, but complicated pregnancies often require specialized care from highly trained providers. While women in urban areas often have access to these providers, rural areas have fewer options. Available providers may be required to maintain demanding call schedules and travel great distances on short notice to reach patients, and expectant mothers living in small or isolated rural areas may have very long distances to travel to a hospital.

Rural Obstetric Provider Demographics

Despite limitations, birth certificate data is the most readily available resource to identify the various types of providers and the relative frequency of deliveries they perform. In this report, we used birth records from 2000, 2005 and 2010 to identify the number and types of providers who delivered babies in Minnesota.⁴⁵

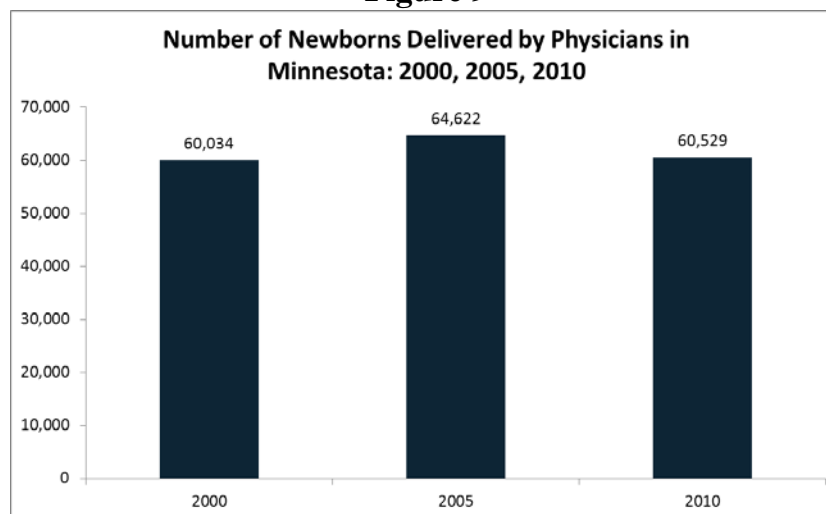
Physicians

Figures 9, 10 and 11 show changes in the number of births with a physician listed as the primary attendant in Minnesota. The number of physician-attended births increased from 60,034 in 2000

⁴⁵ The “attendant at birth” information on birth certificates identifies which providers are performing deliveries in Minnesota. While many providers may participate in a delivery, only one “attendant at birth” is listed on the birth certificate. This limits the ability of birth certificate data to summarize the total number of providers involved in a birth, and especially limits the ability to identify nurses, traditional midwives or other providers who may be working under the supervision of a physician. Additionally, general surgeons may perform cesarean sections with the assistance of a family physician, although the family physician may appear as the “attendant at birth” on the birth certificate.

to 64,622 in 2005, and then decreased to 60,529 in 2010 (Figure 9). This pattern was reflective of the total number of births in Minnesota, which increased from 65,703 in 2000, to 70,963 in 2005, and then decreased to 67,838 in 2010.

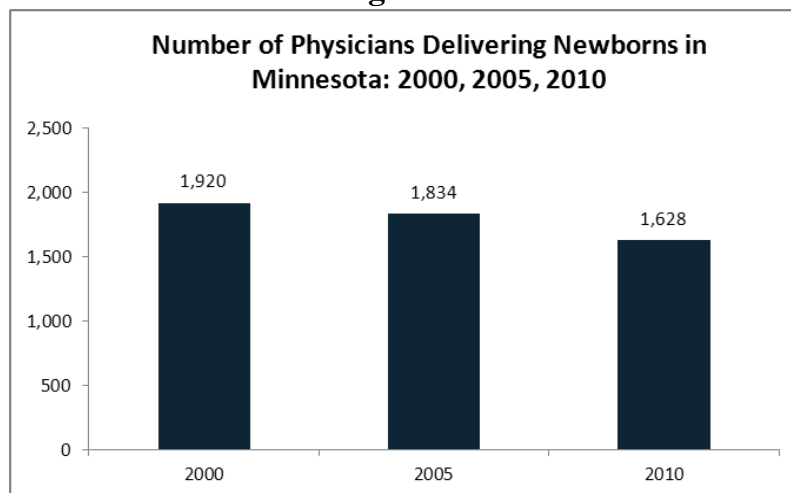
Figure 9



Source: Vital Records Data, Center for Health Statistics, Minnesota Department of Health.

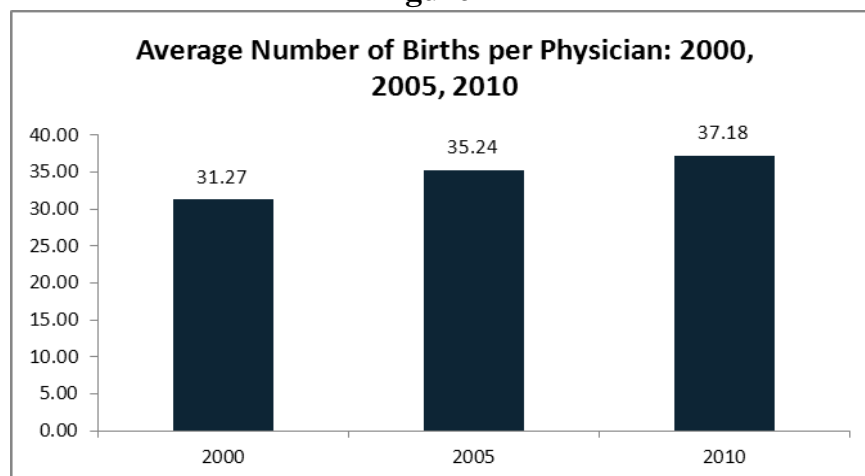
Although there was very little net change in the number of births during the period from 2000-2010, the number of physicians who performed the births decreased 15 percent from 1,920 in 2000 to 1,628 in 2010 (Figure 10).

Figure 10



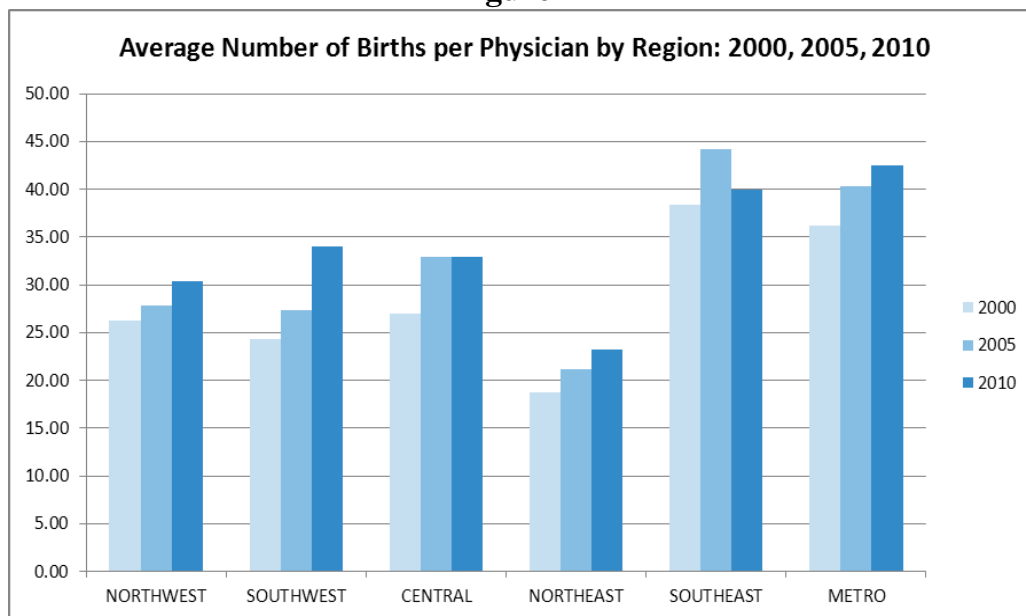
Source: Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health.

The average number of births per provider increased 19 percent from 2000 to 2010, from 31.27 to 37.18 (Figure 11). This pattern was relatively consistent across the regions of the state, with no change in the overall number of births and declining numbers of physicians who delivered newborns over time, resulting in an increase in the average number of births per physician.

Figure 11

Source: Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health.

The average number of births per physician increased in all regions of the state from 2000 to 2005, and all regions except the Central and Southeast had increases again from 2005 to 2010 (Figure 12). The average number of births per physician was lower in the more rural regions of the state than in the Metro or Southeast regions.

Figure 12

Source: Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health.

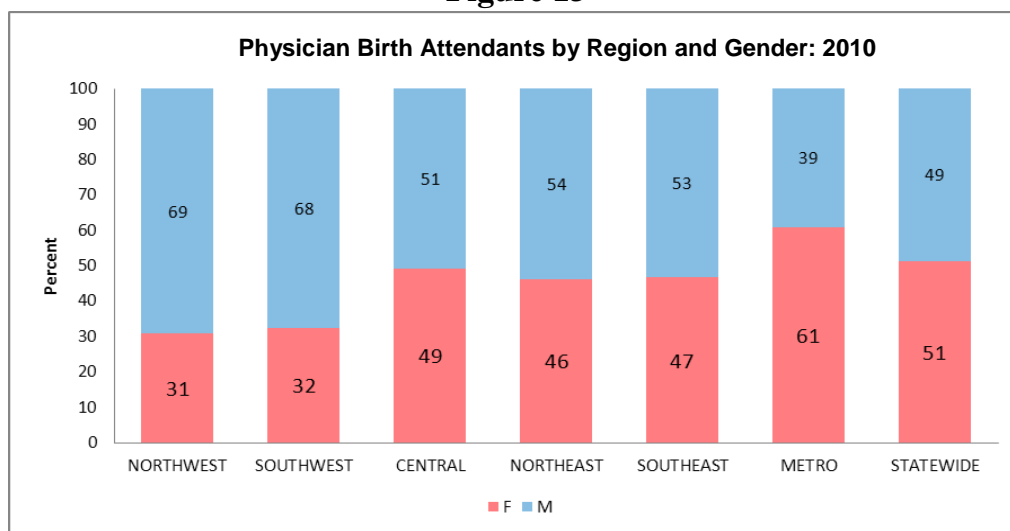
Among the 1,628 physicians who delivered newborns in 2010, 1,437 (88 percent) had medical license numbers that could be linked to Minnesota State Medical Board records so that their subspecialties could be identified. Among these providers, 693 were family medicine providers, 483 were OB/GYNs, 230 had no board certification, six were general surgeons, and 25 had other subspecialties.

While these data indicate that family medicine physicians and OB/GYNs play a key role in deliveries, it is important to note that many other providers take part in each birth in addition to the attendant listed on the birth certificate. Workgroup discussions indicated it is common for family physicians to be present for cesarean sections and to be listed as the attendant at birth on the birth certificate, even though general surgeons actually perform the procedure.

The mean age of the 1,437 providers identified was 46 years. The mean age did not differ significantly by region. Statewide, there were 736 (51 percent) female providers identified and 701 (49 percent) males. While the overall state proportion of females to males was roughly equal, the proportion differed substantially by region of the state, with more male physicians delivering newborns in the rural regions and more female physicians in the urban regions of the state (Figure 13).

This may result in part from a difference in the gender distribution between family physicians, who were 53 percent male and located primarily in rural areas, and OB/GYNs, who were 55 percent female and concentrated in more urban regions. This mirrors national data showing an increasing proportion of women entering obstetrics and family medicine. However, substantially fewer females in both specialties choose to practice in rural areas.⁴⁶

Figure 13



Source: Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health.

