



Request for Information Regarding Maternal and Infant Health Care in Rural Communities

Agency/Office: Department of Health and Human Services (HHS)
Centers for Medicare & Medicaid Services (CMS)
Office of Minority Health (OMH)

Type of Notice: Request for Information (RFI)

SUMMARY: This notice is a Request for Information to seek public comments regarding opportunities to improve health care access, quality, and outcomes for women and infants in rural communities before, during, and after pregnancy. This includes the reduction of health disparities across this time frame between rural and urban communities, within rural communities, and racial and ethnic disparities within rural communities. This notice also includes a request for information to seek public comments regarding readiness of rural providers, including emergency medical services (EMS), to handle obstetric emergencies (i.e., emergencies related to pregnancy, birth, and after birth) in rural areas.

DATES: *Comment Date:* To be assured consideration, comments must be received by 11:59 p.m. EDT on April 12, 2020 (Note: 60 days from issuance).

ADDRESSES: Comments should be submitted electronically to ruralmaternalrfi@cms.hhs.gov.

FOR FURTHER INFORMATION CONTACT: Avareena Cropper at Avareena.Cropper@cms.hhs.gov with "RFI" in the subject line.

CONTACT INFORMATION: Please provide the name, organization, address, and contact number of the commenter.

BACKGROUND: The Rethinking Rural Health Initiative is a vital part of CMS's goal to ensure that individuals who live in rural America have access to high-quality, affordable health care. To advance the commitment of improving the health of Americans living in rural areas, CMS developed the first CMS Rural Health Strategy as part of its Rethinking Rural Health Initiative.¹ The strategy applies a rural lens to CMS's new and ongoing activities and supports intra-agency collaboration, stakeholder engagement, and the elevation of programs and policies that will advance the state of health and well-being for rural Americans.

A woman's health before pregnancy is critical to achieving safe outcomes for her and her baby. Optimizing physical and mental health during preconception not only increases the likelihood of a healthy pregnancy, delivery, and postpartum experience, but also positions the mother and her baby for a lifetime of better health. Following high-quality wellness and preconception care, prenatal care can reduce the risk of pregnancy complications for both the mother and baby. Therefore, safe, effective, and high-quality health care before, during, and after pregnancy is important in improving family health outcomes and transforming health care in rural communities. Since 2010, health care deserts have grown as a result of rural hospitals closing or limiting their services, including those services essential to pregnancy-related health care.^{2,3,4} The closures also affect the availability of pediatric inpatient services and pediatric specialties, including neonatal intensive care.

Approximately 700 women die each year in the United States due to pregnancy or delivery complications, more than 50,000 women experience unexpected outcomes during labor and delivery that have significant consequences for their health, and there has been an increase in severe maternal morbidity.^{5,6} Rural areas have higher rates of maternal morbidity and mortality than urban areas.^{7,8} Many women do not have health coverage or access to health care due to cost and other barriers until becoming pregnant.^{9,10,11,12} Those living in rural areas are also less likely to access prenatal services during their first trimester than urban and suburban individuals, and delays in accessing vital services and fewer total prenatal visits contribute to higher rates of perinatal complications.^{13,14,15,16,17} Additionally, racial and ethnic minority women, including those residing in tribal communities, face even greater challenges accessing health care services than rural non-Hispanic whites, and studies indicate they are less likely to receive the care they need before, during, and after pregnancy.^{18,19,20,21}

In June 2019, CMS in collaboration with the Health Resources and Services Administration (HRSA) and other organizations hosted an interactive stakeholder forum, ["A Conversation on Maternal Health in Rural Communities: Charting a Path to Improved Access, Quality and Outcomes."](#) designed to gain a better understanding of the challenges, opportunities, and priorities regarding maternal health care in the United States. In addition to this event, CMS and HRSA have implemented other efforts that focus on this important issue. They include:

