



**HEALTHY WOMEN,
HEALTHY PREGNANCIES,
HEALTHY FUTURES:
ACTION PLAN TO IMPROVE
MATERNAL HEALTH IN AMERICA**

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

FOREWORD FROM THE SECRETARY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

The United States has one of the most technologically advanced healthcare systems in the world, delivering high quality care in so many circumstances. Yet we have a maternal mortality rate that is significantly higher than comparable countries.

The outcomes are unacceptable, and they exhibit significant racial and ethnic, geographic, and age disparities. Pregnancy-related mortality for American Indian and Alaska Native women and Black women is two and three times higher, respectively, than for white, Hispanic, and Asian/Pacific Islander women.^a The share of rural counties with hospital obstetric services decreased significantly in the past decade, and women over 35 years are one and a half times more likely to experience complications during pregnancy.

In addition to maternal mortality rates, severe maternal morbidity has been increasing and affects thousands of women in the United States each year. Severe maternal morbidity includes unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman's health. These health outcomes create lasting burdens that make it more challenging for mothers and their families to live healthy, flourishing lives.

The Trump Administration has made it a priority to tackle health issues that disproportionately impact Americans of color—such as kidney care, HIV/AIDS, hypertension, and sickle cell disease—and we must do the same for maternal health. We are committed to reducing disparities and improving outcomes for our nation's mothers, and we can accomplish even more if Congress acts on the maternal health proposals contained in President Trump's Fiscal Year 2021 Budget.

We have an opportunity for action. Research indicates that as many as two-thirds of pregnancy-related deaths are preventable. Key factors that may contribute to high maternal mortality and morbidity include variation in clinical practice patterns, access to care, and data limitations that inhibit surveillance and research. Implementing evidence-based measures to reduce maternal mortality has been shown to cut mortality by as much as half.^b

a CDC Morbidity and Mortality Weekly Report. Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016, <https://www.cdc.gov/mmwr/volumes/68/wr/pdfs/mm6835a3-H.pdf>.

b Main, E. K., Markow, C., & Gould, J. (2018). Addressing maternal mortality and morbidity in California through public-private partnerships. *Health Affairs*, 37(9), 1484-1493.

This Action Plan lays out specific steps we as a department are taking to address these issues. We have a vision: **Make the United States one of the safest countries in the world for women to give birth.** To achieve this vision, we establish three aggressive, yet achievable targets:

- **Reduce the maternal mortality rate by 50 percent in five years.**
- **Reduce the low-risk cesarean delivery rate by 25 percent in five years.**
- **Achieve blood pressure control in 80 percent of women of reproductive age with hypertension in five years.**

This plan lays out actions for the Department of Health and Human Services and our partners to execute on: improving prevention and treatment, prioritizing quality improvement, optimizing prenatal and postpartum health, and improving data and bolstering research to inform future interventions.

In a modern healthcare system, pregnancy-related deaths should never occur. This action plan gets us on the path to making maternal mortality a “never” event.

With these steps, we can achieve our ambitious goals, reduce the unacceptable disparities that burden so many, and deliver a healthier, safer country for all women.

Alex M. Azar II

Secretary of Health and Human Services

TABLE OF

CONTENTS

FOREWORD FROM THE SECRETARY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES	3
EXECUTIVE SUMMARY	5
THE PROBLEM: MATERNAL MORTALITY AND MORBIDITY IN THE U.S.	16
TARGETS	23
ACTIONS TO DRIVE PROGRESS	29
CHALLENGES IN REDUCING MATERNAL MORTALITY AND MORBIDITY	47
RECENT EFFORTS TO IMPROVE MATERNAL HEALTH	66
DEVELOPING HHS' ACTION PLAN TO IMPROVE MATERNAL HEALTH	75
APPENDIX: HHS MATERNAL HEALTH PROGRAMS AND INITIATIVE	82



EXECUTIVE SUMMARY

INTRODUCTION

As part of the Administration's broader efforts to improve health in America, the United States (U.S.) Department of Health and Human Services (HHS) is announcing its vision for ensuring the U.S. is one of the safest countries in the world for women to give birth.

In order to realize this vision, America's women and their families need a health care system they can rely on—a health care system that delivers care that is safe, high quality, and evidence-based—and strong communities to draw upon for support. They need a holistic approach to care that proactively identifies risk factors for poor maternal health outcomes (e.g., medical conditions, behaviors, or life circumstances) and engages a comprehensive set of resources, including clinical, behavioral, and social supports, to help mothers and their babies attain optimal pregnancy, birth, and post-delivery outcomes.

THE DEPARTMENT'S ACTION PLAN INCLUDES FOUR GOALS DESIGNED TO ACHIEVE THIS VISION:



GOAL 1

Achieve **Healthy Outcomes for All Women of Reproductive Age** by Improving Prevention and Treatment



GOAL 2

Achieve **Healthy Pregnancies and Births** by Prioritizing Quality Improvement



GOAL 3

Achieve **Healthy Futures** by Optimizing Postpartum Health



GOAL 4

Improve Data and Bolster Research to Inform Future Interventions

Many risk factors for maternal mortality and morbidity develop prior to pregnancy and between pregnancies. Therefore, adopting a comprehensive, holistic approach—sometimes referred to as a “life course” approach—to maternal health policymaking and care provision can facilitate sustainable improvements in health outcomes for mothers and their babies.¹ Clinical care is a significant and important factor, but only part of the solution. A life course approach also acknowledges the important roles that social and economic risk factors and buffers play in affecting maternal health outcomes.² **The goals and objectives we have laid out in this Action Plan reflect the importance of bringing a “life course” perspective to improving maternal and infant health outcomes.** The health and wellness of mothers has important implications for the outcomes of their children. Various risk factors affecting the mother also affect the health of the baby, and complications occurring around the time of delivery can have both short- and long-term implications for infants. Depending on the severity of symptoms associated with maternal health complications during the postpartum period, it can also be challenging for women to attend to the interpersonal and healthcare needs of their new babies when they are dealing with their own complications. By addressing risk factors before and during pregnancy, improving the quality of maternity and postpartum care, and supporting a research agenda to fill gaps in current evidence, we can ensure the U.S. is one of the safest countries in the world for women to give birth.

THE PROBLEM: MATERNAL MORTALITY AND MORBIDITY IN THE U.S.

The U.S. has one of the most technologically advanced health care systems in the world and should be able to ensure the delivery of safe, high-quality maternity care. However, the maternal mortality^c rate remains stubbornly high, at 17.4 deaths per 100,000 live births;^d totaling 658 deaths in 2018.³ This is higher than most other developed and high-income countries. Most importantly, 66 percent of all pregnancy-related deaths are preventable.^{4,15}

Thousands of women experience unintended outcomes of labor and delivery that result in significant short- or long-term consequences to their health.⁵ These complications are referred to as severe maternal morbidity (SMM) and include eclampsia, sepsis, or hysterectomy, among others. Blood transfusions (procedures in which a patient receives donated blood) are significant events and can be an indicator of SMM, although they may not always reflect SMM in the absence of other indicators.^{6,7} As a result of this and changes in data reporting, recent SMM estimates do not include those who only received blood transfusions.

In 2017, there were over 25,000 hospital deliveries with an SMM (not including those who only received a blood transfusion) in the U.S., and the five most common complications were disseminated intravascular coagulation (clotting and bleeding disorder), hysterectomy (surgical removal of the uterus), acute kidney failure, sepsis (severe infection), and adult respiratory distress syndrome. When those with blood transfusions alone are included, the number of hospital deliveries with an SMM more than doubles.

c Maternal mortality is defined by the World Health Organization (WHO) as: deaths of women while pregnant or within 42 days of being pregnant, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Maternal mortality in the U.S. is measured by CDC's National Vital Statistics System.

d Approximately 3.8 million births occurred in 2018 in the U.S.

KEY TARGETS FOR IMPROVEMENT



TARGET 1:

Reduce the maternal mortality rate by 50 percent in 5 years



TARGET 2:

Reduce the low-risk cesarean delivery rate by 25 percent in 5 years



TARGET 3:

Achieve blood pressure control in 80 percent of women of reproductive age with hypertension in 5 years.