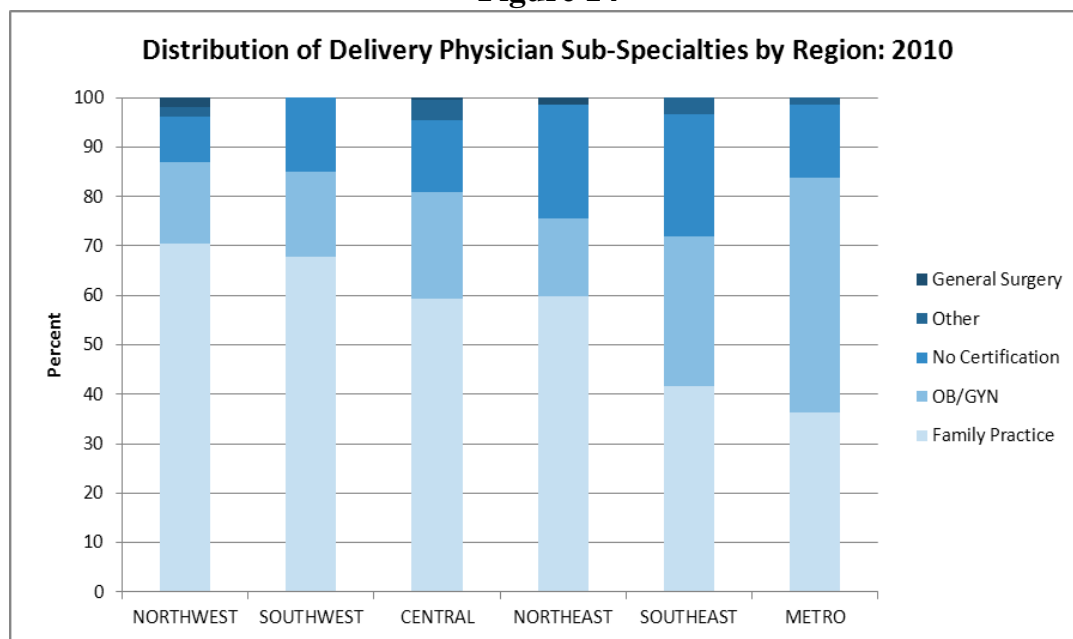
Figure 13 shows obstetric patients in the Twin Cities metro area have the most access to female obstetric providers, while obstetric patients in the northwest and southwest regions have less access to female obstetric providers. Studies have shown that most obstetric patients prefer a female rather than a male provider.⁴⁷

⁴⁶Zhao L. Why are fewer hospitals in the delivery business? NORC Walsh Center for Rural Health Analysis, Working Paper #2007-04. Office of Rural Health Policy, 2007.

⁴⁷Janssen SM, Lagro-Janssen AL. Physician gender, communication style, patient preferences and patient satisfaction in gynecology and obstetrics: a systematic review. *Patient Education Counseling* (2012); Nov: 89 (2): 221-226.

Rural regions had a larger percentage of family medicine physicians listed as the primary attendant at birth compared to the more urban regions. Urban regions had a higher percentage of OB/GYNs listed as primary attendant (Figure 14).

Figure 14



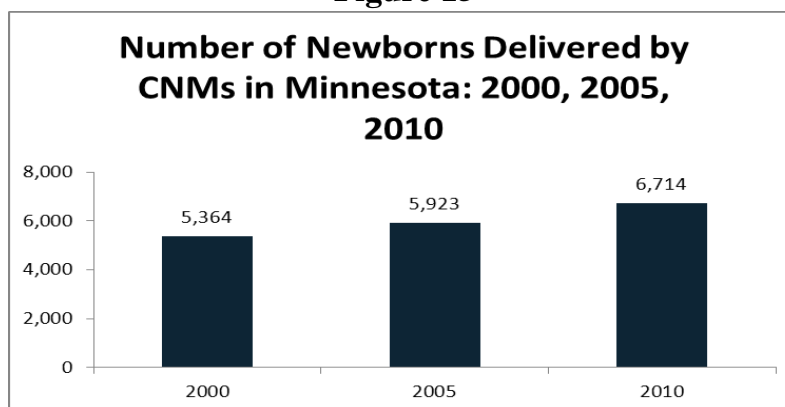
Source: Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health.

Certified Nurse-Midwives

The majority of certified nurse-midwives (CNMs) work in hospitals or freestanding birth centers. Minnesota and Wisconsin are the only midwestern states that allow CNMs to deliver babies in a home setting.

Figures 15, 16 and 17 show changes in the number of births with a CNM listed as the attendant at birth in Minnesota for 2000, 2005 and 2010. The number of births to CNMs increased nearly 26 percent from 5364 to 6714 between 2000 and 2010 (Figure 15).

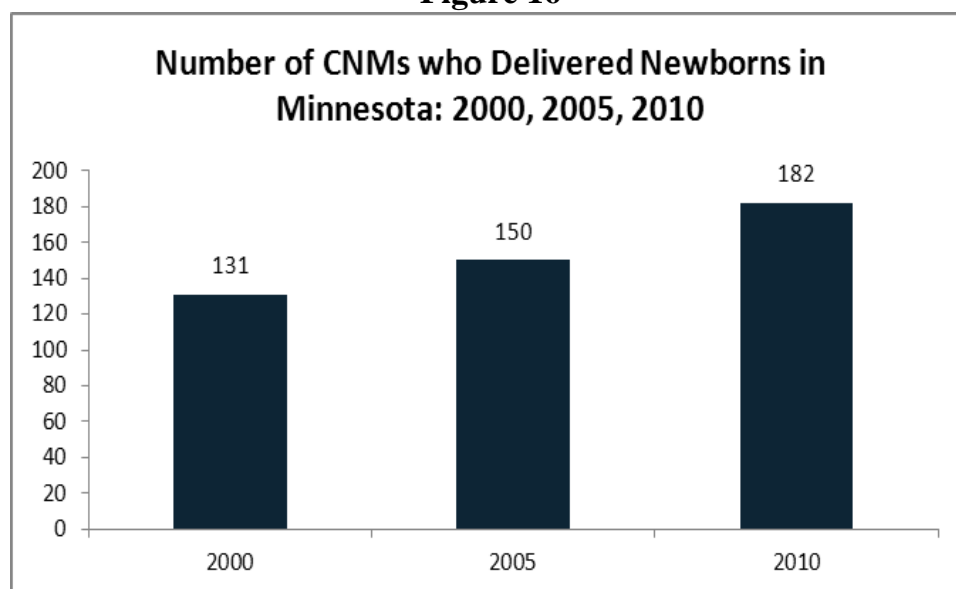
Figure 15



Source: Vital Records Data, Center for Health Statistics, Minnesota Department of Health

The number of CNMs who performed deliveries also increased, from 131 in 2000 to 150 in 2005, and to 182 in 2010 (Figure 16).

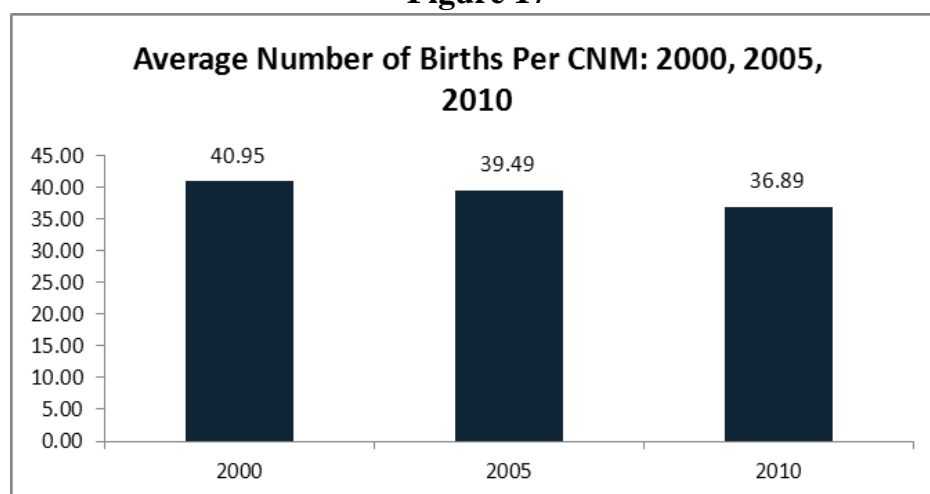
Figure 16



Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health

The result is that the average number of births per CNM decreased from 40.95 in 2000, to 39.49 in 2005, and 36.89 in 2010 (Figure 17).

Figure 17

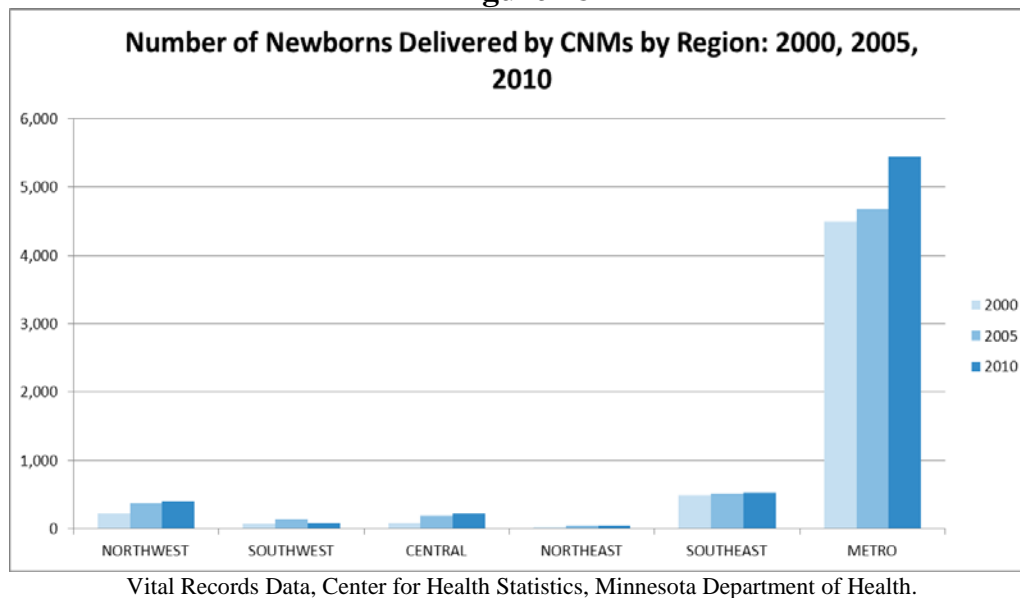


Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health

This pattern is essentially the opposite of that observed among physicians, who had no net change in the number of deliveries attended, but had a decrease in the number of providers who delivered, resulting in an increase in deliveries per physician (Figures 9, 10 and 11).

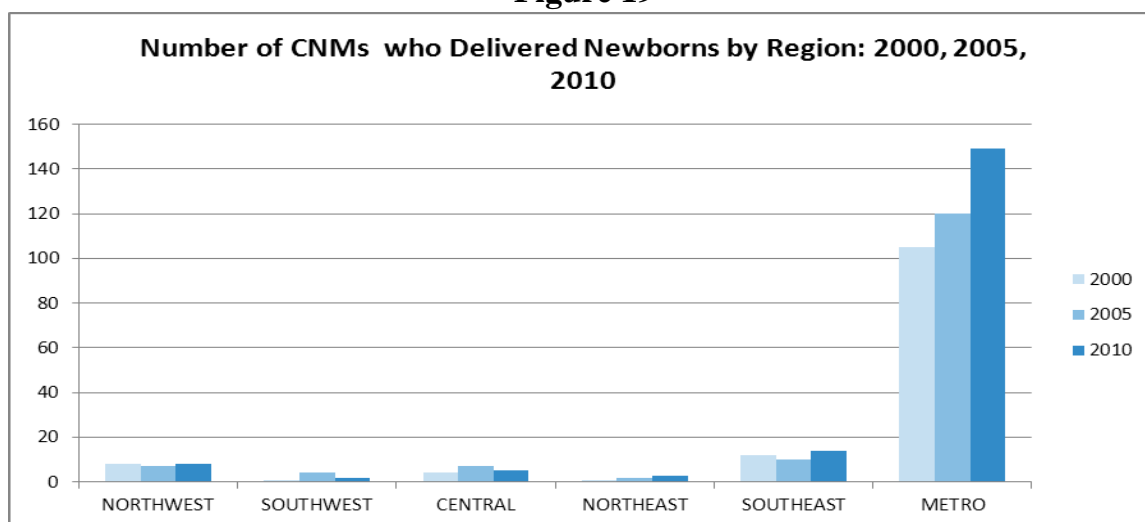
CNMs in the Metro region were listed as attendant at birth for more births than in the other regions of the state. Births to CNMs increased from 2000 to 2010 in the Northwest, Central and Metro regions, while remaining relatively stable in the Southwest, Northeast and Southeast regions (Figure 18).

Figure 18



The number of CNMs who delivered babies in the Metro region increased from 105 in 2000 to 120 in 2005 and again to 149 in 2010. The number of CNMs who delivered babies in other regions of the state was much lower than the Metro, ranging from 0-14 (Figure 19).