- CMS's **Strong Start for Mothers and Newborns Initiative**²² (2013 to 2017) was an Innovation Center model that tested three approaches to enhanced prenatal care (care delivered during pregnancy that addresses medical, behavioral, and social factors) that aimed to reduce preterm birth, improve overall pregnancy outcomes for mothers and infants, and reduce costs to Medicaid and the Children's Health Insurance Program (CHIP) during pregnancy and for the year following birth for women enrolled in Medicaid and CHIP.
- The CMS Center for Medicare and Medicaid Innovation (CMMI) **Maternal Opioid Misuse (MOM) model**²³ was designed to address health care access and quality issues for pregnant and postpartum Medicaid enrollees with opioid use disorder.
- Medicaid's **Child and Adult Core Sets**²⁴ support federal and state efforts to collect, report, and use a standardized set of measures to assess performance and drive improvement in the

quality of care provided by Medicaid and CHIP. Several of the Child and Adult Core Set measures, which are voluntary for states to report, are included on the Medicaid Scorecard. CMS annually releases on Medicaid.gov the Child and Adult Core Set data for measures that were reported by at least 25 states and meet CMS standards for data quality.

- HRSA launched the **Rural Maternity and Obstetrics Management Strategies Program**²⁵ (RMOMS) in 2019. RMOMS is a pilot program that intends to demonstrate the impact on access to and continuity of maternal and obstetrics care in rural communities through testing models that address the RMOMS focus areas: (1) Rural Hospital Obstetric Service Aggregation, (2) Network Approach to Coordinating a Continuum of Care, (3) Leveraging Telehealth and Specialty Care, and (4) Financial Sustainability.
- HRSA's **Maternal, Infant and Early Childhood Home Visiting (MIECHV) Program** funds states, territories, and tribal entities to develop and implement voluntary, evidencebased home visiting services for pregnant women and families in at-risk communities to give them the necessary resources and skills to raise healthy children. In Fiscal Year 2018, the MIECHV Program funded services in 22 percent of all rural counties, and 50 percent of all counties served by the Program were rural.
- HRSA funds the **Healthy Start Initiative: Eliminating Disparities in Perinatal Health (Healthy Start)**,²⁶ which uses community-based strategies to reduce disparities in infant mortality and improve perinatal outcomes in target populations that have high annual rates of infant mortality. New this year, HRSA provided additional funds to Healthy Start to hire clinical service providers to provide direct access to well-woman care and maternity care services.
- **Collaborative Improvement and Innovation Networks**²⁷ are supported by the HRSA. They address a range of topics, including maternal health, prenatal and infant health, newborn screening, infant mortality, home visiting, pediatric emergency care, and child safety.

Building on this work, CMS is interested in developing and refining programs and policies that ensure that all those seeking to have families in rural communities have access to high-quality health care before, during, and after pregnancy, resulting in improved health outcomes for women and infants. The following sections outline three overarching themes—access, quality, and outcomes—that underpin the areas where CMS is seeking comment.

Access

The more than 121 rural hospitals that have closed since 2010 and the hospitals that have stopped providing obstetric services have made access to maternal and infant care more difficult for rural families.^{28,29} The issue of access is exacerbated in rural counties with greater proportions of black and Hispanic residents and lower median incomes, as they are more likely not to have hospital obstetric services.³⁰

Access to prenatal care is vital to monitoring the progression of the pregnancy and identifying problems such as depression, substance use, gestational diabetes, hypertension, oral disease, or other chronic conditions. Some of these conditions can lead to preterm birth, which is the leading cause of infant mortality.³¹ Preterm infants are often at increased risk of a range of

developmental and behavioral morbidities that extend from birth through adulthood, and may have additional health needs requiring ongoing attention from health care providers.³² Compared to their urban counterparts, rural children have higher rates of chronic conditions, are more likely to have unmet medical needs, and among those admitted to children’s hospitals, rural children have a greater reliance on medical technology such as a ventricular shunt, or tracheostomy tube, have more expensive stays, and higher readmission rates.³³