This Action Plan aims to achieve targets that are ambitious, yet attainable. HHS is focusing on reducing the rate of maternal mortality as its topline target for improving maternal health outcomes. Addressing the factors contributing to maternal mortality will translate into reductions in maternal morbidity that can have important short-term and long-term implications for the health of mothers and babies. We selected reducing low-risk cesarean deliveries, defined as nulliparous, term, singleton, vertex (NTSV) cesarean deliveries as our second target, because cesarean deliveries, in general, increase the likelihood of maternal morbidity.^{8,9} In addition, the U.S. has one of the highest rates of cesarean deliveries in the world. These low-risk cesarean deliveries occur among women who are pregnant for the first time, are at a minimum 37 weeks of gestational age, and giving birth to a single baby (not twins or multiples) that is in the vertex position (positioned in the uterus with the head down). We use this rate because it accounts for the most common medical indications for cesarean delivery: preterm or multiple births and fetal positioning. Additionally, the majority of women with a previous cesarean birth have repeat cesareans for subsequent births, so avoiding a low-risk cesarean delivery reduces the likelihood of subsequent cesarean deliveries. We are focusing on improving rates of blood pressure control for women of reproductive age with hypertension for our third target, since uncontrolled hypertension puts women at higher risk of experiencing a number of serious pregnancy complications and at higher lifelong risk of cardiovascular disease. Additionally, hypertension has important implications for infant health outcomes. These targets are discussed in greater detail in Section III.

CHALLENGES IN REDUCING MATERNAL MORTALITY AND MORBIDITY

In order to achieve HHS’ vision, future actions must confront critical challenges in addressing the maternal health crisis. Key challenges include:

RACIAL DISPARITIES

From 2007-2016, the pregnancy-related mortality ratios for black and American Indian/Alaska Native (AI/AN) women were two to three times higher than for white, Hispanic, and Asian/Pacific Islander women. Even among women with a college degree or higher, the pregnancy-related mortality ratio^e was over five times higher for black women^f compared to white, Asian/Pacific Islander, and Hispanic women. College educated black women are more likely to experience a pregnancy-related death than white, Asian/Pacific Islander, and Hispanic women without a high school diploma. Some of these disparities are related to differences in quality of care and clinical practice, with black patients tending to receive care in hospitals with poorer outcomes. Social determinants of health also have an impact on racial and ethnic maternal health disparities.

RURAL DISPARITIES AND ACCESS TO CARE

Compared to women living in urban areas, women living in rural areas experience higher rates of delayed prenatal care initiation. Over the past two decades, many rural counties have lost their hospital-based obstetric services, and less than half of women living in rural areas are within a 30-mile drive of a hospital with obstetric services. In these areas, women are more likely to have out-of-hospital births and to deliver in hospitals without obstetric units, as compared to those living in rural counties that maintained hospital-based obstetric services. It is important for facilities without obstetric units to be “OB Ready”^g in the event they need to perform an emergency delivery, and to have triage protocols in place when it is more appropriate to transfer expecting mothers to another facility with greater capacity.

e The pregnancy-related mortality ratio is an estimate of the number of pregnancy-related deaths per 100,000 live births.

f The sample size of AI/AN women with a college degree or higher is insufficient to generate a reliable estimate of the pregnancy-related mortality ratio for this population.

g “OB Ready” refers to facilities that are adequately equipped to handle a delivery, even if they do not support a full suite of obstetric services.

HEALTH INSURANCE COVERAGE

Medicaid covered 42 percent of all births in the U.S. in 2018, giving state-run Medicaid programs a tremendous opportunity to drive change. Medicaid income eligibility requirements for pregnant and non-pregnant able-bodied individuals vary by state. Collaborative efforts to close coverage and care gaps for postpartum women have potential to improve health outcomes.

PRACTICE PATTERNS AND PAYMENT MISALIGNMENT

Maternal mortality and morbidity vary significantly across states and hospitals. Research has shown that provider and systems of care factors contributed to over half of all pregnancy-related deaths. The most prevalent and costly example of unnecessary utilization is the use of cesarean delivery among pregnant women at low medical risk. There is also significant opportunity to utilize lower cost professionals, such as certified midwives, to expand the capacity of the health care system to address the needs of pregnant women and increase access to care.

DATA QUALITY AND TIMELINESS

Achieving improvements in maternal health outcomes has been challenging, in part, due to a lack of data indicating where poor outcomes are occurring, what types of resources are available or lacking in these areas, and the extent to which deficiencies in quality of care exist. Analyzing this type of information can help identify opportunities to better target resources and develop new interventions to improve care delivery. However, operational barriers, such as resources and workforce capacity to abstract, link, and analyze data, privacy concerns, and differences in data collection methodologies can make it challenging to identify and analyze outcome measures such as maternal mortality rates, pregnancy-related mortality ratios, or SMM rates.

ACTIONS HHS WILL TAKE TO IMPROVE MATERNAL HEALTH

The Department will use all of its available levers and tools to address this crisis, and make investments in maternal and child health by pursuing the following actions:

1. ACHIEVE HEALTHY OUTCOMES FOR ALL WOMEN OF REPRODUCTIVE AGE

- Improve prevention and treatment of cardiovascular disease for women of reproductive age by more effectively controlling blood pressure and preventing hypertension
- Encourage evidence-based preventive and disease management services for other significant medical risk factors

2. ACHIEVE HEALTHY PREGNANCIES AND BIRTHS

- Align provider payment with positive outcomes and quality improvement achievements, such as reducing low-risk cesarean deliveries
- Support efforts to expand adoption of evidence-based clinical best practices in maternal health and obstetrics
- Improve access to high-quality prenatal care and delivery services for at-risk populations

3. ACHIEVE HEALTHY FUTURES

- Improve the quality of, and access to, postpartum care, especially mental health and substance use services
- Improve infant health outcomes by promoting the development of strong parent-child relationships

4. IMPROVE DATA AND BOLSTER RESEARCH

- Enhance maternal health surveillance by improving data collection transparency, timeliness, and standardization, to be able to stratify by risk factors
- Advance a research agenda to identify effective, evidence-based best practices in maternal health, including those addressing clinical, environmental, and socioeconomic factors

See Section IV for specific actions HHS will take to improve maternal health in America.

RECENT EFFORTS TO IMPROVE MATERNAL HEALTH

HHS and its partners have a long history of working together to improve maternal health. This Action Plan represents an opportunity to build on this foundation and accelerate recent progress to reduce maternal mortality and morbidity.

The President's Fiscal Year (FY) 2021 Budget provided a total of \$116 million for the *Improving Maternal Health in America* initiative. This report covers a variety of programs authorized by Congress and administered by HHS. However, it is important to note that based on assessment of the effectiveness of some of these efforts, HHS does not include funding for some of these programs in the FY 2021 President's Budget request. HHS continues to evaluate the effectiveness of these programs as statutorily required.

The Budget invests \$24 million in the Centers for Disease Control and Prevention (CDC) to expand Maternal Mortality Review Committees (MMRCs) to all 50 states to ensure every pregnancy-related death is examined. MMRCs perform detailed examinations of individual maternal deaths to identify potential mitigation strategies that can be implemented to avoid deaths from occurring in the future for women with similar circumstances. The Centers for Disease Control and Prevention's (CDC's) Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) Program provides funding to 25 states to support this activity. In total, there are MMRCs in 43 states, the District of Columbia, New York City, and Philadelphia.¹⁰

In addition to MMRCs, state or multi-state perinatal quality collaboratives (PQCs) work to implement evidence-based practices to improve quality of care for mothers and babies, in addition to identifying the role that various human and systems-level factors play in affecting health outcomes. Since 2011, CDC has supported the development of PQCs, and currently, CDC funds 13 state PQCs to improve outcomes throughout their state.

The President's FY 2021 Budget provides \$80 million to the Health Resources and Services Administration (HRSA) to improve the quality of maternal health services, expand access to care, and reduce disparities in care. Beginning in 2014, HRSA funded the Alliance for Innovation on Maternal Health (AIM), a national effort to develop and implement maternal health safety bundles, which are prevention toolkits consisting of evidence-based best practices to prevent complications such as hemorrhage and preeclampsia. Within the \$80 million proposed for HRSA, the President's FY 2021 Budget adds an additional \$10 million, for a total of \$15 million, in funding to expand AIM safety bundles in federally-qualified health centers, the Indian Health Service (IHS), and tribal facilities. Across the country, state and regional PQCs are working with the AIM initiative to develop and implement safety bundle initiatives in their own states.

The President's FY 2021 Budget also invests \$7 million in the National Institute for Research on Safety and Quality to improve service delivery data, advance data evaluation, and expand medical expenditure surveys to ensure policymakers have timely and accurate data, as well as \$5 million in IHS to help improve health outcomes by standardizing care, increasing cultural awareness, and improving care for pregnant women.