Figure 19

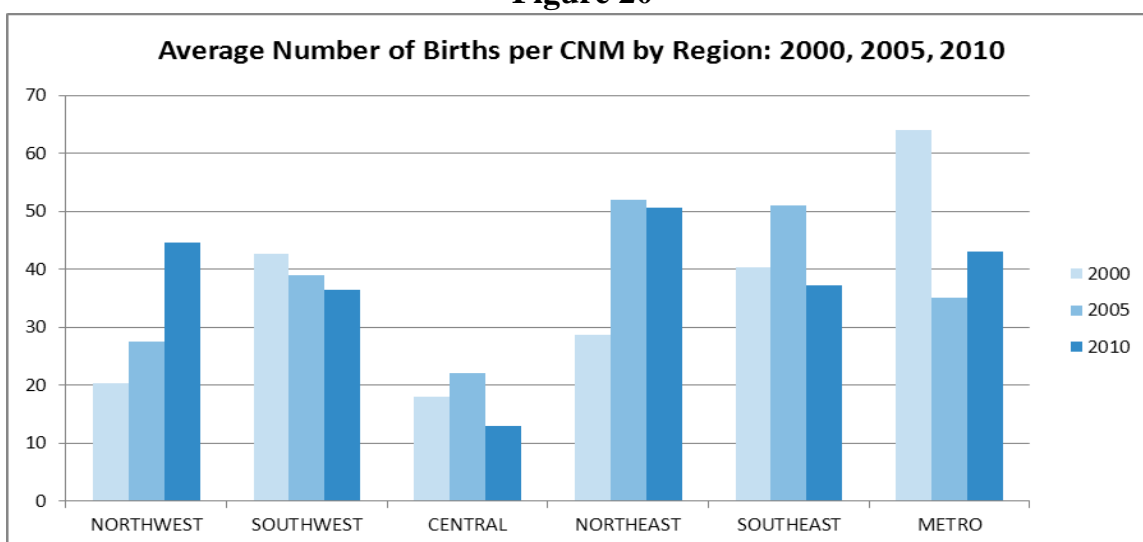


Source: Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health

Regions differed in the average number of births per CNM, with an increase in Northeast and Northwest regions, a sustained decrease in the Southwest, and fluctuations in the Central, Southeast and Metro regions, resulting in net decreases from 2000-2010 (Figure 20). This

inconsistency may result from differences in whether CNMs are listed as the primary attendant at birth.

Figure 20



Source: Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health

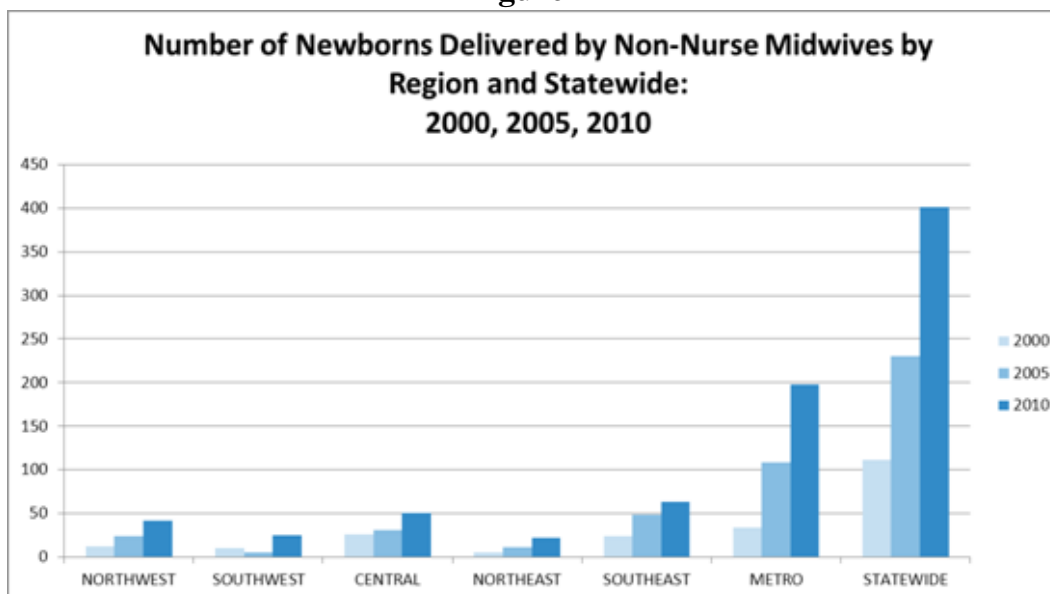
Workgroup discussions suggest that rural CNMs often travel between counties and regions to see patients. CNMs who delivered babies in two different regions were represented in each region in this report. Because CNMs work in collaboration with physicians, it is possible that they are underrepresented in birth certificate data.

Recommendation L: Address ongoing challenges related to workforce shortages in rural obstetrics. Affordable training programs could increase the potential for more obstetric providers and add a wider range of birth options for rural women. State-level health care workforce planning should include periodic assessments of all primary obstetric providers in rural Minnesota.

Non-Nurse Midwives

Apart from physicians and certified nurse-midwives, the most common provider listed as the “attendant at birth” on birth certificates was non-nurse midwives. These providers have a variety of titles including Midwife, Amish Midwife, Traditional Lay Midwife (TLM or LM), or Certified Professional Midwife (CPM). The majority of non-nurse midwives do deliveries in a home setting or freestanding birth center.

Non-nurse midwives represent a very small percentage of attendants at birth (<1 percent). The number of births they have attended in Minnesota has increased over the past 10 years, from 112 in 2000 to 401 in 2010 (Figure 21). The majority of these births occurred in the Metro region. However, increases in births to non-nurse midwives have increased in all regions of the state.

Figure 21

Source: Health Workforce Data Analysis Program, Office of Rural Health & Primary Care, Minnesota Department of Health

Doulas

Doulas provide a low-cost way for pregnant women to receive ongoing support and education. Prenatal doulas play a key role in supporting women over the course of their pregnancy. They are educators and connectors to health care and human services. Many doulas encourage needed conversations between women and their health care providers.

Birth doulas are present during the labor and delivery process. They are not medical professionals and cannot diagnose, treat or monitor the progress of labor. Birth doulas provide emotional support, comforting techniques and ideas for helping labor progress. Doulas can offset the need for medical interventions and help women cope with difficult transitions during the birth process.

Currently there is no licensure or certification requirement to work as a doula in Minnesota. Anyone may be hired as a private doula. The largest certifying body is Doulas of North America (DONA). Most agencies that hire doulas require a minimum of completion of a registered DONA-sanctioned training, or certification from another recognized institution. Doula trainings typically provide a broad body of information on supporting a laboring mother through the birth process.⁴⁸ This includes:

- What to do in a prenatal visit.
- The hormones of pregnancy, labor and birth.
- The importance of emotional support for birth.
- Physical support techniques for labor and birth.
- Communication skills, values and cultural sensitivity.
- Helping women prepare for medical interventions, cesareans and vaginal birth after cesarean section (VBAC).

⁴⁸ www.dona.org/develop/birth_cert.php. Accessed 2/27/13.

- Breastfeeding support.

Some Minnesota hospitals have their own doula programs, including Woodwinds Health Campus, Unity Hospital and Hennepin County Medical Center. It is not known how many doulas work in health care settings in rural Minnesota. The Rural Health Advisory Committee believes provider education about the role of doulas may facilitate doula access to hospital settings.

A recent study compared childbirth-related outcomes for Medicaid recipients who received prenatal education and childbirth support from trained doulas with outcomes from similar women who did not receive doula support. The cesarean rate was lower among doula-support births (22.3 percent versus 31.5 percent) as were pre-term birth rates (6.1 percent versus 7.3 percent). These outcomes suggest significant cost savings are possible through the use of doulas. The use of doulas may also lead to improvements in birth outcomes and may be an effective way to reduce racial/ethnic childbirth-related disparities.

Recommendation M: Educate rural providers and hospital staff about the role of doulas.

Interviews with medical students suggest they have not been exposed to work with doulas and may not understand their unique role during pregnancy and the birthing process. Doulas working with racial or ethnic minority populations can educate rural hospital providers and staff about culturally based beliefs regarding birth and related considerations for hospital settings.

5. Rural Hospital Issues

Rural Minnesotans depend on their community hospital to provide services that meet their medical needs. At a minimum, they provide emergency and primary care, and most have some surgical, procedural and specialty care services. Rural hospitals need the necessary infrastructure to deliver safe and high quality obstetric services.

Childbirth is the most frequent reason for hospitalization in the United States, and related charges exceed those for any other category of hospital expense for both public and private payers.⁴⁹ Rural hospital administrators must make tough choices to maintain or discontinue their obstetric programs in a low-volume environment. They must consider the needs of the local community while taking a realistic assessment of their hospital's workforce, infrastructure and financial situation.

Critical Access Hospitals (CAHs) serve most rural areas of Minnesota. CAHs are rural hospitals licensed for 25 or fewer inpatient beds. The designation was created to preserve access to primary and emergency care in rural communities. Minnesota has 79 CAHs and many provide some level of obstetric care for their communities. Most CAHs are located in small or isolated rural areas under the RUCA classification system (see Appendix F.)

Trends in Hospital-based Obstetric Services

Trends affecting local access to obstetric care in rural Minnesota are similar to trends observed across the rural U.S. There is a general decline in the number of family medicine physicians including obstetrics in their practice and a general decline in the number of rural hospitals offering obstetrical services. This is due to several factors including aging populations in rural communities, obstetric workforce shortages, and costs to implement technology or update facilities to maintain obstetric services.

Of 101 rural hospitals surveyed in Minnesota in 2008, 76 percent offered obstetrical services (defined as the elective birth of a child with intra-partum care). Fewer hospitals in small and isolated rural areas offered obstetric services. Of the 79 hospitals in towns under 10,000 people, 71 percent offered obstetrical services. Roughly 92 percent of rural hospitals with obstetric services had family medicine physicians providing the services.

Of the 101 rural hospitals with obstetric programs, 96 percent performed cesarean sections.⁵⁰ Obstetric surgeries account for 23.6 percent of all surgeries at Minnesota CAHs in 2011 (Table 6).

⁴⁹ Sakala C, Corry MP, Fund MM. *Evidence-Based Maternity Care: What It Is and What It Can Achieve*. New York, NY: Milbank Memorial Fund; 2008.

⁵⁰ Wagner L. Trends in Obstetrical Care in Rural Minnesota, Minnesota Academy of Family Physicians' David Mercy Externship, 2008.

Table 6: Types of Surgeries in Minnesota Critical Access Hospitals (2011)⁵¹

Type of Surgery	Urban	Large Rural	Small Rural	Isolated Rural	Total
General Surgery	23.3%	22.7%	37.9%	38.6%	34.6%
Orthopedics	27.1%	39.1%	29.7%	27.6%	30.6%
Obstetrics	38.5%	28.5%	21.6%	20.1%	23.6%
Gynecology	9.1%	6.5%	6.5%	7.5%	6.8%
Oncology	0.4%	0.6%	1.3%	1.9%	1.2%
Cardiac & Vascular	0.2%	0.9%	1.1%	2.1%	1.1%
Urology	0.4%	0.2%	1.2%	0.9%	0.9%
General Medicine	0.6%	0.5%	0.5%	0.4%	0.5%
Ear, Nose & Throat	0.0%	1.0%	0.3%	0.4%	0.4%
Neurology	0.4%	0.2%	0.0%	0.6%	0.2%
Total Surgery Discharges*	100.0%	100.0%	100.0%	100.0%	100.0%

*Totals may not add up to 100% due to rounding.

The overall U.S. rate of cesarean section is 33 percent. Cesarean section rates vary between 0-58 percent for Minnesota's hospitals.⁵² Cesarean section rates vary between 19-41 percent for Minnesota counties, with an overall state rate of 27 percent in 2009. (See Appendix F: Minnesota Map 3.)

Challenges for Hospitals

Many factors contribute to the discontinuation of obstetrical services in rural hospitals. Many rural areas have large elderly populations and small percentages of women in their childbearing years. There may be too few deliveries in the rural hospital to maintain a viable obstetrics practice. Obstetric provider caseloads vary, with physicians in small or isolated rural settings performing fewer deliveries per year than physicians in large rural or urban settings.

Another factor contributing to the discontinuation of obstetrical services in rural hospitals is a lack of female providers. As more women entered the field of medicine and specialized in women's health, obstetric patients were given more options to choose a male or female provider. Selecting a health care provider to deliver a baby is a very personal decision. When pregnant women are given a choice regarding the gender preference of their obstetric provider, the majority of women prefer female providers.