Access to care includes both the availability of pregnancy and infant-related health care from providers and the ability of individuals to receive available services. Pregnancy-related health care and/or support is delivered by many types of health care providers, including obstetricians/gynecologists, family practice physicians, nurse practitioners, certified nurse midwives, physician assistants, mental and behavioral health providers, EMS providers, community health workers, and doulas, all of whom need to work together to provide high-quality care and to achieve positive maternal and infant outcomes. However, there is a shortage of these health care providers in both rural and urban areas.³⁴ In addition, people of color in rural communities are less likely to have a personal doctor.³⁵ Transportation, housing, food security, safety, financial stress, and other social determinants of health play a role in health before, during, and after pregnancy.^{36,37,38,39} Compared to white women, American Indian and Alaska Native women are more likely to face barriers to care such as a lack of health insurance, and face difficulties accessing care, whether they live in rural or urban settings.⁴⁰ In addition, American Indian and Alaska Natives are three to four times more likely than whites to die from complications related to pregnancy and/or childbirth.^{41, 42}

Quality

Ensuring that patients get the right care in the appropriate setting for their medical needs is critical to achieving high-quality outcomes before, during, and after pregnancy. Many rural hospitals are successfully implementing quality improvement initiatives for health care through statewide collaboratives, such as those under the Alliance for Innovation on Maternal Health (AIM) program⁴³ or in collaboration with Perinatal Quality Collaboratives.⁴⁴ Efforts to designate Levels of Maternal Care for hospitals—that is, to classify levels of maternal care as those that address basic care (level I), specialty care (level II), subspecialty care (level III), and regional perinatal health care centers (level IV)—are underway to help providers identify the most appropriate locations for each birth within their region based on perinatal risk factors.⁴⁵ Additionally, efforts are underway at the local, state, and federal levels to address quality improvement for infant health. For example, at the federal level, HRSA has supported Collaborative Improvement & Innovation Networks on topics including newborn screening, infant mortality, and Healthy Start.⁴⁶

Measuring and monitoring quality are also important to achieving better maternal and infant health. CMS has developed a core set of maternal and perinatal health quality measures (Maternity Core Set), including measures related to elective deliveries and cesarean sections, pre- and postnatal care, and contraceptive care. The 2020 Maternity Core Set includes 11 measures, seven from CMS’s Child Core Set and four from the Adult Core Set, to help evaluate

maternal and perinatal health in Medicaid and CHIP.⁴⁷ Maternal Mortality Review Committees (MMRCs) provide an additional opportunity to monitor quality. More than half the states have a comprehensive maternal mortality review process. MMRCs provide information on the causes of maternal mortality beyond the basic surveillance data collected by the National Center for Health Statistics and the Pregnancy Mortality Surveillance System, both of which are administered by the Centers for Disease Control and Prevention (CDC). Measuring and reporting quality of care in rural communities can be difficult due to the low volume of services provided.

The quality aims from the National Academy of Medicine include equity and patient-centeredness.⁴⁸ Available data demonstrates that in both rural and urban areas, there are persistent disparities in health outcomes, including prenatal care and maternal morbidity and mortality, by race, ethnicity, and socioeconomic status.⁴⁹ Racial and ethnic minorities in rural areas report experiencing discrimination and/or feelings of stigmatization when accessing health care services, resulting in health care avoidance and exacerbating health risks.^{50,51}

Outcomes

Between 2007 and 2015, maternal morbidity and mortality increased across the country, but rural residents had a 9 percent greater probability of maternal mortality and severe maternal morbidity compared to urban women with similar characteristics.⁵² Rural communities also experienced higher rates of infant mortality and preterm births.^{53,54} Infant mortality rates were highest for non-Hispanic black women in rural counties.⁵⁵

Health risks before, during, and after pregnancy include chronic diseases such as hypertension, cardiac disease, obesity, and asthma; behavioral and mental health conditions (e.g., substance use disorder); exposure to violence; and unintended pregnancy.⁵⁶ Rural residents experience higher rates of many chronic diseases, including obesity and hypertension.^{57,58} Delays in accessing vital health services, and fewer total prenatal visits, contribute to higher rates of perinatal complications.^{59,60,61}

Health status, access challenges, bias in health care settings, and social determinants of health contribute to a number of poor pregnancy-related health outcomes, including preterm birth, low birth weight, maternal mortality, severe maternal morbidity, and increased risk of postpartum depression, and these negative health outcomes affect American Indian and Alaska Native and other racial and ethnic minorities disproportionately.⁶²

Improving Access, Quality, and Outcomes for Maternal and Infant Health in Rural Areas

CMS is interested in developing and refining programs and policies to ensure that all those seeking to have families in rural communities have access to high-quality health care before, during, and after pregnancy, resulting in improved health outcomes for women and infants.