The Joint Commission recently introduced two new standards for hospitals to address prevention, early recognition, and timely treatment of maternal hemorrhage and severe hypertension/preeclampsia, which will go into effect, and be required for hospital accreditation, as of January 1, 2021.

See Section VI and the Appendix for additional programs and initiatives that HHS operates to improve maternal health.

DEVELOPING HHS' ACTION PLAN TO IMPROVE MATERNAL HEALTH

In developing this Action Plan, the Department sought feedback from a wide variety of stakeholders during numerous meetings and listening sessions to hear their perspectives on what they view as important challenges in maternal health and how they might be addressed. This information helped inform the Department's strategic vision for improving maternal health described in this Action Plan. These activities included a series of roundtable discussions and regional listening sessions where HHS leadership heard from academics, state officials, providers, insurers, hospitals, health systems, advocacy groups, mothers, and other stakeholders. The Department also spoke with state officials leading MMRCs to better understand the challenges these organizations face and to hear their recommendations for making maternal mortality reviews more efficient and effective.

CONCLUSION

Addressing the maternal health crisis is an important priority for HHS. By taking a comprehensive life course approach that supports quality improvements in clinical care and incorporates actions to address social and economic risk factors, HHS aims to halve the maternal mortality rate, reduce the current rate of low-risk cesarean deliveries by a quarter, and reach 80 percent blood pressure control among women of reproductive age in five years. Addressing racial and geographic disparities will be critical to this effort.

However, we fully recognize that we cannot achieve such a bold objective alone. We know that making meaningful progress to combat the maternal mortality and morbidity crisis will require vision, investments, and commitment from providers, payers, patients, and other important stakeholders. Therefore, we engaged with a wide variety of stakeholders while preparing this Action Plan and obtained their input on how to tackle this challenge. Additionally, the Surgeon General is releasing a Call to Action to Improve Maternal Health simultaneous with release of this Action Plan, calling on all of our public and private sector partners to join forces with us in making the U.S. one of the safest countries in the world for women to give birth.

Moving forward, we look forward to continuing to foster partnerships with state and local governments, health care providers, health insurance companies, state Medicaid programs, Medicaid managed care plans, and other stakeholders involved in efforts to improve maternal health. Together, we can turn the tide on maternal mortality and morbidity.

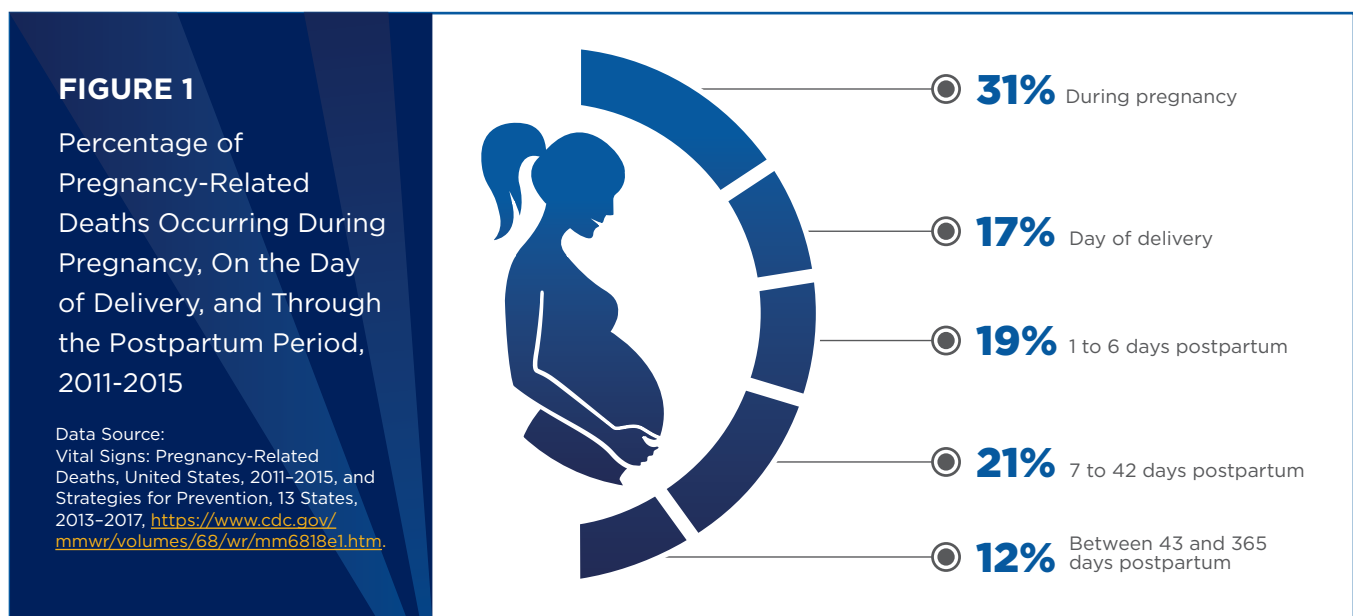


THE PROBLEM: MATERNAL MORTALITY AND MORBIDITY IN THE U.S.

MEASURES OF MATERNAL MORTALITY IN THE U.S.

The U.S. has one of the most technologically advanced health care systems in the world and should be able to ensure the delivery of safe, high-quality maternity care. However, the maternal mortality^h rate remains stubbornly high, at 17.4 deaths per 100,000 live births;ⁱ totaling 658 deaths in 2018.¹¹ This is higher than most other developed and high-income countries. Most importantly, 66 percent of all pregnancy-related deaths are preventable.^{12,15}

While the maternal mortality rate refers to deaths occurring during pregnancy or within 42 days of the end of pregnancy, the term pregnancy-related death is more broadly defined^j and represents deaths occurring during pregnancy, around the time of delivery, and through the first year postpartum (see Figure 1).



^h Maternal mortality is defined by the Centers for Disease Control and Prevention as: deaths of women while pregnant or within 42 days of being pregnant, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Maternal mortality in the U.S. is measured by CDC's National Vital Statistics System.

ⁱ Approximately 3.8 million births occurred in 2018 in the U.S.

^j Pregnancy-related death is a separate measure from maternal mortality and is defined as the death of a woman while pregnant or within 1 year of the end of a pregnancy regardless of the outcome, duration, or site of the pregnancy—from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. CDC's Pregnancy Mortality Surveillance System (PMSS) tracks pregnancy-related deaths in the U.S. In addition to measuring maternal deaths over a longer period of time post-delivery than the National Vital Statistics System (NVSS) maternal mortality measure (see footnote a), the PMSS and NVSS measures also differ in other ways, including how the data are collected and how the cause of death is determined to be related to pregnancy or not.

MEASURES OF MATERNAL MORTALITY IN THE U.S.

NATIONAL VITAL STATISTICS SYSTEM (NVSS)

Maternal Mortality Rate:

The NVSS, coordinated by the National Center for Health Statistics (NCHS), defines the official U.S. maternal mortality rate as: deaths of women while pregnant or within 42 days of being pregnant, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. NCHS reports the maternal mortality rate as the number of maternal deaths per 100,000 live births. This measure of the maternal mortality rate is used to compare the U.S. to other countries and is considered the official source of maternal mortality statistics in the U.S. However, between 2007 and 2018, NCHS did not publish official estimates of the U.S. maternal mortality rate as states were implementing the pregnancy checkbox on death certificates. The pregnancy checkbox was added to the U.S. Standard Certificate of Death in 2003 to address the underreporting of maternal deaths in vital statistics and not all states implemented the checkbox until 2018 (California uses a different checkbox from the other states).