Inadequate staff training is another challenge. It is difficult for family medicine physicians who do few deliveries per year to maintain their skill sets and confidence in their abilities. Initial training and experience in obstetrics is important, but opportunities to maintain competencies are also needed. It is also difficult for rural nurses to maintain their competence in obstetrics. Nurses in small or isolated rural hospital settings may need to travel to larger hospitals for obstetric training opportunities. This is especially important for new rural nurses who plan to assist in deliveries.

⁵¹ 2011 Minnesota Hospital Discharge Dataset, Minnesota Department of Health.

⁵² Minnesota Hospital Price Check website: www.mnhospitalpricecheck.org/, accessed 5/6/13

A lack of a general surgeon or anesthesia services is yet another issue. Recruitment of anesthesiologists, certified registered nurse anesthetists and general surgeons is difficult and costly for small rural facilities. The need for cesarean delivery can arise suddenly during the course of labor. The availability of local surgical interventions is imperative in these situations. The majority of rural hospital administrators are not comfortable providing obstetric services without surgical backup.

Insufficient infrastructure or technology is also a major challenge. Most rural hospitals in Minnesota were originally built in the 1950s and 1960s. Renovation or new construction is required to keep obstetric wards up-to-date. Patient expectations may include private birthing rooms, a birthing tub, space for visitors and a secure obstetric ward. Hospitals that perform cesarean deliveries need adequate surgical suites. Technology is needed to monitor patients, exchange digital imaging, and consult with specialists.

Quality and Safety Considerations for Rural Hospitals

A lack of access to obstetric services can affect the safety and quality of care. It delays diagnosis or medical interventions for mothers and developing fetuses. Inadequate obstetric care is associated with increased infant mortality, low birth weight, and poor maternal and child health outcomes.⁵³ Mothers lacking access to local obstetric services are more likely to delay or skip prenatal visits. A lack of access to obstetric care impacts patient safety and health outcomes, and may result in otherwise preventable death.

Quality

The Minnesota Department of Health currently collects four quality measures related to obstetric care:

- Primary cesarean section rate.⁵⁴
- Obstetric trauma/vaginal delivery with instrument.⁵⁵
- Obstetric trauma/vaginal delivery without instrument.⁵⁶
- Late Sepsis or meningitis in very low birth weight neonates.⁵⁷

All hospitals report data on these measures as required by Minnesota's Statewide Quality Reporting and Measurement System, including small rural hospitals with relatively few numbers of obstetric patients. As with other quality measures, reporting for hospitals with small case numbers presents statistical challenges. The Rural Obstetrics Workgroup members noted these challenges, but did not examine this issue in depth.

Obstetric measures are currently not a part of the Minnesota Bridges to Excellence quality incentive payment system. This system rewards clinics for optimal outcomes on diabetes care, vascular care, and depression. Participating purchasers in this initiative have identified maternity care as an area they would like to address.⁵⁸

⁵³ Rural Policy Implications for Maternal, Infant and Early Childhood Home Visitation Program, National Advisory Committee on Rural Health and Human Services, 2011.

⁵⁴ Minnesota Community Measurement clinic measure

⁵⁵ Agency for Healthcare Research and Quality (AHRQ) hospital measure

⁵⁶ Agency for Healthcare Research and Quality (AHRQ) hospital measure

⁵⁷ Vermont Oxford Network hospital measure

⁵⁸ <http://mnhealthactiongroup.org/taking-action/innovation/clinic-quality/> Accessed 2/27/13

Safety

Emphasis on patient safety has steadily increased in recent years. Many rural hospitals in Minnesota have made commitments to establishing a culture of safety to reduce medical errors. The aim is for health professionals to follow safe practices and reduce the likelihood of system failures that cause adverse outcomes.⁵⁹

Rural obstetric providers use a set of safety protocols to ensure proper care for typical as well as high-risk obstetric patients. Other areas of focus in rural obstetric practices include: safe medication practices, reduction of surgical errors, improved communication between all members of the obstetric care team, improved communication with patients, partnerships with patients to improve safety, and making safety a priority through patient-focused care. Many of these drivers of safe care are incorporated into obstetric team training opportunities. (See Appendix D: Obstetric Team Training Programs.)

Rural hospital staff may benefit from an expanded awareness of the impact of local obstetric services on patient safety. Hospital administrators can make more informed decisions if they understand the significance of local obstetric care. Removing maternity care from a community creates significant psychosocial consequences that are not well understood, but that have physiological implications for women, babies and families.⁶⁰

A critical area of focus for obstetric patient safety is the transport of high-risk women in labor or critically ill newborns. Some common disorders in pregnancy, such as preeclampsia, require immediate transport to prevent maternal morbidity. Medical transport of high-risk pregnant women or critically ill newborns requires skilled personnel and specialized equipment. Most newborns that require transfer to a neonatal intensive care unit (NICU) are experiencing respiratory failure. These infants require stabilization, monitoring and transport via ambulance, helicopter or airplane. Transport programs should establish patient care guidelines that are reviewed on an annual basis by emergency obstetric care teams.

Workgroup members mentioned that a complicated scenario occurs in rural areas when it is necessary to transport a high-risk patient in labor, but weather or other factors do not allow EMS transfer. In these cases, a great deal of money and effort is spent on air transportation via planes or helicopters. The risks and benefits of money spent on air transport versus training rural obstetric providers to provide timely, local care for a rural community should be considered.

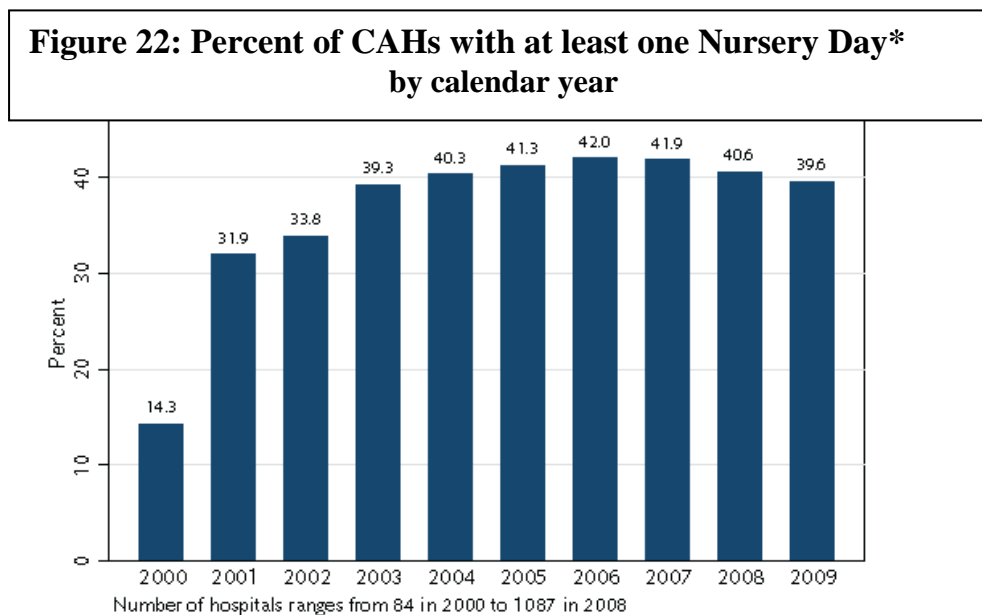
Recommendation N: Develop and promote a set of best practices for rural hospitals that encounter obstetric emergencies with limited obstetric staff or resources. Rural obstetric providers face difficult situations when women are unable to travel to their chosen birth location and experience complications prior to admission. A set of best practices helps providers offer quality care when faced with obstetric emergencies.

⁵⁹ Patient Safety in Obstetrics and Gynecology. ACOG Committee Opinion No. 447. 2009; 114: p. 1424-7.

⁶⁰ Kornelsen J and S. Grzybowski. Safety and Community: the Maternity Care Needs of Rural Parturient Women, J Obstet Gynaecol Canada (2005); 27 (6), 247-254.

Financial Considerations for Rural Hospitals

The percentage of Critical Access Hospitals (CAHs) providing obstetrical services in the U.S. remained steady at around 40 percent from 2003-2009 (Figure 22).⁶¹ However, a recent national survey found that obstetrical services are being discontinued by CAHs for financial reasons.⁶²



*The term “Nursery Day” refers to the care of newborns as patients following their birth.

Nationally, CAH administrators report that obstetric services have a negative impact on financial performance. Specifically, 50 percent of CAHs reported an increase in the number of obstetrical beds led to a bad financial result. Additionally, 77 percent of CAHs reporting a reduction in the number of obstetrical beds had a good financial result.⁶³ A recent national CAH report also found there are financial incentives to close obstetric units, mostly due to cost allocation and payer mix factors.⁶⁴

One Minnesota study found that, on average, offering obstetric services is correlated with higher profitability. However, the study acknowledged that for some rural communities, recruiting physicians willing to do obstetrics would cost more than the operating profits from these services.⁶⁵

⁶¹ Changes in Obstetrical Services Among Critical Access Hospitals, Flex Monitoring Team, University of North Carolina at Chapel Hill, 2012.

⁶² Holmes M., et al. Changes in obstetrical services among Critical Access Hospitals, North Carolina Rural Health Research and Policy Analysis Center, University of North Carolina, Policy Brief #18, March 2011.

⁶³ Holmes GM and Pink GH. Adoption and Perceived Effectiveness of Financial Improvement 2. Strategies in Critical Access Hospitals. *Journal of Rural Health*. Jan. 2012; 28 (1): p. 92-100.

⁶⁴ Changes in Obstetrical Services Among Critical Access Hospitals, Flex Monitoring Team, University of North Carolina at Chapel Hill, 2012.

⁶⁵ Stensland, J., Brasure, M., Moscovice, I., Radcliff, T. *The Financial Incentives for Rural Hospitals to Expand the Scope of Their Services*, June 2002.

Reimbursement

Reimbursement for obstetric services is dependent on the health insurance coverage of the mother at the time of her pregnancy. Pregnant women are more likely to have group or individual insurance, or to be uninsured one month prior to pregnancy when compared to the general population of women. Most pregnant women in Greater Minnesota have group insurance or public insurance at the time of their delivery (Table 7).

Table 7: Sources of Health Insurance Coverage in Greater Minnesota (2010)⁶⁶				
	Group	Individual	Public	Uninsured
Greater MN	50.7%	5.2%	33.3%	10.7%
Greater MN – women only	53.5%	4.6%	34.9%	7.0%
Greater MN – pregnant only*	47.9%	5.0%	45.7%	1.4%

* Insurance status during delivery, PRAMS weighted sample.

Rural hospitals with low numbers of deliveries and high numbers of publicly insured patients are most affected by poor reimbursement for Medicaid patients. The problem of low reimbursement rates is complex, reflecting pressures on state budgets, competition among provider types for improved coverage and payment, and general state philosophies regarding Medicaid.

For rural obstetric programs, the Medicaid payment system remains unfavorable for two reasons: higher numbers of women are covered by Medicaid in rural areas and Medicaid does not provide additional payments to low-volume hospitals. In 2010, almost half (45.7 percent) of rural women were covered by public insurance at the time of their delivery compared to a third (33.3 percent) of urban women.⁶⁷ The base rate for most inpatient hospital deliveries is \$3,528 with a slightly higher payment rate for cesarean section delivery with complications. The rate is far below the \$8,671-\$21,040 range of average charges for hospital births in Minnesota.⁶⁸

Workgroup members noted it is relatively easy to enroll eligible women in the state Medical Assistance program, especially if they are pregnant and/or a single mother. However, state legislators reduced Medicaid reimbursement for obstetric care in 2012, so some providers may be reluctant to work with this population.

Recommendation O: Support improvements to Medical Assistance reimbursement for rural obstetrics. Analyze the impact of low Medicaid payments on Critical Access Hospitals. The Minnesota Department of Health, along with stakeholder groups such as the Minnesota Hospital Association and Minnesota Medical Association, can advocate for improvements in reimbursement for obstetric programs in rural areas.

⁶⁶Health Economics Program and PRAMS data, Minnesota Department of Health.

⁶⁷ Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), 2009-2010.

⁶⁸ U.S. Agency for Healthcare Research and Quality, *HCUPnet, Healthcare Cost and Utilization Project*. Rockville, MD: AHRQ. <http://hcupnet.ahrq.gov/> American Association of Birth Centers. *Uniform Data Set*. Perkiomenville, PA: AABC, 2010.