Therefore, CMS is requesting information from stakeholders in response to the following questions:

1. What barriers exist in rural communities in trying to improve access, quality of care, and outcomes in prenatal, obstetrical, and postpartum care?
2. What opportunities are there to improve the above areas (i.e., access, quality and outcomes)?
3. What initiatives, including community-based efforts, have shown a positive impact on addressing barriers or maximizing opportunities?
4. How can CMS/HHS support these efforts?

Specifically, CMS seeks responses to the aforementioned questions related to the following areas:

- Implementing clinical quality improvement efforts, including AIM bundles and coordination of pregnancy and infant related health services in rural communities
- Developing innovative payment and service delivery models that support better maternal and infant health outcomes
- Increasing capacity of rural EMS and hospital emergency departments to handle obstetric and pediatric emergencies
- Eliminating racial and ethnic disparities in maternal and infant health, especially in tribal communities
- Addressing the social determinants of health affecting maternal and infant health in rural communities (e.g., housing, transportation, food insecurity)
- Improving mental and behavioral health outcomes before, during, and after pregnancy
- Measuring and monitoring maternal and infant health outcomes, health care quality, and health equity in rural communities
- Developing and implementing state collaborations and partnerships related to maternal and infant health
- Reducing regulatory burden, and any other area related to improving maternal and infant health outcomes in rural communities

Responses to this RFI will be used to inform future work by CMS toward the development and refinement of programs and policies that ensure rural families have access to high-quality health care that results in improved health outcomes.

THIS IS A REQUEST FOR INFORMATION (RFI) ONLY. This RFI is issued solely for information and planning purposes; it does not constitute a Request for Proposal (RFP), applications, proposal abstracts, or quotations. This RFI does not commit the U.S. Government to contract for any supplies or services or make a grant award. Further, we are not seeking proposals through this RFI and will not accept unsolicited proposals. Responders are advised that the U.S. Government will not pay for any information or administrative costs incurred in response to this RFI; all costs associated with responding to this RFI will be solely at the interested party's expense. We note that not responding to this RFI does not preclude participation in any future procurement, if conducted. It is the responsibility of the potential responders to monitor this RFI announcement for additional information pertaining to this request. In addition, we note that CMS will not respond to questions about the policy issues raised in this RFI.

CMS may or may not choose to contact individual responders. Such communications would only serve to further clarify written responses. Contractor support personnel may be used to review RFI responses. Responses to this notice are not offers and cannot be accepted by the U.S. Government to form a binding contract. Information obtained as a result of this RFI may be used by the U.S. Government for program planning on a non-attribution basis. Respondents should not include any information that might be considered proprietary or confidential. This RFI should not be construed as a commitment or authorization to incur cost for which payment would be required or sought. All submissions become U.S. Government property and will not be returned.

¹ Centers for Medicare & Medicaid Services. (2018). CMS Rural Health Strategy. Retrieved 2019 from <https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Rural-Strategy-2018.pdf>

² The Cecil G. Sheps Center for Health Services Research. 102 Rural hospital closures: January 2010 – present. (n.d). Retrieved 2019 from <https://www.shepscenter.unc.edu/programs-projects/ruralhealth/rural-hospital-closures>

³ United States Government Accountability Office. (2018). GAO-18-634, Rural hospital closures: Number and characteristics of affected hospitals and contributing factors. Retrieved from <https://www.gao.gov/assets/700/694125.pdf>

⁴ Committee on Health Care for Underserved Women. (2014). Committee Opinion Number 586: Health disparities in rural women. *The American College of Obstetricians and Gynecologists*. Retrieved from <https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Health-Care-for-Underserved-Women/Health-Disparities-in-Rural-Women>