PREGNANCY MORTALITY SURVEILLANCE SYSTEM (PMSS)

Pregnancy-Related Mortality Ratio:

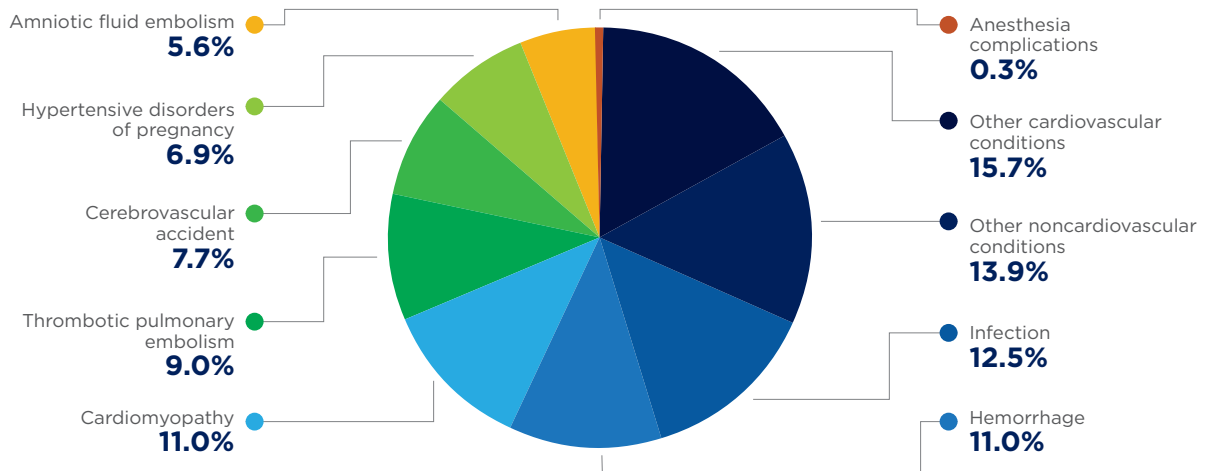
A related but different measure is the pregnancy-related mortality ratio (PRMR), reported by the Centers for Disease Control and Prevention's PMSS as the number of pregnancy-related deaths per 100,000 live births. A pregnancy-related death is defined as the death of a woman while pregnant or within 1 year of the end of a pregnancy regardless of the outcome, duration, or site of the pregnancy from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Unlike the NVSS, the PMSS receives death certificates that are often linked with live birth or fetal death certificates, as well as additional data when available (e.g., autopsy reports, hospital discharge records, and media reports). All of the information obtained is summarized and medically trained epidemiologists determine whether the cause of death is related to the pregnancy. Compared to the NVSS-reported maternal mortality rate, the PRMR is both more systematic, based on an in-depth review of each death for pregnancy-relatedness, and broader, tracking pregnancy related deaths up to a year after the end of pregnancy.

CAUSES OF PREGNANCY-RELATED DEATHS

The most common causes of pregnancy-related death from 2011 to 2016 were: cardiovascular conditions, infection, and hemorrhage (See Figure 2).¹³ Cardiovascular-related conditions including cardiomyopathy, other cardiovascular conditions, and cerebrovascular accidents were responsible for more than 33 percent of pregnancy-related deaths when combined. Moreover, cardiovascular-related conditions account for a growing share of pregnancy-related deaths over time.¹⁴ Approximately two-thirds of all pregnancy-related deaths are preventable, with hemorrhage, severe hypertension, and infection being the most common preventable causes.^k

FIGURE 2

Causes of Pregnancy Related Death, 2011-2016



Note: The above pie chart does not sum to 100 percent, because the cause of death is unknown for 6.4 percent of all 2011–2016 pregnancy-related deaths.

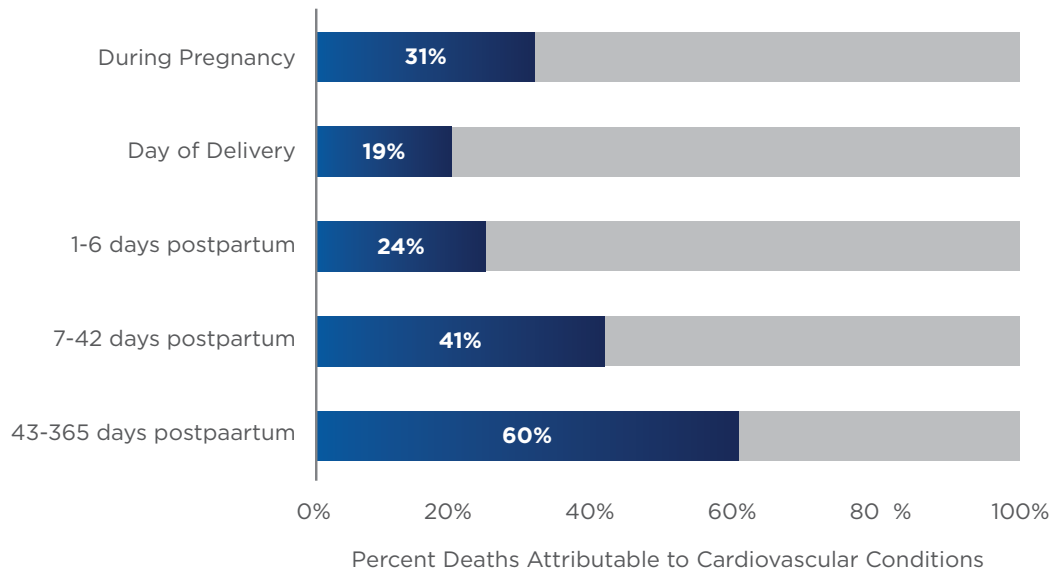
Source: Centers for Disease Prevention and Control Pregnancy Mortality Surveillance System: <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm>.

Causes of pregnancy-related death also vary across the prenatal, perinatal, and postpartum periods.^{15,26} For instance, data from 2011–2015 show that cardiovascular diseases account for an increasing percentage of all maternal deaths progressing from pregnancy into the postpartum period (see Figure 3).

^k CDC's Pregnancy Mortality Surveillance System (PMSS) provides the best national data on pregnancy-related deaths. However, birth and death certificates used to identify pregnancy-related deaths in the PMSS do not provide full medical histories, such as whether a woman had a mental health condition that may have contributed to a death. Data from MMRCs suggest a significant contribution of mental health to pregnancy-related deaths.¹⁵

FIGURE 3

Percentage of Pregnancy-Related Deaths Due to Cardiovascular Conditions by Timing of Death, 2011-2015



Note: Cardiovascular conditions include: cardiomyopathy, cerebrovascular accidents, and other cardiovascular conditions.

Source: Vital Signs: Pregnancy-Related Deaths, United States, 2011-2015, and Strategies for Prevention, 13 States, 2013-2017. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6818e1.htm>

TRENDS IN SEVERE MATERNAL MORBIDITY

Each year, thousands of women experience and survive severe complications during pregnancy, such as eclampsia, infection, or hemorrhage and may require intensive care, lengthy hospital stays, or hysterectomy.⁵ These complications are referred to as severe maternal morbidity (SMM). Blood transfusions (a procedure in which a patient receives donated blood) are significant events and can be an indicator of SMM, although they may not always reflect SMM in the absence of other indicators.^{6,7} As a result of this and changes in data reporting, recent SMM estimates do not include those who only received blood transfusions.

In 2017, there were over 25,000 hospital deliveries with an SMM (not including those who only received a blood transfusion) in the U.S., and the five most common complications were disseminated intravascular coagulation (clotting and bleeding disorder), hysterectomy (surgical removal of the uterus), acute kidney failure, sepsis (severe infection), and adult respiratory distress syndrome (see Table 1). When those with blood transfusions alone are included, the number of hospital deliveries with an SMM more than doubles.

Data also indicate that from 2008 through 2015, the rate of deliveries involving any SMM (not including blood transfusions) increased 21 percent, from 59.8 (0.6 percent of all delivery hospitalizations) to 72.6 (0.7 percent of all delivery hospitalizations) per 10,000¹ delivery hospitalizations.¹⁶ Research has indicated that changes in the overall health of women may be a contributing factor to rising rates of SMM, leading to higher rates of complications, including maternal mortality.⁴ For example, women are giving birth later in life, there are higher rates of pre-pregnancy obesity, and more women are entering pregnancy with chronic medical conditions.²³

TABLE 1

Frequencies of the Most Common Severe Maternal Morbidity (SMM) Complications Affecting Women Aged 12-55, 2017

Complication	Percentage of deliveries with at least one indication of SMM*
Disseminated intravascular coagulation**	24.4%
Hysterectomy	17.0%
Acute renal failure	16.7%
Sepsis	13.9%
Adult respiratory distress syndrome	12.0%

* Excludes blood transfusions

** Additional explorations are underway to better understand the impact of the transition from International Classification of Diseases (ICD)-9 to ICD-10 on disseminated intravascular coagulation diagnosis coding.