Liability Coverage

The topic of liability in obstetrics was a looming national crisis in the 1970s and 80s. Some states such as Ohio continue to lose obstetric programs because of lawsuits and the liability structure. In states like Montana, Wyoming and Minnesota, the insurance climate is not prohibitive for rural hospitals (Table 8).

State	Internal Medicine	General Surgery	Obstetrics
Minnesota	\$4,906	\$14,717	\$22,484
Arizona	\$7,484	\$30,515	\$41,737
California	\$8,673	\$29,081	\$30,463
Colorado	\$13,518	\$58,108	\$60,407
Florida	\$24,478	\$97,911	\$97,911
Illinois (Chicago)	\$40,862	\$96,189	\$127,748
New York	\$24,862	\$90,242	\$128,268
North Carolina	\$8,964	\$35,740	\$41,672

Hospital-based providers typically have their liability insurance paid for by their practice location, while obstetric providers in independent practice must self-pay to be insured. There is substantial risk in the private practice world for physicians not associated with systems. Workgroup members suggested that independent physicians have a break-even point of 15-20 deliveries per year to cover liability insurance costs. A hospital-based obstetric practice takes care of this issue for physicians, as the hospital pays for the malpractice insurance, but it is a major consideration for independent obstetric providers.

Recommendation P: Protect Minnesota's low cost liability and malpractice insurance environment for obstetric providers. The Minnesota Medical Insurance Company (MMIC) is a physician-led effort to provide malpractice insurance and keep down the costs of coverage in Minnesota. Rural providers and hospitals can support MMIC in their efforts to keep insurance costs low to protect the viability of rural obstetric practices.

⁶⁹ Medical Liability Monitor, October 2011

6. Rural Obstetric Support Services

Care coordination for obstetric patients is an important issue. Collaboration between health care providers and local public health professionals is needed to provide preventive and support services before, during and after pregnancy. Telehealth provides an alternative to traditional models for adding obstetric care capacity and can provide access to specialty care for high-risk patients.

Obstetric Care Coordination and Collaboration

Rural hospitals have limited options for obstetric provider coverage during times of sickness, vacations and emergencies. Alternate staffing models are sometimes needed for rural obstetric practices. Shared care models are used by some rural hospitals to address workforce shortages. This allows multiple providers to share a pool of patients. If prenatal and birth risks are low, family medicine physicians may provide all the care and attend the birth. If there are concerns about the birth, obstetricians may attend the birth and perform a cesarean section if necessary. Provider communication with each other and the expectant mother is essential in a shared care model.

Obstetric care can be integrated at other levels. The Rural Health Advisory Committee believes collaborative practices can fill gaps in expertise and workforce that are common in rural areas. Midlevel and primary care practice can be integrated to maximize workforce capacities. If there are concerns with the health of the mother or infant, an obstetrician or specialist may be involved in ongoing care. It is beneficial when electronic health record (EHR) systems allow prenatal information to be shared with multiple obstetric providers and across health care settings.

There are several shared obstetric staffing models being used in Minnesota. Johnson Memorial in Dawson uses one physician and three midlevel providers to cover obstetric patients. Another OB/GYN consults on cases and does deliveries 40 miles away in Marshall, while a surgeon travels from Montevideo for cesarean section deliveries. At Riverwood Health Care Center in Aitkin, OB/GYN coverage is shared with nearby Crosby Hospital. There is a core group of obstetric nurses with one scheduled for every shift. Riverwood partners with a St. Cloud hospital to train their obstetric nurses. In Paynesville, a team of three physicians (two family practice and one OB/GYN) cover cesarean sections for several nearby towns including Melrose, Long Prairie and Sauk Center.

Recommendation Q: Support collaborative efforts to maintain local obstetric services and share successful models. Shared care team approaches that include providers sharing patients and call schedules could be considered. With flexible staffing models, rural communities can have viable obstetric programs. Some rural hospitals develop relationships with neighboring hospitals with the goals of sharing surgical teams and obstetric call coverage. Promising collaborative models should be supported and shared.

Care coordination for high-risk births is essential. In the United States, three to five percent of live births have major structural birth defects, the leading cause of infant mortality.⁷⁰ Rural women are more likely to have low birth weight infants and preterm births. They are more likely to experience neonatal and post-neonatal mortality. Mothers with early or mid-term complications are referred to neonatal intensive care unit (NICU) facilities before birth. Hospitals in small rural areas are Level 1 NICU facilities, meaning they have no NICU capacity. There are Level 2 NICU facilities in large rural areas for mildly ill infants. Level 3 NICU facilities with surgical capacities are found in metropolitan areas, as well as Duluth, St. Cloud and Rochester.

Obstetric Telehealth Services

Care coordination also involves work across health care settings and systems. Obstetrics is an exciting area for telehealth applications because pregnancy is a time-limited condition with many providers involved in the provision of care. Obstetric telehealth applications are being developed to incorporate information sharing (electronic health records), image sharing (ultrasounds), and remote fetal and maternal monitoring.

In Minnesota, some rural hospitals are set up with 24/7 telemedicine relays between their emergency room and remote locations. These include OB/GYNs or family medicine physicians' homes, or regional emergency departments, for consultation purposes. Obstetric providers can do remote fetal monitoring to cut down on in-hospital time for obstetric providers with on-call responsibilities. Health systems are discovering potential uses of telehealth for obstetrics, and rural models are in their infancy. Descriptions of two statewide rural obstetric telehealth systems are featured below.

Women's Telehealth (Atlanta, GA)

Women's Telehealth brings health care services to rural obstetric patients across the state of Georgia, where 39 of 160 counties lack obstetric services. Patients travel long distances for obstetric appointments, and transfers from rural hospitals to specialized care centers can take up to three hours.

Women's Telehealth supports clinics in three primary ways. First, the "store and forward" method involves clinics sending ultrasound images to a web-based repository that physicians can access and respond with a medical analysis based on the images. The second service is scheduled live consultation appointments where patients, nurses and doctors can communicate in real time with obstetric specialists. The third service line provides urgent and emergency consults through non-scheduled and on-call services.

The Georgia Partnership for Telehealth established an infrastructure for a statewide telehealth network and Women's Telehealth makes use of this network to interface with their spoke clinics and hospitals. The spokes pay a \$600 monthly subscription to tap into the statewide network. Women's Telehealth makes a series of clinic or hospital visits to orient the spokes to the system.

⁷⁰Centers for Disease Control and National Birth Defects Prevention Network (NBDPN). Preventing Birth Defects. Available at <http://www.nbdpn.org/current/2008pdf/PrevBDBroch.pdf>. Accessed 7/24/2012.

In addition to the monthly network fee, connected sites pay for telehealth equipment, which includes teleconferencing tools as well as ancillary devices such as EKGs, Littmann stethoscopes and ultrasound equipment. Rural obstetric practices benefit from the cost effectiveness of these telehealth services: the price of two to three deliveries in the NICU would equal the cost of implementing a telehealth system in a rural location.

Solutions to Obstetrics in Rural Counties (STORC) (Chattanooga, TN)

Rural Obstetrical Consultants (ROC), a high-risk obstetrics specialty clinic, initiated their Solutions to Obstetrics in Rural Counties (STORC) telehealth program in 2009. Previously, ROC would get referrals from rural health organizations, but patient no-show rates were high. The mountainous Tennessee landscape increased the time commitment and costs for patients to travel to a distant clinic.

With the help of a \$1.8 million grant from the BlueCross BlueShield of Tennessee Health Foundation, the STORC program established telemedicine sites in rural locations to allow obstetric patients to keep their appointments closer to home. The grant allowed STORC to provide telehealth equipment and cover the cost of clinical subscriptions to the statewide telehealth network. STORC has continued with funding from the Foundation to move across the state and establish more spokes.

STORC works by sending a sonographer and a caregiver with hands-on experience (usually a CNM or RN) to a rural clinic or hospital to capture images and consult with ROC via teleconferencing. The two-person team visits each of the 11 sites once a week and sees 12-15 patients per clinic session. The teleconferencing equipment at each clinic is also used to educate staff with course instruction provided by the department of OB/GYN at the University of Tennessee's College of Medicine.

STORC has reduced the costs of telehealth by using secure firewalls and internet lines to connect spokes to the hub instead of a T1 network line. Some of the clinics use desktop computers rather than mobile telehealth carts—a price differential of over \$13,000. By receiving specialty care in their hometowns, patients are delivering their babies locally, allowing hospitals to bill at the local site and reducing rates of expensive transport.

Recommendation R: Develop and pilot a rural obstetrics telehealth program in Minnesota.

Telehealth applications specifically tailored to rural obstetric practices are needed. These could support family medicine physicians, providers in small or remote facilities, and solo or home-based obstetric providers.

Summary and Recommendations

Rural obstetric programs are vital components of the rural health care system. Minnesotans depend on their community hospital to provide medical services that meet their medical needs. Obstetrics is among the core services needed to keep residents safe and healthy.

Recommendations

The continued provision of obstetric services in Minnesota is at risk. It is imperative that all residents of Minnesota have access to obstetric care during emergencies and within a reasonable time and distance for uncomplicated births. The following recommendations address steps toward achieving equal access to obstetric services throughout Minnesota.

Policy Recommendation

- A. Ensure the inclusion of obstetrics as a required service in health care delivery models such as Accountable Care Organizations.** It is important to minimize the differences in standards of care based on geography while recognizing that unique challenges exist for rural obstetric programs.

Patient Recommendations

- B. Address smoking in childbearing age women in rural areas with a special focus on women who are young, uninsured or publicly insured, and those most likely to have an unintended pregnancy.** Obstetric providers can improve screening rates for smoking during prenatal visits, and during preventive health visits for women who are not pregnant. Timely referrals to tobacco cessation programs can be made for the pregnant woman and her spouse/partner, where such programs exist. Rural communities without access to smoking cessation resources may need help through family physicians, school nurses and public health nurses. Provider education is needed to increase the understanding of how smoking affects pregnancy.
- C. Encourage collaboration between rural obstetric providers and public health nurses to maximize the use of local resources available to pregnant women and new parents.** It is important for clinics, hospitals and local public health to understand the resources of each agency so pregnant women and new parents can be referred and easily access a range of support services from prenatal care to breastfeeding support.
- D. Educate rural providers and hospital staff about ways to better serve American Indian women.** Rural obstetric programs can improve cultural competencies and internal processes to address birth-related disparities in American Indian communities. Statewide trainings in rural and urban underserved areas may be offered on traditional birth from an American Indian perspective. Standardized referral processes for pregnant women

between clinics, hospitals, IHS facilities, human services, tribal nurses and doulas are needed.

Education, Training and Residency Recommendations
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- E. Support a system for medical school admissions that considers rural provider perspectives and a prospective student's inclination towards a rural obstetrics practice.** Revisit the metrics used to choose and evaluate incoming medical students to ensure admissions processes do not lock out individuals with a propensity for rural family medicine and obstetrics.
- F. Provide more opportunities for rural family physicians to receive training in natural births and cesarean sections.** Expand initial training in obstetrics for family medicine medical students through rural elective courses, residency and fellowship programs. Offer ongoing cesarean section training to rural family physicians through refresher courses, intensive retraining opportunities or simulation technology.
- G. Analyze and address the impact of 2011 federal work hour restrictions on medical residents.** Residents are getting less experience overall, especially in obstetrical and surgical training areas. This policy restriction may have unintended consequences and should be studied at the state level.
- H. Support an appropriate number of new medical graduates to meet future rural obstetric care needs.** Minnesota is falling behind in the percentage of family physicians ready to practice in rural areas. A smaller percentage of these graduates are willing to include obstetrics in a rural practice. The consequences of these trends for Minnesota must be documented using data and workforce projections. It may be necessary to increase GME funding, change restrictions on residency slots, or directly fund rural resident slots at the state level to address these workforce challenges. A state program could designate post-graduate year one (PGY-1) slots in family medicine with obstetrics or OB/GYN dedicated to rural practice.
- I. Address regulatory barriers to practice at federal, state and hospital levels for certified nurse-midwives.** Many certified nurse-midwives are often unable to practice at the top of their education and training due to federal, state or hospital regulations. Hospital bylaws determine the extent of their privileges and sometimes require a supervisory relationship between physicians and certified nurse-midwives. Models demonstrating the best use of certified nurse-midwives in rural obstetric practices need to be promoted.
- J. Support rural obstetric teams' involvement in educational offerings that supplement their labor and delivery skills.** Continuing education issues are important for all labor and delivery staff. Courses focused on high-risk pregnancies and emergency obstetric care geared towards nurses, EMTs and emergency room physicians may be especially helpful. Minnesota Department of Health grant programs should give consideration to proposals to fund rural obstetric training and curriculum development.