⁵ Garcia, M.C., Rossen, L.M., Bastian, B., Faul, M., Dowling, N.F., Thomas, C.C., & Lademarco, M.F. (2019). Potentially excess deaths from the five leading causes of death in metropolitan and nonmetropolitan counties – United States, 2010–2017. *Morbidity and Mortality Weekly Report (MMWR) Surveillance Summaries*, 68(10), 1-11. Retrieved from https://www.cdc.gov/mmwr/volumes/68/ss/ss6810a1.htm?s_cid=ss6810a1_e&deliveryName=USCDC_921-DM12720

⁶ Centers for Disease Control and Prevention (2017). Severe Maternal Morbidity in the United States <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html> ⁷ Maron, D.F. (2017). Maternal health care is disappearing in rural America. *Scientific American*. Retrieved from <https://www.scientificamerican.com/article/maternal-health-care-is-disappearing-in-ruralamerica>

⁸ Kozhimannil, K.B., Interrante, J.D., Henning-Smith, C., & Admon, L.K. (2019). Rural-urban differences in severe maternal morbidity and mortality in the US, 2007–15. *I* 38, No. 12 (2019): 2077–2085, doi: 10.1377/hlthaff.2019.00805

⁹ Markus, A.R., Andres, E., West K.D., Garro, N., & Pellegrini, C. (2013). Medicaid covered births, 2008 through 2010, in the context of the implementation of health reform. *Women's Health Issues*, 23(5), e273–e280. <https://doi.org/10.1016/j.whi.2013.06.006>.

¹⁰ Medicaid and CHIP Payment and Access Commission (MACPAC). (n.d.). Pregnant women: Eligibility. Retrieved 2019 from <https://www.macpac.gov/subtopic/pregnant-women/>

¹¹ Committee on Health Care for Underserved Women. (2014). Committee Opinion Number 586: Health disparities in rural women. *The American College of Obstetricians and Gynecologists*. Retrieved from <https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Health-Care-for-Underserved-Women/Health-Disparities-in-Rural-Women>

¹² Harris, D.E., Aboueissa, A.M., Baugh, N., & Sarton, C. (2015). Impact of rurality on maternal and infant health indicators and outcomes in Maine. *Rural Remote Health*, 15(3), 3278. Retrieved from <https://www.rrh.org.au/journal/article/3278>

- ¹³ Committee on Health Care for Underserved Women. (2014). Committee Opinion Number 586: Health disparities in rural women. *The American College of Obstetricians and Gynecologists*. Retrieved from <https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Health-Care-for-Underserved-Women/Health-Disparities-in-Rural-Women>
- ¹⁴ Harris, D.E., Aboueissa, A.M., Baugh, N., & Sarton, C. (2015). Impact of rurality on maternal and infant health indicators and outcomes in Maine. *Rural Remote Health*, 15(3), 3278. Retrieved from <https://www.rrh.org.au/journal/article/3278>