Source: Estimates provided by the Agency for Healthcare Research and Quality based on analysis of the Healthcare Cost and Utilization Project, National (Nationwide) Inpatient Sample, 2017 with ICD-10-CM Coding. <https://www.hcup-us.ahrq.gov/nisoverview.jsp>

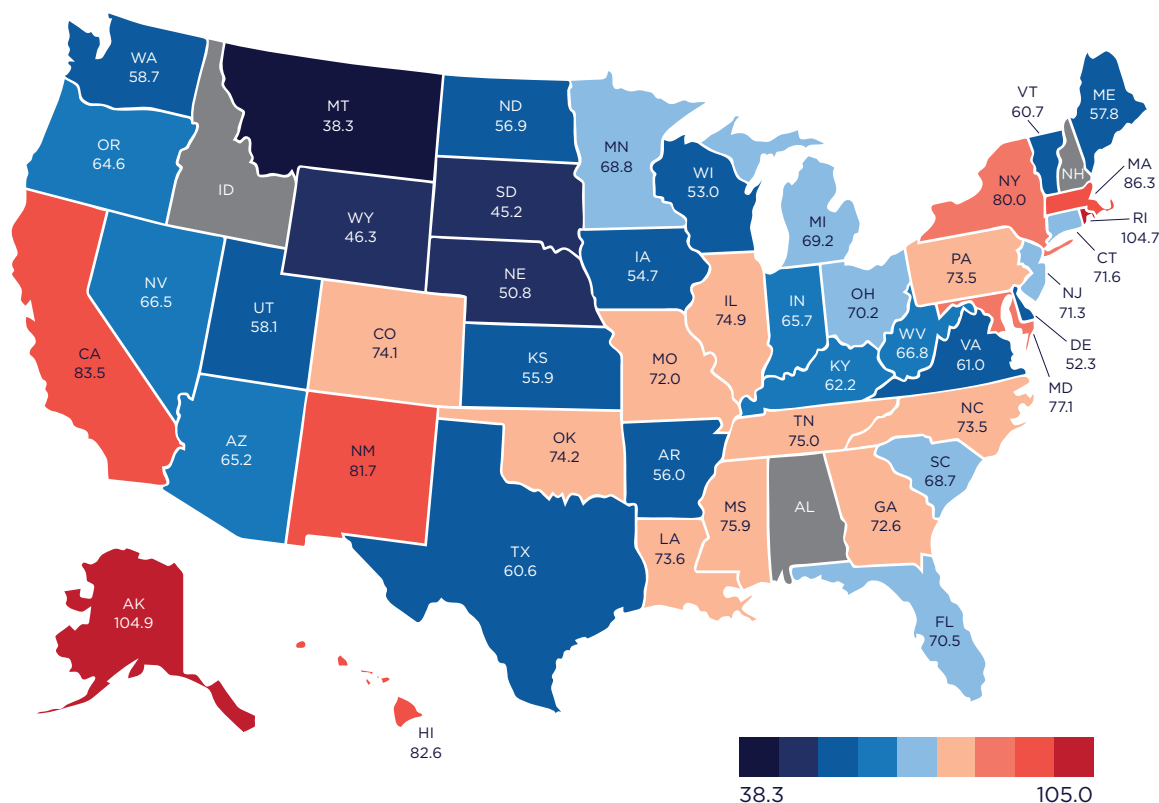
¹ SMM rates are reported per 10,000 delivery hospitalizations, rather than per 100,000 live births, which is used to report maternal mortality. In addition to including broader sets of births, SMM rates are reported using a different scale due to the size of the numerator. That is, there are many more cases of SMM than of mortality.



Figure 4 shows the geographical distribution of SMM across states in 2017, using data coded in International Classification of Diseases, 10th Revision Clinical Modification/Procedure Coding System (ICD-10-CM/PCS).^m Additional research is needed to identify factors contributing to state-level trends.

FIGURE 4

Rate of SMM (per 10,000 delivery hospitalizations) by State, 2017



Note: States colored gray indicate that HCUP data was not available in 2017. Data do not include blood transfusions.

Source: Estimates provided by the Agency for Healthcare Research and Quality based on analysis of the Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 47 States and the District of Columbia (from all states except Alabama, Idaho, and New Hampshire), 2017. www.hcup-us.ahrq.gov/sidoverview.jsp. HCUP SID Partners: <https://www.hcup-us.ahrq.gov/partners.jsp?SID>

Given the wide disparity in outcomes across states and hospitals, the wide array of common SMM complications, and the fact that more than half of maternal mortality and SMMs are preventable, there is substantial room for improvement.¹⁵

^m The focus on SMM rates that do not include blood transfusions in the absence of other indicators corresponded with changes in data reporting due to the mid-2015 transition from the 9th revision of the International Classification of Diseases (ICD-9-CM) to the 10th (ICD-10-CM/PCS). More information on this change is available in Section V: Challenges in Reducing Maternal Mortality and Morbidity, under *Data Quality and Timeliness*.



TARGETS

THIS ACTION PLAN AIMS TO ACHIEVE THE BELOW AMBITIOUS, YET ATTAINABLE TARGETS.



TARGET 1:

Reduce the maternal mortality rate by 50 percent in 5 years.

HHS is focusing on reducing the national maternal mortality rate by 50 percent as its topline target for improving maternal health outcomes. Mortality is generally preceded by severe complications and various morbidities, often caused by upstream risk factors such as pre-existing health conditions. While reducing mortality is an extremely important goal in its own right, addressing maternal mortality necessarily requires addressing the wide range of factors that affect maternal morbidity. Addressing the factors contributing to maternal mortality will translate into reductions in maternal morbidity that can have important short-term and long-term implications for the health of mothers. Additionally, reducing the maternal mortality rate by 50 percent will bring the U.S. much closer to the average mortality rate for other highly developed countries, as shown in Figure 5.

In order to meet this ambitious target, it will be particularly important to address the drivers of poor outcomes for at-risk populations. As shown in Table 2, maternal mortality is substantially higher for non-hispanic black women.ⁿ Mortality is also higher in non-metropolitan areas. Addressing these disparities is critical to improving the maternal mortality rate.

ⁿ As noted elsewhere in this report, while official rates for American Indian/Alaska Native (AI/AN) women were not published in 2018 by CDC's National Center for Health Statistics, previous estimates from CDC's PMSS suggest that rates of maternal death among AI/AN women are also very high. Mortality data do not support making a statistically reliable estimate for maternal mortality for the AI/AN population with one year of data.

FIGURE 5

2018 vs. 5-Year Target U.S. Maternal Mortality Rate

MATERNAL MORTALITY RATE (per 100,000 live births)



Source: National Center for Health Statistics
(<https://www.cdc.gov/nchs/maternal-mortality/index.htm>)

TABLE 2.

U.S. Maternal Mortality Rates per 100,000 Live Births by Race and Metro Status, 2018

Population	Overall	Non-Hispanic White	Non-Hispanic Black	Hispanic	Metro	Non-metro
Maternal Mortality Rate	17.4	14.7	37.1	11.8	16.7	21.6

Source: Race/ethnicity: "Maternal Mortality in the United States: Changes in Coding, Publication, and Data Release, 2018" National Vital Statistics Report. https://www.cdc.gov/nchs/data/nvsr/nvsr69/nvsr69_02-508.pdf Metro/non-Metro estimates provided by the National Center for Health Statistics



TARGET 2:

Reduce the low-risk cesarean delivery rate by 25 percent in 5 years.

As discussed in Section V, while cesarean deliveries are sometimes medically necessary, unnecessary cesarean deliveries pose higher risks for women compared to vaginal deliveries. The U.S. has one of the highest rates of cesarean deliveries in the world. Cesarean deliveries accounted for approximately 32 percent of all births in 2018, which is more than double the World Health Organization's (WHO) global target of 10 to 15 percent.^{17,18} Mean hospital rates vary substantially with some hospital rates below the WHO's guideline.¹⁹ Given the higher risks of poor outcomes associated with cesarean deliveries, in general, as well as evidence that provider practice patterns are a predominant driver of cesarean delivery rates, substantial progress can be made to improve maternal health outcomes if more providers followed the practices of those that complete fewer of these procedures.²⁰ This is why we aim to reduce the rate of low-risk cesarean deliveries (see Figure 6). We are specifically focusing on nulliparous, term, singleton, vertex (NTSV) cesarean deliveries, which occur among women who are pregnant for the first time, are at a minimum 37 weeks of gestational

age, and giving birth to a single baby (not twins or multiples) that is in the vertex position (positioned in the uterus with the head down). We use this rate because it accounts for the most common medical indications for cesarean delivery: preterm or multiple births and fetal positioning, and the majority of women with a previous cesarean birth have repeat cesareans for subsequent births, so avoiding a low-risk cesarean delivery reduces the likelihood of subsequent cesarean deliveries.