Workforce Recommendations

- K. Support loan forgiveness programs for obstetric providers in small and isolated rural areas.** Recent changes to state loan forgiveness programs include the level of rurality of a future practice location as a selection factor. State legislation to increase the number of loan forgiveness opportunities for physician and midlevel providers would help small and isolated rural hospitals maintain their obstetric practices.
- L. Address ongoing challenges related to workforce shortages in rural obstetrics.** The number of certified nurse-midwives being trained in Minnesota has remained relatively flat for 15 years. Affordable training programs increase the potential for more women obstetric providers and add a wider range of birth options for rural women. State-level healthcare workforce planning should include periodic assessments of all primary obstetric providers in rural Minnesota.
- M. Educate rural providers and hospital staff about the role of doulas.** Medical students are not exposed to work with doulas and may not understand their unique role during pregnancy and the birthing process. Doulas representing racial or ethnic minority populations can educate rural providers and staff about culturally-based beliefs regarding birth and related considerations for hospital settings.

Hospital Recommendations

- N. Promote a set of best practices for rural hospitals that encounter obstetric emergencies with limited obstetric staff or resources.** Rural obstetric providers face difficult situations when women are unable to travel to their chosen birth location and experience complications prior to admission. A set of best practices helps providers offer the best care possible when faced with obstetric emergencies.
- O. Support improvements to Medical Assistance reimbursement for rural obstetrics.** Analyze the impact of low Medical Assistance payments on Critical Access Hospitals. The Minnesota Department of Health, along with hospital and provider stakeholders, can advocate for improvements in reimbursement for rural obstetric programs.
- P. Protect Minnesota's low-cost liability and malpractice insurance environment for obstetric providers.** In many parts of the U.S., obstetric providers are leaving their practices due to high malpractice and liability costs. Minnesota has a relatively low-cost liability and malpractice environment that should be maintained and protected. The Minnesota Medical Insurance Company (MMIC) is a physician-led effort to provide malpractice insurance and keep down the costs of coverage in Minnesota. Rural providers and hospitals can support MMIC in their efforts to keep insurance costs low to protect the viability of rural obstetric practices.

Collaboration Recommendations

- Q. Support collaborative efforts to maintain local obstetric services and share successful models.** Collaborative practices can fill gaps in expertise and workforce that are common in rural areas. Midlevel and physician practice can be integrated to maximize workforce capacities. Shared care team approaches that include providers sharing patients and call schedules could be considered. Neighboring hospitals may share surgical teams and obstetric call coverage.
- R. Develop and pilot a rural obstetrics telehealth program in Minnesota.** Telehealth applications specifically tailored to rural obstetric practices are needed. This technology could support family medicine physicians, providers in small or remote facilities, and solo or home-based obstetric providers.

Appendix A: Acknowledgements

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Appendix B: Healthy People 2020: Preconception Health and Behaviors Indicators in Greater Minnesota, 2009-2010⁷¹

Healthy People 2020 Preconception Indicators from Minnesota PRAMS, Greater Minnesota								
	Take multivitamins/folic acid prior to pregnancy		No smoking prior to pregnancy		No alcohol use prior to pregnancy		Healthy weight prior to pregnancy	
	Percent	95% CI	Percent	95% CI	Percent	95% CI	Percent	95% CI
Race								
White Non-Hispanic	34.2%	(31.1-37.5)	65.5%	(62.1-68.7)	25.3%	(22.4-28.4)	50.7%	(47.3-54.1)
Black Non-Hispanic [^]	30.7%	(14.6-53.4)	75.9%	(60.0-86.9)	66.8%	(49.0-80.8)	52.0%	(31.0-72.4)
American Indian Non-Hispanic	16.3% *	(11.4-22.8)	25.9% *	(19.9-32.9)	31.5%	(24.8-39.1)	37.0%*	(29.9-44.8)
Other Non-Hispanic #								
Hispanic*	21.9%	(12.3-36.1)	92.6%	(82.6-97.1)	55.8%	(41.0-69.6)	42.8%	(27.8-59.3)
Age Group (yrs)								
<20	12.1% *	(6.0-22.9)	44.6%*	(32.4-57.5)	52.8%	(40.0-65.2)	53.7%	(40.2-66.6)
20-34	33.1%	(29.9-36.4)	66.1%	(62.7-69.4)	25.4%	(22.4-28.6)	50.8%	(47.3-54.3)
>=35	46.1%	(37.1-55.5)	78.5%	(69.6-85.3)	37.3%	(28.8-46.7)	41.3%	(32.2-51.0)
Pregnancy Intention								
Intended	44.3%	(40.5-48.2)	74.9%	(71.3-78.2)	30.0%	(26.5-33.7)	49.0%	(45.1-53.0)
Unintended	14.0% *	(10.7-18.1)	50.9% *	(45.5-56.3)	25.5%	(21.1-30.6)	51.0%	(45.5-56.4)
Prepregnancy Insurance Status								
Private	43.0%	(39.2-46.9)	76.6%	(73.0-79.8)	23.3%	(20.1-26.7)	51.6%	(47.7-55.5)
Medicaid	20.8% *	(15.7-27.0)	45.0% *	(38.3-52.0)	40.8%	(34.2-47.8)	43.4%	(36.5-50.6)
None	8.8% *	(5.1-14.8)	51.5% *	(42.9-60.0)	33.1%	(25.5-41.8)	51.8%	(43.1-60.5)
Greater Minnesota (2009-2010)	33.1%	(30.3-36.1)	66.1%	(63.0-69.0)	28.5%	(25.7-31.5)	49.9%	(46.7-53.1)
Healthy People 2020 Target	33.1%		85.4%		56.4%		53.4%	

* Statistically below Overall Greater Minnesota (2009-2010)

[^] Represents < 60 respondents; data might not be reliable.

Represents < 30 respondents; data not reported.

Source: Minnesota Department of Health, Division of Community and Family Health, Maternal and Child Health.
This data was made possible by grant number IU01DP003117-01 from the Centers for Disease Control and Prevention.

⁷¹Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), 2009-2010.

Appendix C: Family Medicine Residencies with Obstetrics (Midwest states only)

* indicates an emphasis on rural health

- Illinois**
- * Dixon Rural Training Track in Family Medicine, Dixon
 - * SIU Family Medicine Center Residency, Carbondale
 - * SIU Quincy Family Medicine Residency, Quincy
- Indiana**
- * Union Hospital Family Medicine Residency, Terre Haute
- Iowa**
- * Mercy Family Medicine Residency, Mason City
 - * University of Iowa Pella Rural Track, Iowa City
- Kansas**
- * Kansas University Rural Family Med Residency, Junction City
 - * Salina Health Education Foundation, Salina
- Michigan**
- * Marquette Family Medicine Residency Program, Marquette
 - Midland Family Practice Residency Program, Midland
 - * Munson Medical Center Family Practice Residency, Traverse City
 - * Univ. of Michigan Family Medicine Residency Program, Ann Arbor
- Minnesota**
- * United Family Medicine Residency, St. Paul
 - * Univ. of Minnesota Duluth Family Medicine Residency, Duluth
 - * Univ. of Minnesota Mankato Family Medicine Residency, Mankato
 - * Univ. of Minnesota St. Cloud Family Medicine Residency, St. Cloud
- Nebraska**
- * University of Nebraska Rural Program, Omaha
- North Dakota**
- * Center for Family Medicine, Minot
- Ohio**
- University of Cincinnati Family Practice Residency, Wilmington
- South Dakota**
- * Rapid City Regional Hospital Family Practice Residency, Rapid City
 - Sioux Falls Family Medicine Residency, Sioux Falls
- Wisconsin**
- * Eau Claire Family Practice Residency Program, Eau Claire
 - La Crosse - Mayo Family Medicine Residency, La Crosse
 - Mercy Health System Family Medicine Residency Program, Janesville
 - * Univ. of Wisconsin Baraboo Rural Family Practice Program, Baraboo
 - * Univ. of Wisconsin Fox Valley Family Medicine Residency, Appleton
 - * Wausau Family Medicine Residency, Wausau

Appendix D: Obstetric Team Training Programs

PROMPT: PRactical Obstetric MultiProfessional Training

www.prompt-course.org

PROMPT is a curriculum that develops the teamwork of obstetric teams for obstetric emergencies. Using a “train the trainer” approach, the PROMPT workshop instructs course participants on teamwork and communication strategies. Participants return to their obstetric teams at their clinic or hospital and implement the program in situ. The curriculum includes course manuals, trainers’ manuals, and a CD Rom which consists of lectures and simulation workshop scenarios. Outcomes of the workshop include substantial improvement in teamwork operation as well as perinatal health and wellbeing.

MOES: Mobile Obstetric Emergencies Simulator

www.health.mil/dodpatientsafety/News/Media_Room.aspx?MediaID=4c8d4bfd-031d-4709-8c49-0712768af6af

Birthing simulators allow rural obstetric teams to prepare for high-risk, low-volume obstetric emergencies. The simulators include maternal and newborn interactive models displaying vital signs such as heart beat, blood pressure and blood oxygen levels. The simulators come with training course manuals, team member handbooks, videos and emergency scenarios. Some of the situations that simulators can prepare teams to encounter include shoulder dystocia, postpartum hemorrhage, eclampsia, breech and operative vaginal delivery and neonatal resuscitation, to name a few. Teamwork skills are also heightened through simulation exercises.

TeamSTEPPS: Team Strategies and Tools to Enhance Performance and Patient Safety

www.health.mil/dodpatientsafety/ProductsandServices/TeamSTEPPS.aspx?wt=TeamSTEPPS

Developed by the Department of Defense, TeamSTEPPS works to create highly reliable teams in emergency situations through teamwork skills. Their “train the trainer” approach engages participants in a two-and-a-half-day long course. Participants then return to their hospital or clinic and implement the program. The training sites are based out of six regional centers, one of which is at the University of Minnesota Fairview Medical Center. Included in their comprehensive curriculum is a multimedia workshop kit with courses and modules.

Mayo Multidisciplinary Simulation Center: Instructor Development

www.mayo.edu/multidisciplinary-simulation-center/transformative-education/minnesota/instructor-development

This course, offered by the Mayo Clinic, produces individuals who are trained in simulation education. In a three-day course, offered biannually in April and October, participants are instructed in teamwork development techniques, and return to their home clinic or hospital equipped with training exercises, simulation course designs and concepts, debriefing strategies, and other hands-on methods of skill development.

Appendix E: Aspiring Obstetric Provider Roundtable Discussion*

1. When did you first decide you were interested in obstetrics?

The majority of students had an experience with an obstetrics practice. Some of these experiences occurred in their hometown while they were in high school. Others had clinical exposure prior to medical school. Several students commented that seeing their first baby being born was a significant life-changing event.

Several students view obstetrics as a part of family medicine. Their primary interest is in the broad practice of family medicine, and obstetrics is one component of that practice. Other students mentioned a strong interest in women's health. Their interest in obstetrics grew out of interest in women's health in general.

2. What are unique characteristics of medical students who wish to do family medicine with obstetrics or specialize in obstetrics/gynecology?

Female medical students are more likely to pursue obstetrics. This is related to the shift in female patients preferring female obstetric providers. Male medical students have a difficult time getting experience in the delivery room.

Students who are interested in a rural obstetrics practice are willing to commit to the demands of an obstetrics practice. Those who want a more intense practice that includes advanced surgical training will choose an OB/GYN specialization. Family medicine with obstetrics is a draw for those who want to practice in a broad field.

3. Do medical students who do not want to do obstetrics have biases or preconceived notions about the profession? What are the biases?

Participants believed that other medical students' biggest bias against obstetrics is the time commitment. They have heard established obstetrics providers openly state their regrets about lost family time and difficult schedules. The nature of the profession is unpredictable. Other medical students have biases based on liability or malpractice concerns. Physicians in other specialties assume malpractice is a greater concern for obstetric providers. Some medical students view obstetrics as a monotonous practice.