-
- ¹⁵ Larson, E.H., Hart, L.G., & Rosenblatt, R.A. (1997). Is non-metropolitan residence a risk factor for poor birth outcomes in the U.S.? *Social Science & Medicine*, 45(2), 171–188.
[https://doi.org/10.1016/S0277-9536\(96\)00332-2](https://doi.org/10.1016/S0277-9536(96)00332-2)
- ¹⁶ Lishner, D.M., Larson, E.H., Rosenblatt, R.A., & Clark, S.J. (1999). Rural maternal and perinatal health. In T.C. Ricketts (Ed.), *Rural Health in the United States* (pp. 134-149). New York, NY: Oxford University Press.
- ¹⁷ Peck, J. & Alexander, K. (2003). Rural healthy people 2010 literature reviews: Maternal, infant, and child health in rural areas. In L.D. Gamm, L.L. Hutchison, B.J. Dabney, & A.M. Dorsey (Eds). *Rural healthy people 2010: A companion document to Healthy People 2010 Volume 2* (pp.85-96). College Station, TX: The Texas A&M University System Health Science Center, School of Rural Public Health, Southwest Health Research Center. Retrieved from <https://srhrc.tamhsc.edu/docs/rhp-2010-volume2.pdf>
- ¹⁸ United Health Foundation America’s Health Rankings. (n.d.). Health of women and children: Maternal mortality. Retrieved 2019 from https://www.americashealthrankings.org/explore/health-of-women-andchildren/measure/maternal_mortality_a
- ¹⁹ Center for Reproductive Rights. (n.d.). Research overview of maternal mortality and morbidity in the United States. Retrieved from https://www.reproductiverights.org/sites/crr.civicactions.net/files/documents/USPA_MH_TO_ResearchBrief_Final_5.16.pdf
- ²⁰ Novoa, C. & Taylor, J. (2018). Exploring African Americans’ high maternal and infant death rates. *Center for American Progress*. Retrieved from <https://www.americanprogress.org/issues/earlychildhood/reports/2018/02/01/445576/exploring-african-americans-high-maternal-infant-death-rates>
- ²¹ Center for Reproductive Rights. (n.d.). Research overview of maternal mortality and morbidity in the United States. Retrieved from https://www.reproductiverights.org/sites/crr.civicactions.net/files/documents/USPA_MH_TO_ResearchBrief_Final_5.16.pdf
- ²² Centers for Medicare & Medicaid Services, Center for Medicare & Medicaid Innovation. (n.d.). Strong start for mothers and newborns initiative: General information. Retrieved 2019 from <https://innovation.cms.gov/initiatives/strong-start>
- ²³ Centers for Medicare & Medicaid Services, Center for Medicare & Medicaid Innovation. (n.d.). Maternal Opioid Misuse (MOM) Model. Retrieved 2019 from <https://innovation.cms.gov/initiatives/maternal-opioid-misuse-model>
- ²⁴ Centers for Medicare & Medicaid Services, Center for Medicaid & Child Health Program. Adult and Child Health Care Quality Measures. Retrieved from <https://www.medicaid.gov/medicaid/quality-ofcare/performance-measurement/adult-and-child-health-care-quality-measures/index.html>
- ²⁵ Department of Health and Human Services. HHS Awards \$9 Million to Develop New Models to Improve Obstetrics Care in Rural Communities. Retrieved from <https://www.hhs.gov/about/news/2019/09/10/hhs-awards-9-million-new-models-obstetrics-care-ruralcommunities.html>
- ²⁶ Health Resources and Services Administration. Healthy Start. Retrieved from <https://mchb.hrsa.gov/maternal-child-health-initiatives/healthy-start>
- ²⁷ Health Resources and Services Administration, Bureau of Maternal and Child Health. Collaborative Improvement & Innovation Networks (CoIINs). Retrieved from <https://mchb.hrsa.gov/maternal-childhealth-initiatives/collaborative-improvement-innovation-networks-coiins>
- ²⁸ Hung, P., Henning-Smith, C., Casey, M.M., & Kozhimannil, K. (2017). Access to obstetric services in rural counties still declining, with 9 percent losing services, 2004–14. *Health Affairs (Millwood)*, 36(9), 1663-1671. <https://doi.org/10.1377/hlthaff.2017.0338>