Notably, the low-risk cesarean delivery rate is too high in every group of American women, but it is particularly high among Non-Hispanic black women (see Table 3). Addressing this disparity is critical to achieving the national target.

FIGURE 6

2018 vs. 5-Year Target U.S. Low-Risk Cesarean Delivery* Rate

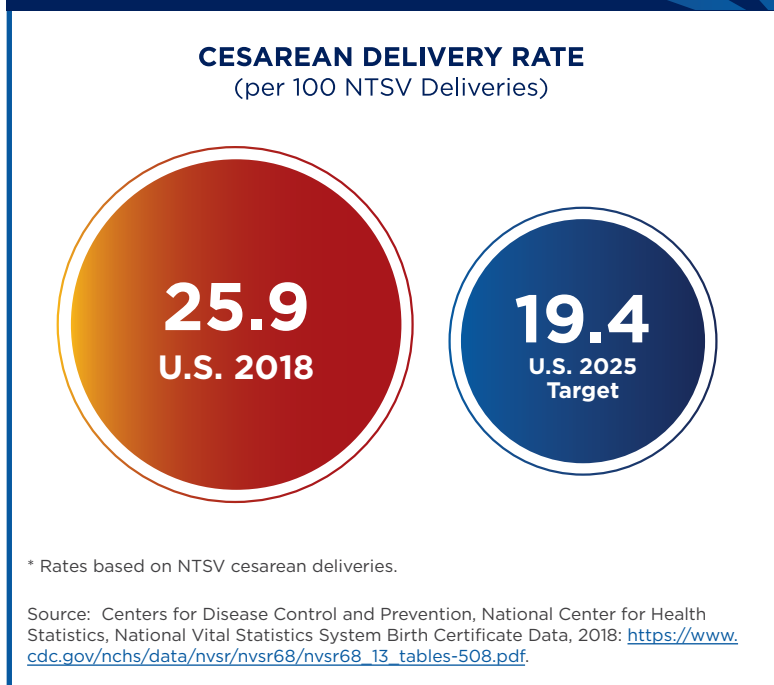


TABLE 3

U.S. Low-Risk Cesarean Delivery Rates per 100 Deliveries* by Race/Ethnicity and Metro Status, 2018

Population	Overall	Non-Hispanic White	Non-Hispanic Black	Hispanic	American Indian/ Alaska Native	Metro	Non-metro
Cesarean Delivery rate	25.9	24.9	30.3	25.4	22.3	25.9	25.2

* Rates based on NTSV cesarean deliveries. The cesarean delivery rate is reported per 100 NTSV births instead of per 100,000 live births. NTSV deliveries are a subsection of all deliveries and are reported on a different scale due to the size of the numerator.

Source: Race/ethnicity: "Births: Final Data for 2018" National Vital Statistics Report, Supplemental Tables. https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_13-508.pdf Metro/non-Metro estimates provided by the National Center for Health Statistics.



TARGET 3:

Achieve blood pressure control in 80 percent of women of reproductive age with hypertension within 5 years.

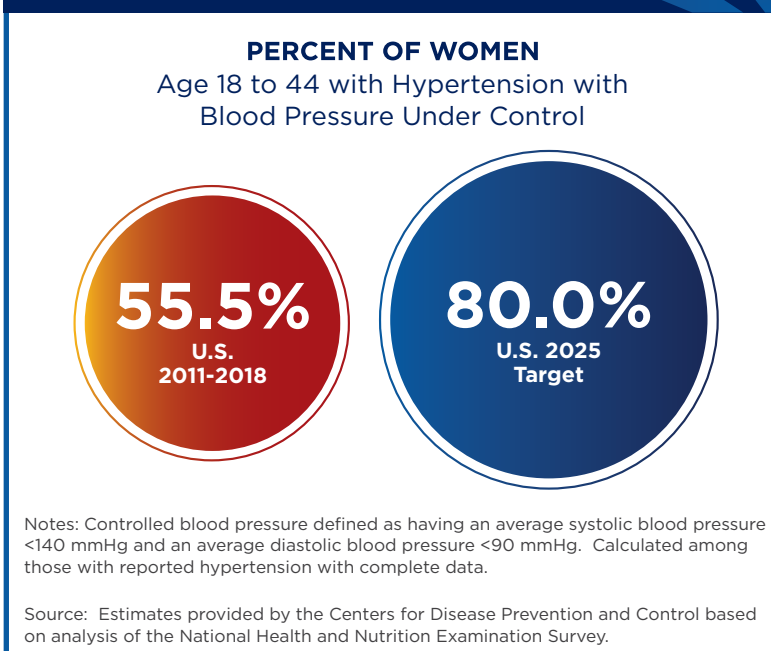
Approximately 9 percent of all women of reproductive age (ages 20-44), and 19 percent of black women of reproductive age, in the U.S. have hypertension (chronically high blood pressure), which puts them at higher risk for pregnancy complications such as preeclampsia, heart attack, severe postpartum bleeding, gestational diabetes, issues with the placenta (abruption), or kidney failure.^{21,22} High blood pressure during pregnancy raises a woman's lifelong risk of cardiovascular disease and can have implications for infants, including low birth weight, premature birth, and birth defects, including congenital heart defects.²³ Of the 9 percent of women of reproductive age with hypertension, approximately 17 percent are unaware of their hypertension status and approximately 41 percent have uncontrolled hypertension.^o

Given the numerous implications of this condition for women and their babies, HHS aims to increase the percentage of women of reproductive age with hypertension who have their blood pressure under control to improve pregnancy and birth outcomes (see Figure 7).

^o Note: These statistics were calculated based on women ages 20-44 from National Health and Nutrition Examination Survey (NHANES) 2011-2016 and do not correspond to Figure 7, which is based on women ages 18-44 from NHANES 2011-2018.

FIGURE 7

2011-2018 Average Prevalence vs. 5-Year Target Blood Pressure Control, Women of Reproductive Age with Hypertension (ages 18-44)



As shown in Table 4, among women of reproductive age with hypertension, Non-Hispanic black and Hispanic women are substantially less likely to have their blood pressure under control compared to Non-Hispanic white women. Given the amount of maternal mortality and morbidity that is attributable to cardiovascular conditions, in which hypertension can play a contributing role, it is important that efforts be made to address existing disparities in blood pressure control.

TABLE 4

2011-2018 Average Prevalence of Blood Pressure Control among Women of Reproductive Age with Hypertension (ages 18-44)

Population	Overall	Non-Hispanic White	Non-Hispanic Black	Hispanic
Blood Pressure Control Prevalence	55.5%*	66.3%	44.7%	49.9%

Notes: Controlled blood pressure defined as having an average systolic blood pressure <140 mmHg and an average diastolic blood pressure <90 mmHg. Calculated among those with reported hypertension with complete data. Non-Hispanic Asian women and women of other Race-Hispanic origins are included in the total but not reported as subgroups. Estimates for metropolitan and non-metropolitan prevalence are not provided, because this information is only available in the National Health and Nutrition Examination Survey restricted-use files.

Source: Estimates provided by the Centers for Disease Prevention and Control based on analysis of the National Health and Nutrition Examination Survey.





ACTIONS TO DRIVE PROGRESS

THE DEPARTMENT'S ACTION PLAN INCLUDES FOUR GOALS DESIGNED TO ACHIEVE THE VISION FOR ENSURING THE U.S. IS ONE OF THE SAFEST COUNTRIES IN THE WORLD FOR WOMEN TO GIVE BIRTH.



GOAL 1:

Healthy Outcomes for All Women of Reproductive Age

Because the most common cause of pregnancy-related death is cardiovascular and coronary conditions, it is critically important that the Department's Action Plan prioritize prevention and treatment of cardiovascular disease. Cardiovascular disease and coronary conditions have a significant impact on every stage of women's lives. For example, high blood pressure during pregnancy increases the risk for future cardiovascular disease and death.

The Department will make new investments in evidence-based prevention and treatment strategies for cardiovascular disease and other significant medical risk factors, and disseminate evidence-based public health messages that are culturally appropriate for high-risk populations.