4. How would you feel about practicing obstetrics in more than one rural community?

Most students stated their preference for practicing in one rural location. They feel medical practice is full of time restraints and believe travel negatively affects productivity. Others believe a single practice location enables providers to follow families more closely.

Some students would consider practicing in multiple rural locations. This would depend on the size of the community and its region in the state. Those pursuing OB/GYN were more likely to consider it an obligation to be on call in more than one rural community.

Students stated that regulations make it difficult to practice in more than one rural location. Obtaining surgical privileges in more than one hospital may be difficult to navigate. The process of building a reputation in multiple communities would be challenging.

5. What is your perception of the role of certified nurse-midwives in the provision of obstetric services? Is the role of certified nurse-midwives talked about in medical school? Do you have expectations for how you would interact or work together?

Students felt that certified nurse-midwives work well in hospital settings with physician backup for emergencies or cesarean sections. Those who had contact with midwives in a clinical setting had a better understanding of their role and scope of practice.

Students were nervous about certified nurse-midwives doing out-of-hospital births in distant rural locations without back up. This had less to do with the midwife's credentials and more to do with the distance to reach a hospital in case of emergencies. They stated the importance of having a general surgeon on call and family medicine physicians available if the midwife needs support during delivery.

Several medical students felt that certified nurse-midwives offer a level of care that is preferable to some women. They have experienced patients choosing to travel to smaller rural hospitals to access care from a midwife. Students noted that patients who want a more intimate birth experience may be inclined to choose a midwife.

6. What is your perception of the role of traditional midwives or doulas in the provision of rural obstetric services?

Students had limited knowledge about doulas. They perceived doulas as similar to birth coaches and sometimes nurses take on this role. They wanted to know more about training, roles and scope of practice for doulas.

Students were concerned about a lack of licensure or credentials. They stated that oversight and safety regulations are important for an obstetrics practice. Most students stated that doulas work well in home or hospital settings as long as there is midwife or physician backup.

Some medical students felt that doulas and midwives present an exciting opportunity for inter-professional work. They plan to build relationships with these care providers in the location of their future obstetrics practice.

7. What are your expectations for call duty as a rural obstetric provider? Will your expectations be different if you are in mid-sized rural community versus a small or isolated rural community?

Student expectations for call duty depend on the number of obstetric providers in their practice. Choosing a bigger town means there are likely more obstetric providers. Expectations for call duty also depend on the willingness of other providers to do cesarean sections.

Student expectations for call duty will be less in a mid-sized town versus a small town and is one of the main reasons for considering the size of a rural practice community. Expectation for call is dependent on the number of obstetric patients taken on by a provider. They anticipate doing deliveries for a limited number of patients. They have witnessed doctors who do not set these limits and are worn down by a rigorous practice.

Student expectations for call will be a balancing act that may change over time. They plan to serve patients to the best of their abilities and strike a work-life balance to maintain personal sanity. They anticipate a heavy caseload early in their career and cutting back their caseload or giving up call duties over time. They see this flexibility as an attractive part of family medicine with obstetrics.

8. What is your reaction to a shared care team model where a team takes on the same patients and shares the call schedule?

Students felt a shared care team model has both benefits and downsides. They see it working well in terms of delivery coverage with family physicians doing less complicated births and OB/GYNs doing more complicated births. They see it working well for call coverage when a provider is sick or on vacation.

Students were concerned that obstetric patients may be confused by a shared care team model. Patients have the potential to see a different physician every time they need care. They stated the downside of this model for providers is not having the satisfaction of providing continuous care to the patients. They stated the relationship between patient and provider is central to the provision of quality care over the course of pregnancy.

9. Do you pay attention to malpractice lawsuits in the area of obstetrics?

The majority of medical students felt it is not helpful to focus on malpractice issues. Doing so creates fear over things they cannot control. They plan to focus on providing the best care to their patients. They understand the need for a system to handle unfortunate outcomes and noted the importance of taking responsibility if errors do occur.

10. Consider what your career would look like if you began in a rural community doing 40-50 births per year, but over time your practice was

reduced to 15-20 births per year. At that point, would you be worried about your training and ability to keep up your skills?

Students stated that obstetric providers in low-volume environments need to assess their practice environment as it changes over time. They mentioned the need for criteria to determine which patients should be transferred to higher levels of care. They stated that it is entirely dependent on training and experience and a provider's comfort level with doing a low number of births or surgeries per year.

11. Are family medicine doctors trained in cesarean sections? To what level are they trained throughout medical school, residency and fellowship programs?

Students have identified residency programs that offer cesarean section training to family medicine physicians, but the process of identifying these residency programs is confusing. There is no consistency and it is a huge frustration to determine what is offered. Some offer no cesarean section training and state a fellowship is needed to become competent. Others offer comprehensive training and participation in up to 70 cesarean sections.

Some medical students felt that a fellowship is needed to be adequately trained as a family medicine physician doing cesarean sections. Several students plan to extend their training an additional six months to a year to complete an obstetrics fellowship. All students were planning to participate in training to provide cesarean sections.

12. Health reform is moving towards measuring outcomes for quality care and reporting outcomes to ensure transparency. What is your perspective on it as a future obstetrics provider in a lower volume setting?

Some students felt that lower volume environments are at a disadvantage when it comes to quality reporting. Rural areas have higher numbers of older and disabled patients, and underserved or uninsured populations. They felt quality reporting is tenuous because patient choice is a large determinant of health outcomes.

Respondents felt that quality reporting can be arbitrary and has little to do with actual quality of patient care. They voiced concerns about how patients use physician ratings information. They noted that physician ratings accessible via internet can be misleading and very damaging to a physician in a rural community. They stated that some incidences of negative physician ratings had little to do with a physician's ability to care for people.

13. How important is it for rural hospitals to maintain an obstetrics program? What does this mean in terms of healthy outcomes for women and their infants?

The medical students stated that local obstetric programs are important for access to care. They believe local care leads to more consistent prenatal care and travel is a deterrent to

consistent prenatal care. They felt strongly that obstetric care should be easily accessible by every woman in Minnesota. At a minimum, rural communities need physicians that are comfortable seeing pregnant patients so ongoing care can be provided locally.

Students stated that local obstetric programs are important for rural economies. Health care is a business and an important economic driver for small towns. They mentioned the importance of young women making health care decisions for their families. It is a quality of life issue to provide local health care services to families.

14. How do family medicine physicians help patients access obstetric care in other locations? How does care coordination take place when there are multiple obstetric providers?

Students thought communication was key to care coordination for obstetric patients. Physicians need to have honest conversations with patients about the services they provide and their expertise, as well as their limitations. Students believe patients have a responsibility to understand the role of their primary care physician and other providers throughout their pregnancy.

Students viewed care coordination as a major consideration for high-risk obstetric patients. Local obstetric providers need to understand the level of neonatal care that will be needed and make referrals to an appropriate facility. Physicians need to be comfortable communicating with other providers.

The medical students felt the current use of electronic health records is limited, so other forms of communication are still needed. They noted that electronic health records work well within health care systems, but are not user friendly between systems. They anticipate limitations to electronic medical records until there is a universal method for sharing them.

15. What are important cultural competency considerations for a rural obstetrics practice?

Students stated that cultural competency is about communication, keeping an open mind, and making an effort to learn. Trainings they have received on cultural competency emphasize the need to keep an open mind and to ask for help. It is a physician's responsibility to learn about the special populations in their community of practice. Conversations with patients help providers understand what is significant to them concerning prenatal care, labor and delivery. Physicians can work with patients on their individual birth plan preferences.

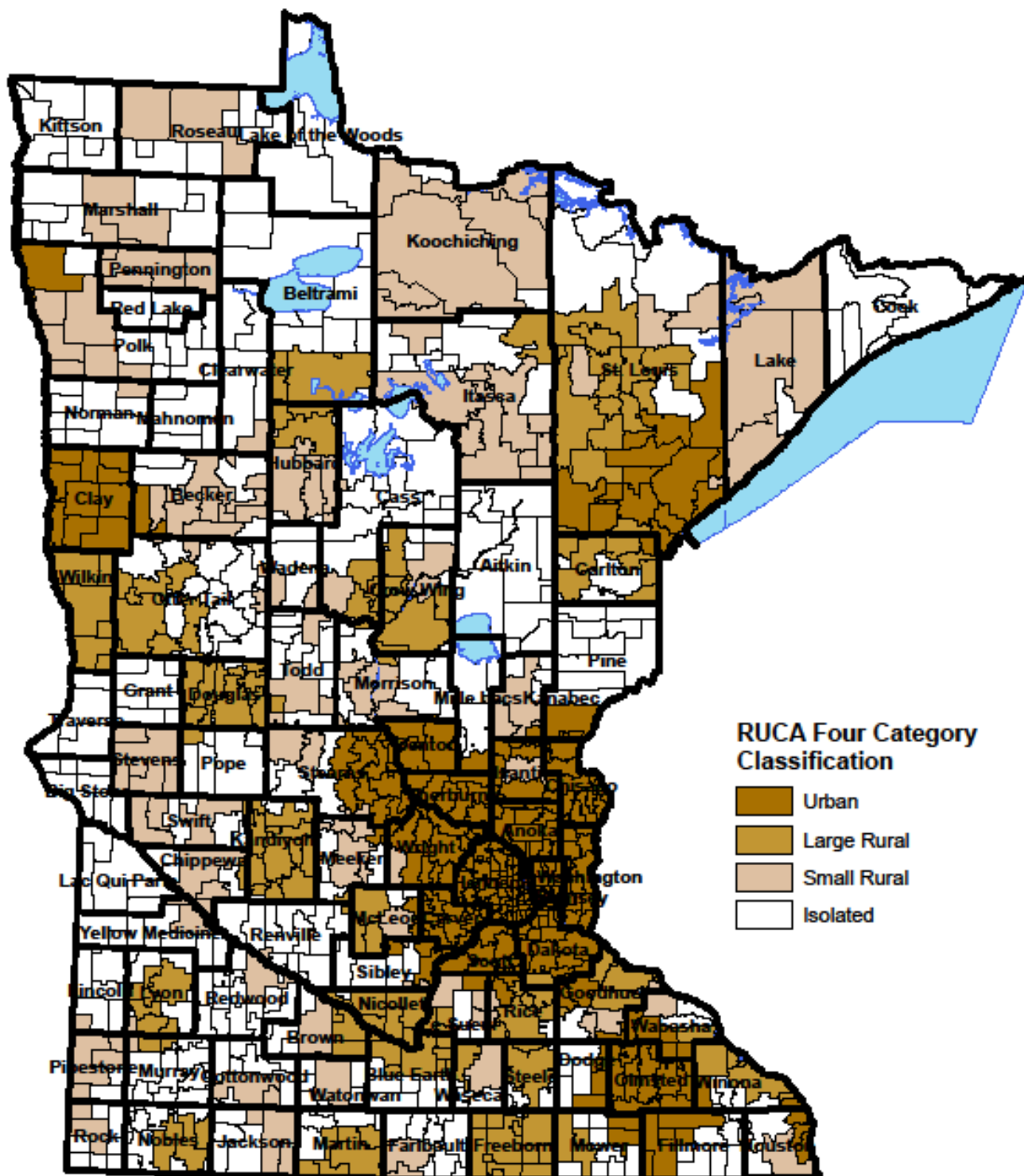
*A complete transcript of this discussion is available upon request from kristen.tharaldson@state.mn.us.