-
- ²⁹ Hung, P., Kozhimannil, K.B., Casey, M.M., & Moscovice, I.S. (2018). Why are obstetric units in rural hospitals closing their doors? *Health Services Research*, 51(4), 1546–1560. <https://doi.org/10.1111/14756773.12441>
- ³⁰ Thomas, S.R., Holmes, G.M., & Pink, G.H. (2016). To what extent do community characteristics explain differences in closure among financially distressed rural hospitals? *Journal of Health Care for the Poor and Underserved*, 27(4A), 194–203.
- ³¹ Kozhimannil, K.B., Interrante, J.D., Henning-Smith, C., & Admon, L.K. (2019). Rural-urban differences in severe maternal morbidity and mortality in the US, 2007–15. *Health Affairs* 38, NO. 12 (2019): 2077–2085, doi: 10.1377/hlthaff.2019.00805
- ³² Ibid.
- ³³ Peltz, A, Wu, C.L., White, M.L., Wilson, K.M., Lorch, S. A., Thurm, C., Hall, M, & Berry, J. G. *Pediatrics* May 2016, 137 (5) e20153156; DOI: <https://doi.org/10.1542/peds.2015-3156> ³⁴
- March of Dimes. (2018). Nowhere to go: Maternity care deserts across the U.S. Retrieved from https://www.marchofdimes.org/materials/Nowhere_to_Go_Final.pdf
- ³⁵ James, C.V., Moonesinghe, R., Wilson-Frederick, S.M., Hall, J.E., Penman-Aguilar, A., & Bouye, K. Racial/ethnic health disparities among rural adults — United States, 2012–2015. *MMWR Surveill Summ* 2017;66(No. SS-23):1–9. DOI: <http://dx.doi.org/10.15585/mmwr.ss6623a1>
- ³⁶ U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (n.d.). Maternal, infant, and child health across the life stages. Retrieved 2019 from <https://www.healthypeople.gov/2020/leading-health-indicators/2020-lhi-topics/Maternal-Infant-and-Child-Health/determinants>
- ³⁷ Kuh, D. & Ben-Shlomo, Y. (Eds.). (1997). *A life course approach to chronic disease epidemiology*. New York, NY: Oxford University Press.
- ³⁸ Braveman, P. & Barclay, C. (2009). Health disparities beginning in childhood: A life-course perspective. *Pediatrics*, 124(3), S163– S175. <https://doi.org/10.1542/peds.2009-1100D>
- ³⁹ Cable, N. (2014). Life course approach in social epidemiology: An overview, application and future implications. *Journal of Epidemiology*, 24(5), 347-352. <https://doi.org/10.2188/jea.JE20140045> ⁴⁰
- National Partnership for Women & Families. (2019). Fact Sheet: American Indian and Alaska Native Women’s Maternal health: Addressing the crisis. Retrieved from: <https://www.nationalpartnership.org/our-work/resources/health-care/maternity/american-indian-andalaska.pdf>
- ⁴¹ Petersen, E.E., Davis, N.L., Goodman, D., et al. Vital signs: Pregnancy-related deaths, United States, 2011–2015, and strategies for prevention, 13 states, 2013–2017. *MMWR Morb Mortal Wkly Rep* 2019;68:423–429. DOI: <http://dx.doi.org/10.15585/mmwr.mm6818e1>
- ⁴² National Partnership for Women & Families. (2019). Fact Sheet: American Indian and Alaska Native Women’s maternal health: Addressing the crisis. Retrieved from: <https://www.nationalpartnership.org/our-work/resources/health-care/maternity/american-indian-andalaska.pdf>
- ⁴³ Health Resources and Services Administration. Alliance for Innovation on Maternal Health. Retrieved from <https://mchb.hrsa.gov/maternal-child-health-topics/maternal-and-womens-health>
- ⁴⁴ Centers for Disease Control and Prevention. (n.d.). Perinatal quality collaboratives. Retrieved 2019 from <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pqc.htm>
- ⁴⁵ The American College of Obstetricians and Gynecologists. (2019). Levels of maternal care: Obstetric care consensus No. 9. *Obstetrics & Gynecology*, 134(2), e41-55. Retrieved from <https://www.acog.org/Clinical-Guidance-and-Publications/Obstetric-Care-Consensus-Series/Levels-of-Maternal-Care>