DISPARITIES IMPACT:

Non-Hispanic black women are more likely to enter pregnancy with chronic hypertension and are more likely to develop preeclampsia.²⁴ Investments in better prevention and treatment of cardiovascular disease are important to address the racial and ethnic disparities in cardiovascular diseases and related maternal mortality and morbidities among non-Hispanic black women and American Indian/Alaska Native women.

OBJECTIVE 1.1

Improve prevention and treatment of cardiovascular disease for women of reproductive age by more effectively controlling blood pressure and preventing hypertension

Given that cardiovascular conditions account for such a large share of maternal mortality and morbidity, as described in Section II of this Action Plan, the Department will launch the below two initiatives to improve the prevention and treatment of cardiovascular conditions for women of reproductive age, through controlling blood pressure and preventing hypertension.

The Department will launch the following initiatives to address cardiovascular conditions:

ACTION 1.1.1

Launch the initial implementation of a national \$3.3 million prize competition in Fiscal Year 2020 to identify effective, innovative models to ensure women with hypertension during pregnancy and postpartum receive appropriate monitoring and follow-up care. This competition will allow the Department to identify, validate, and promote replication of programs that successfully target gaps in management of hypertension.

ACTION 1.1.2

Dedicate \$1.6 million to the training and technical assistance of Title X National Family Planning centers focusing on hypertension among women of child-bearing age. This training and technical assistance will increase the rate of early screenings for socioeconomically disadvantaged and racially diverse populations for hypertension and quick referrals to appropriate providers.

OBJECTIVE 1.2:

Encourage evidence-based preventive and disease management services for other significant medical risk factors

While the Department is placing a special emphasis on cardiovascular conditions, maternal health outcomes are affected by a number of other important risk factors such as diabetes, obesity, substance use, and nutrient deficiencies. Below, we describe initiatives for making health information on important risk factors and evidence-based screening and treatment services more accessible for women, evaluating the evidence for screening, counseling, and other interventions to address risk factors, and improving and implementing new models of pre-pregnancy health screening and care delivery to reduce health disparities among high-risk and underserved women.

ACTION 1.2.1

Increase use of preventive services across care settings and diverse populations by:

- Creating billing and coding guides to accompany the Women's Preventive Services Guidelines to support utilization in the clinical setting, disseminating and translating the Guidelines and the Well Woman Chart into Spanish, and publishing additional patient-facing materials for each of the Guidelines' existing 12 preventive service recommendations.
- Updating the United States Preventive Services Task Force reviews, which establish preventive health care services

that must be covered by health plans in-network without cost sharing, specifically to include maternal health recommendations.^p

ACTION 1.2.2

Disseminate new models and promising practices of integrating pre-pregnancy health screening and follow-up into primary care and other clinical settings through HRSA's Preconception Collaborative Improvement & Innovation Networks (CoIIN), including creation of a provider practice bulletin and consumer/patient education materials.

ACTION 1.2.3

Award supplemental funding to Healthy Start sites to expand clinical support services for at-risk clients, including pre-pregnancy health screening and care delivery.^q

ACTION 1.2.4

To address viral hepatitis, HHS is developing the next iteration of a national viral hepatitis strategy for the United States to guide stakeholders from all sectors in collaborative efforts focused on key strategies to achieve our national viral hepatitis goals. Pregnant women are listed as a priority population because of the risk of women with infections transmitting the virus to their infants unless proper steps are taken.

ACTION 1.2.5

Continue to invest in eliminating mother-to-child transmission of human immunodeficiency virus (HIV), primarily through efforts with health departments in jurisdictions with recent perinatal HIV cases or a high number of HIV infected women of childbearing age. CDC continues to increase screening in women at risk, monitor women infected with HIV and their infants, and conduct real-time investigations of perinatal acquisition cases to understand and address where the system failed. Further, CDC has published a framework to guide federal agencies and other organizations in their efforts to reduce the rate of perinatal transmission of HIV to less than 1 percent among infants born to women with HIV and less than 1 perinatal transmission per 100,000 live births.

ACTIONS 1.2.6

Partner with healthcare providers and medical professional organizations focused on prenatal and maternal care to promote the incorporation of routine conversations about the importance and safety of immunizations during patient visits.

^p See the Appendix for a full list of planned recommendations.

^q Each Healthy Start grantee's approach to clinical care and client support will be different, but grantees are currently in the process of onboarding health care professionals or negotiating service arrangements to provide care.



GOAL 2:

HEALTHY PREGNANCIES AND BIRTHS

Implementing evidence-based clinical best practices and payment reforms aimed at reducing low-risk^r cesarean delivery births and providing patient-centered prenatal care to pregnant women have great potential to improve maternal health outcomes. In order to improve the quality of maternity care throughout pregnancy and delivery, the Department will support efforts to implement and expand adoption of evidence-based maternal health care through the three strategies described below. In addition to improving the health of all pregnant women, HHS aims to reduce disparities in health outcomes for populations that have been especially at risk.

^r Defined as nulliparous, term, singleton, vertex cesarean deliveries.



DISPARITIES IMPACT:

Non-Hispanic black women are more likely to have low-risk cesarean deliveries than are women from other races and ethnicities.⁶³ The Department's focus on reducing the low-risk cesarean delivery rate^s by reforming provider payment has a particular importance for improving maternal health outcomes for this population.

^s Specifically, NTSV cesarean deliveries

OBJECTIVE 2.1

Align provider payment with positive outcomes and quality improvement achievements, such as reducing low-risk cesarean deliveries

Standard approaches to care during pregnancy and childbirth can contribute to negative trends in maternal mortality and morbidity. For example, misaligned payment structures can drive unnecessary utilization of cesarean deliveries among women with low medical risk, and low reimbursement rates can contribute to a lack of access to high-quality, evidence-based prenatal care services. Implementing care delivery models and payment incentives that aim to reduce elective cesarean delivery births and that invest in patient-centered prenatal and postpartum care to pregnant women has enormous potential to improve maternal mortality and morbidity.

The Department will invest in initiatives to align provider payment and quality improvement using the following strategies.

ACTION 2.1.1

Encourage state Medicaid programs to adopt value-based payment models for maternity care that bundle payment for prenatal, delivery, and postpartum services tied to key maternal and infant outcomes.

ACTION 2.1.2

Encourage state Medicaid programs to leverage payment, create incentives, or manage utilization to reduce low-risk, early-elective cesarean deliveries.

ACTION 2.1.3

Develop and publicly report quality measures related to maternal mortality and morbidity in the Hospital Inpatient Quality Reporting program, including a comprehensive maternal morbidity electronic clinical quality measure, a structural measure on participation in a Perinatal Quality Improvement Collaborative Program, and a cesarean delivery measure.

ACTION 2.1.4

Align appropriate quality measures for maternal care across all Centers for Medicare & Medicaid Services (CMS) programs, including Medicare, and Medicaid.

ACTION 2.1.5

Explore ways to inform health care practitioners and facilities on their cesarean delivery rates and encourage best practices to improve outcomes.

OBJECTIVE 2.2

Support efforts to expand adoption of evidence-based clinical best practices in maternal health and obstetrics

There is a tremendous opportunity to improve the provision of maternal health and obstetric services through the expansion of state-based efforts to diffuse and implement evidence-based clinical best practices. We discuss how the Department will further support these efforts through investments in the Alliance for Innovation on Maternal Health (AIM) and

Perinatal Quality Collaboratives (PQCs), which are informed by ongoing investigations of maternal deaths conducted by state-based Maternal Mortality Review Committees and other research, among other efforts.

ACTION 2.2.1

Invest in the AIM program by:

- Expanding participation in the AIM hospital-based safety bundles to all 50 states, Washington D.C., Territories, and Tribal Communities consistent with the funding increase proposed in the President's FY 2021 Budget;
- Developing new AIM hospital-based safety bundles on cardiovascular disease and maternal sepsis;
- Implementing additional AIM patient safety bundles at all IHS federal facilities; and
- Developing and deploying new AIM bundles to address care at a national level provided in outpatient and other community settings.

ACTION 2.2.2

Deploy interdisciplinary action teams to hospitals, clinics, health centers, providers, and community organizations that serve women at high-risk of maternal mortality and morbidity to provide technical support for best practices and lessons learned.

ACTION 2.2.3

Test alternative systems for delivering maternal care in rural areas through HRSA's Rural Maternity and Obstetrics Management Strategies (RMOMS) program, which funds three rural health networks in Missouri, New Mexico, and Texas to increase sustainability, access, and delivery of pre-pregnancy, pregnancy, labor and delivery, and postpartum services. The President's FY 2021 Budget proposes a total of \$12.4 million to expand the RMOMS pilot beginning in FY 2021.