Appendix F: Minnesota Maps

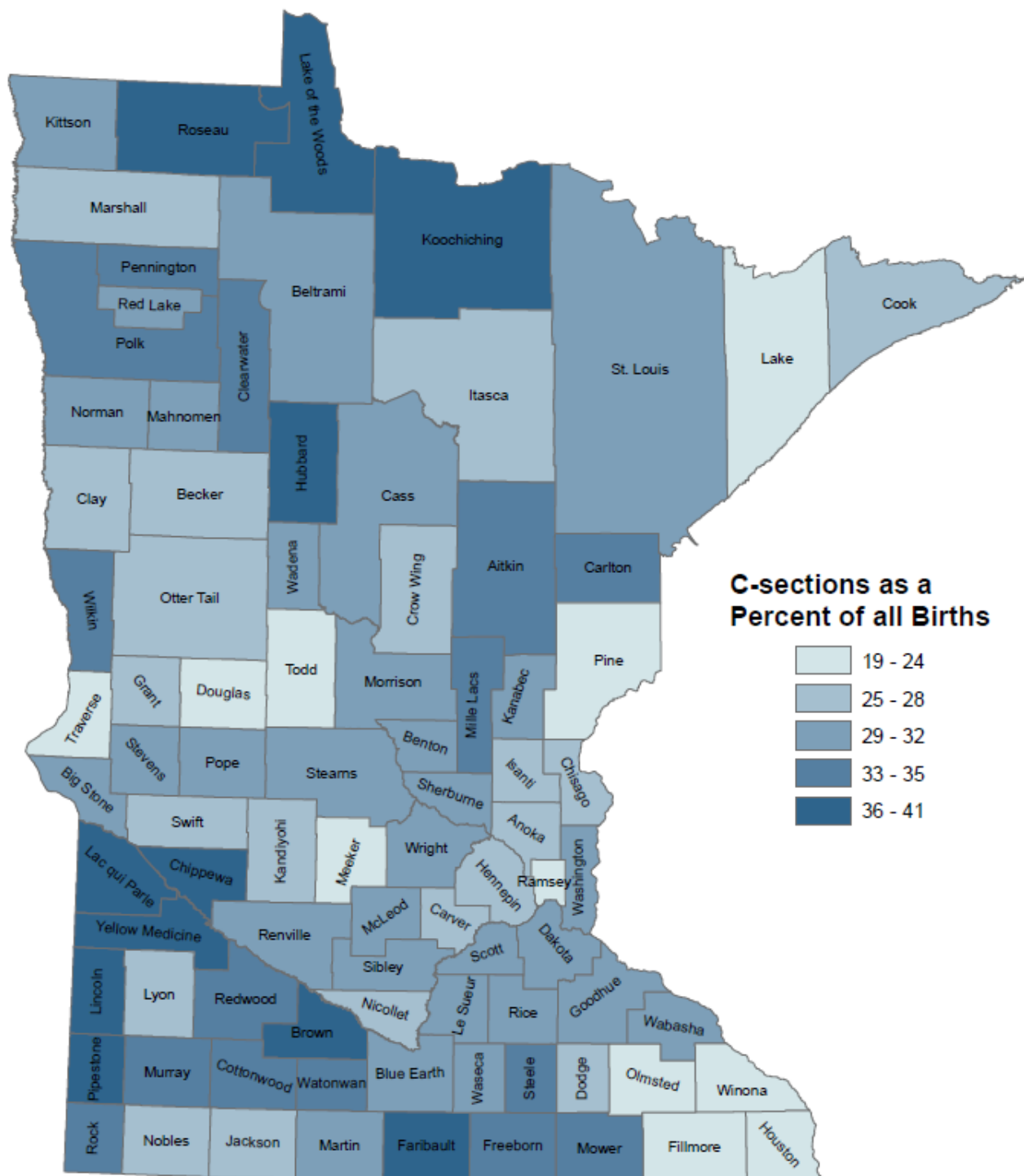
Map 1: Critical Access Hospitals in Minnesota, 2013



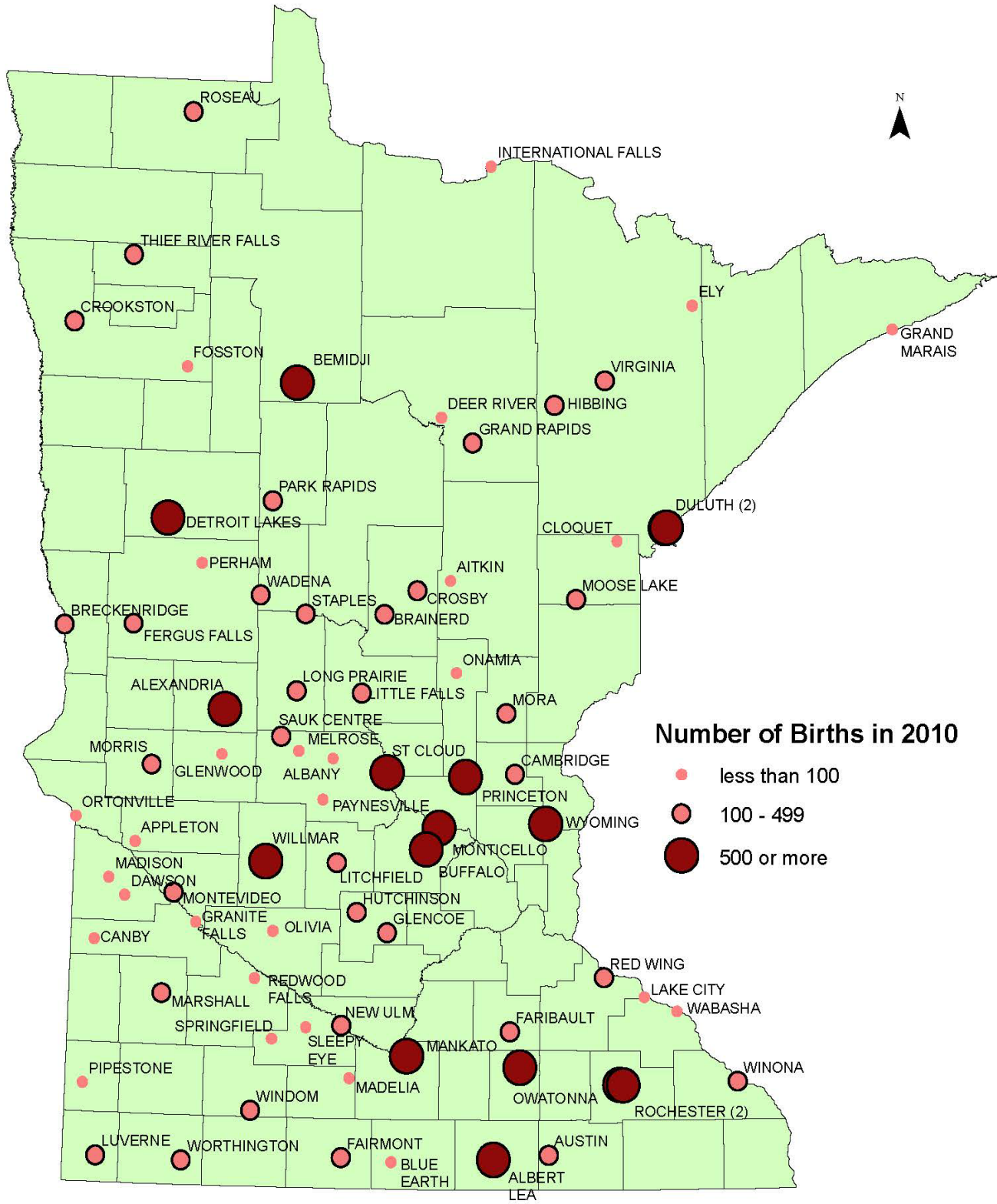
Map 2: Rural-Urban Commuting Areas (RUCAs) in Minnesota, 2013



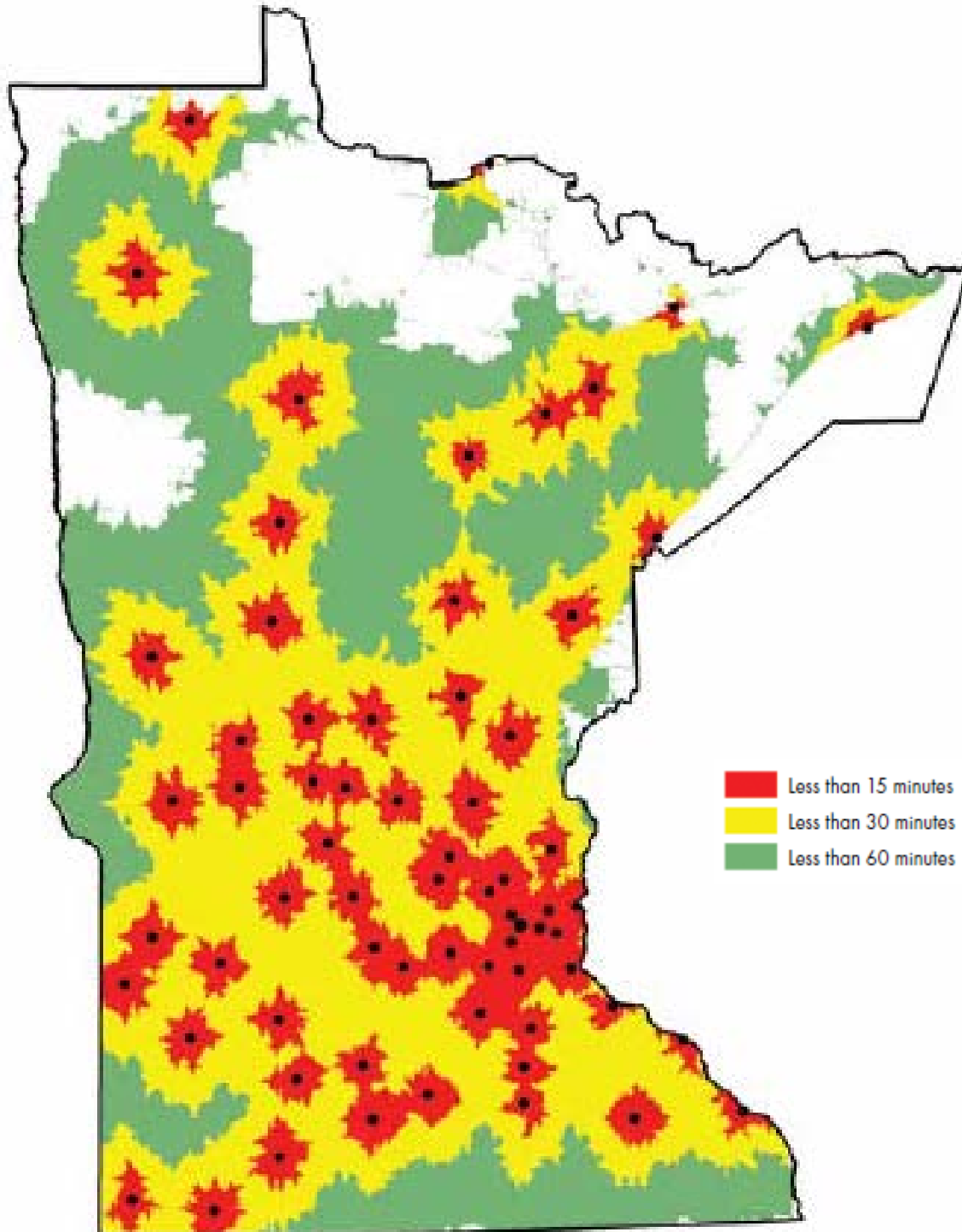
Map 3: Cesarean Section Percentage by County of Residence, 2009



Map 4: Rural Hospitals Performing Births, 2010



Map 6: Driving times to hospitals with maternity centers in Minnesota, 2010



Sources: American Congress of Obstetricians and Gynecologists, 2010.
U.S. hospitals reporting an obstetrics unit or obstetrics level, FY 2010.
American Hospital Association, 2011.

Appendix G: DEED Planning Regions

The Minnesota Department of Employment and Economic Development (DEED) Planning Areas are referred to as regions for the purposes of this report. DEED and other state agencies use these planning areas in regional reporting of economic information. These regions are made up of counties, and are defined as follows:

- **Northwest Region**
 - Becker, Beltrami, Cass, Clay, Clearwater, Crow Wing, Douglas, Grant, Hubbard, Kittson, Lake of the Woods, Mahnommen, Marshall, Morrison, Norman, Otter Tail, Pennington, Polk, Pope, Red Lake, Roseau, Stevens, Todd, Traverse, Wadena, Wilkin.
- **Northeast Region**
 - Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, St. Louis.
- **Central Region**
 - Benton, Chisago, Isanti, Kanabec, Kandiyohi, McLeod, Meeker, Mille Lacs, Pine, Renville, Sherburne, Stearns, Wright.
- **Seven-County Metropolitan Region (Metro)**
 - Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, Washington.
- **Southwest Region**
 - Big Stone, Blue Earth, Brown, Chippewa, Cottonwood, Faribault, Jackson, Lac qui Parle, Le Sueur, Lincoln, Lyon, Martin, Murray, Nicollet, Nobles, Pipestone, Redwood, Rock, Sibley, Swift, Waseca, Watonwan, Yellow Medicine.
- **Southeast Region**
 - Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, Winona.



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