-
- ⁴⁶ Health Resources and Services Administration, Bureau of Maternal and Child Health. Collaborative Improvement & Innovation Networks (CoIINs). Retrieved from <https://mchb.hrsa.gov/maternal-childhealth-initiatives/collaborative-improvement-innovation-networks-coiins>
- ⁴⁷ Centers for Medicare & Medicaid Services. 2020 Maternity Core Set. Retrieved from <https://www.medicare.gov/medicaid/quality-of-care/downloads/performance-measurement/2020maternity-core-set.pdf>.
- ⁴⁸ The National Academies of Sciences Engineering Medicine. (2018). Crossing the quality chasm: The IOM health care quality initiative. Retrieved 2019 from <http://www.nationalacademies.org/hmd/Global/News%20Announcements/Crossing-the-Quality-Chasm-The-IOM-Health-Care-Quality-Initiative.aspx>.
- ⁴⁹ Centers for Medicare & Medicaid Services, Office of Minority Health. (2019). Improving access to maternal health care in rural communities. Retrieved from <https://www.cms.gov/About-CMS/AgencyInformation/OMH/equity-initiatives/rural-health/09032019-Maternal-Health-Care-in-RuralCommunities.pdf>
- ⁵⁰ Roeder, A. (2019). America is failing its Black mothers. *Magazine of the Harvard T.H. Chan School of Public Health*. Retrieved from https://www.hsph.harvard.edu/magazine/magazine_article/america-isfailing-its-black-mothers/
- ⁵¹ NPR, Robert Wood Johnson Foundation, & Harvard T.H. Chan School of Public Health. (2017). Discrimination in America: Experiences and views of Native Americans. Retrieved from <https://www.npr.org/documents/2017/nov/NPR-discrimination-native-americansfinal.pdf?t=1548242665303>
- ⁵² Kozhimannil, K.B., Interrante, J.D., Henning-Smith, C. & Admon, L.K. (2019). Rural-urban differences in severe maternal morbidity and mortality in the US, 2007-15. *Health Affairs*, 38(12), 2077-2085. <https://doi.org/10.1377/hlthaff.2019.00805>
- ⁵³ Branum, A. Urban-rural patterns of birth characteristics. National Center for Health Statistics. 2015. Retrieved 2020 from https://www.cdc.gov/nchs/ppt/nchs2015/Branum_Tuesday_SalonD_BB1.pdf.⁵⁴
- Ely, D.M., Driscoll, A.K., & Mathews, T.J. Infant mortality rates in rural and urban areas in the United States, 2014. NCHS data brief, no. 285. Hyattsville, MD: National Center for Health Statistics. 2017.
- ⁵⁵ Ibid.
- ⁵⁶ Johnson, K., Posner, S.F., Biermann, J., Cordero, J.F., Atrash, H.K., Parker, C.S., & Curtis, M.G. (2006). Recommendations to improve preconception health and health care – United States: A report of the CDC/ATSDR Preconception Care work group and the Select Panel on Preconception Care. *Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports*, 55(RR06), 1-23. Retrieved from <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5506a1.htm>
- ⁵⁷ Centers for Disease Control and Prevention. (2018). CDC: More obesity in U.S. rural counties than in urban counties. Retrieved 2019 from <https://www.cdc.gov/media/releases/2018/s0614-obesity-rates.html> ⁵⁸ Shaw, K.M., Theis, K.A., Self-Brown, S., Roblin, D.W., & Barker, L. (2016). Chronic disease disparities by county economic status and metropolitan classification, behavioral risk factor surveillance system, 2013. *Preventing Chronic Disease*, 13. <https://doi.org/10.5888/pcd13.160088>
- ⁵⁹ Larson, E.H., Hart, L.G., & Rosenblatt, R.A. (1997). Is non-metropolitan residence a risk factor for poor birth outcomes in the U.S.? *Social Science & Medicine*, 45(2), 171–188. [https://doi.org/10.1016/S0277-9536\(96\)00332-2](https://doi.org/10.1016/S0277-9536(96)00332-2)
- ⁶⁰ Lishner, D.M., Larson, E.H., Rosenblatt, R.A., & Clark, S.J. (1999). Rural maternal and perinatal health. In T.C. Ricketts (Ed.), *Rural Health in the United States* (pp.134-149). New York, NY: Oxford University Press.

-
- ⁶¹ Peck, J. & Alexander, K. (2003). Rural healthy people 2010 literature reviews: Maternal, infant, and child health in rural areas. In: L.D. Gamm, L.L. Hutchison, B.J. Dabney, & A.M. Dorsey (Eds). *Rural healthy people 2010: a companion document to Healthy People 2010 Volume 2* (pp.85-96). College Station, TX: The Texas A&M University System Health Science Center, School of Rural Public Health, Southwest Health Research Center. Retrieved from <https://srhrc.tamhsc.edu/docs/rhp-2010-volume2.pdf>
- ⁶² deValpine, M.G., Jones, M., Bundy-Carpenter, D., & Falk, J. (2016). First trimester prenatal care and local obstetrical delivery options for women in poverty in rural Virginia. *Journal of Community and Public Health Nursing*, 137(2). <https://doi.org/10.4172/2471-9846.1000137>