ACTION 2.2.4

Develop a new *Think Cultural Health* e-learning continuing education course through the HHS Office of Minority Health (OMH) for physicians, nurses, other health care providers, and students about culturally and linguistically appropriate services (CLAS)^t in maternal health care, to be released in fall of 2020. The course will be available on *Think Cultural Health*, an OMH website that provides health professionals with resources to learn about cultural competency. The site houses a suite of free, accredited e-learning programs designed for a variety of health professionals, including physicians, nurses, dentists, and behavioral health providers. It also houses resources on the National Standards for Culturally and Linguistically Appropriate Services in Health and Health Care, a set of actions steps that health care organizations can take to provide CLAS.

^t Culturally and linguistically appropriate services are respectful of and responsive to the health beliefs, practices, and needs of diverse patients and are an important component of efforts to reduce maternal health disparities.

ACTION 2.2.5

Launch the second phase of the Safety Program in Perinatal Care (SPPC), which will operate through 2022, to complement AIM maternal safety bundles by emphasizing essential teamwork and communication skills. The SPPC complements the AIM program by providing free continuing education and technical assistance to hospital-based teams, who secure leadership buy-in, foster a culture of teamwork and communication skills to improve unit-level patient safety culture and quality of obstetric care, and select and implement at least two perinatal safety bundles.

ACTION 2.2.6

Launch a public-private partnership that addresses racial differences in maternal health outcomes by driving sustained quality improvement in the hospital setting. The partnership's goal is to reduce maternal morbidity—and ultimately mortality—among black women, who are at the highest risk for poor outcomes.

OBJECTIVE 2.3

Improve access to high-quality prenatal care and delivery services for at-risk populations

Prenatal care access, including addressing risk factors and complications as they arise, is vitally important to the health of the mother and her baby. It is also important that pregnant women deliver their babies at facilities that are adequately resourced to address the complexity of the pregnancy. In areas where there may be a shortage of tertiary obstetric services,

it is important local facilities are “OB Ready.” Addressing each of these issues is important to not only improve maternal health outcomes across the board, but to also reduce disparities in care.

Below, we discuss HHS’ planned initiatives to improve the delivery of prenatal and obstetric services.

ACTION 2.3.1

Launch an “OB Readiness Initiative” through CMS that convenes experts to develop recommendations on how to expand the number of rural hospitals that are “OB Ready,” meaning they are adequately equipped to handle a delivery, even if they do not support a full suite of obstetric services.

ACTION 2.3.2

Develop a program of Rural Obstetric Readiness in 2021 for rural IHS sites that have an Emergency Department, but do not have on-site Labor and Delivery services. This “OB Ready” program will include staff development with ongoing training and drills, resource development with assurance of access to necessary equipment and medications, and integration with regional maternity care and transportation networks. The President’s FY 2021 Budget included \$5 million in additional funding to support IHS’ preventative, perinatal, and postpartum care.

ACTION 2.3.3

Provide more than \$2,500,000^u under the Scholarships for Disadvantaged Students program to educate midwives to address the national shortage of maternity care providers, with a specific emphasis on addressing the lack of diversity in the maternity care workforce.

ACTION 2.3.4

Encourage increased access to birth centers and midwives in state Medicaid programs.

- Encourage access to birth centers by recommending states increase Medicaid payments to licensed birth centers and remove state scope of practice barriers that prevent care from being delivered by certified nurse midwives (CNMs) and/or certified professional midwives (CPMs).
- Examine whether states should expand reimbursable services available under Medicaid to include high-value, low-cost services such as doulas, lactation consultants, certified professional midwives, etc.

ACTION 2.3.5

Implement the Innovation Center's Maternal Opioid Misuse (MOM) Model to address the needs of pregnant and postpartum women with opioid use disorder (OUD), and the fractured health care delivery systems for this population, in partnership with 10 states.

ACTION 2.3.6

Conduct a public health social marketing effort, *Hear Her*, led by CDC, that seeks to reduce the number of preventable deaths by increasing awareness of serious pregnancy-related complications and their warning signs. The campaign was designed to empower women to speak up when they have concerns, and to encourage women's support systems to listen and take action. It will work to strengthen patient and provider communication. The campaign, which launched in August, is being implemented through online and print media placements, partner distribution tactics, and social media promotions.

ACTION 2.3.7

Establish criteria for and collect data to identify, publish, and score maternal care shortages in already existing Health Professional Shortage Areas for use in placement of National Health Service Corps and Nurse Corps providers.

ACTION 2.3.8

Prioritize funding in HRSA's Nurse Corps Loan Repayment Program (NCLRP) to nurses specializing in women's health (i.e., Women's Health Nurse Practitioners, OB-GYN^v Nurse Practitioners, Certified Nurse Midwives, Psychiatric Nurse Practitioners, and OB-GYN nurses) to increase the number of nurses that can provide maternity care to women living in rural and underserved communities. The President's FY 2021 Budget increases funding for the NCLRP to \$5 million.

^u Appropriated under the Further Consolidated Appropriations Act of 2020.

^v OB-GYN - Obstetrics and Gynecology

ACTION 2.3.9

Expand medical training, including residencies, fellowships, and clinical rotations, for OB-GYNs, nurses, and other health professions students in community-based settings and collaborative care models, specifically in rural and underserved communities through the Teaching Health Center Graduate Medical Education (THCGME) and Behavioral Health Workforce Education and Training (BHWET) programs.

- The THCGME program incentivizes applicants who operate community-based ambulatory patient care center training sites in rural communities.
- The BHWET program supports paraprofessional, master's, and doctoral-level behavioral health practitioners who work in settings with integrated primary and behavioral health care, such as community health centers.

ACTION 2.3.10

Increase rates of Hispanic women receiving first-trimester prenatal care in target areas along the U.S.-Mexico border through innovations developed and tested by HRSA's Infant Mortality Collaborative Improvement and Innovation Network (ColIN) – Border States ColIN.

ACTION 2.3.11

Develop and refine CMS programs and policies that ensure rural women have access to high-quality maternal and infant health care that results in optimal health outcomes. On February 12, 2020, CMS released a Request for Information (RFI) to learn about opportunities to improve access, quality, and outcomes for women in rural

communities before, during, and after pregnancy. Specifically, CMS sought information about how to reduce maternal health disparities between rural and urban environments, and racial and ethnic disparities within rural environments. The RFI also requested comments on the readiness of rural providers to respond to obstetric emergencies (emergencies related to pregnancy, birth, and after birth) in rural areas.

Find more information on the Rural Maternal & Infant Health Care RFI at: <https://www.cms.gov/blog/rethinking-rural-health-maternal-and-infant-health-rfi>

ACTION 2.3.12

Identify ways to improve the health and wellness of families through increased physical activity during pregnancy and postpartum through formative research with input from pregnant and postpartum women and their health care providers in order to develop targeted tools and resources for these audiences, and to evaluate the effectiveness of efforts to encourage physical activity during pregnancy and beyond. This effort is part of Move Your Way, which is the promotional campaign for the second edition of the Physical Activity Guidelines for Americans.

Find more information on Move Your Way at <https://health.gov/moveyourway>

and <https://www.womenshealth.gov/blog/improving-maternal-health-outcomes-focus-physical-activity>



GOAL 3:

HEALTHY FUTURES

The Department aims to improve support for women and their families during the postpartum period by assisting efforts to increase the quality of postpartum care, including increasing rates of screening and treatment for risk factors and complications including, but not limited to, intimate partner violence, behavioral health conditions including postpartum depression, and substance use disorder (SUD) that can have an impact on both the health of mothers and their newborn children. Additionally, to help infants have a healthy start on life, the Department will improve access to information on taking care of a newborn child, such as childbirth education, breastfeeding, safe sleep practices for babies, parenting skills, self-esteem building, family supports, and healthy child development.



DISPARITIES IMPACT:

Significant disparities exist in the accessibility and quality of postpartum care for women of color. For example, studies have shown that black women are less likely to utilize postpartum visits.²⁵ Black and Latina^w women with Medicaid coverage also enter treatment for postpartum depression at much lower rates than white women.²⁶ The Department will apply a disparities-informed lens to ensure that high quality, evidence-based postpartum care is available to all families.

^w Study authors considered women's race and ethnicity as categorized in New Jersey Medicaid Enrollment, which considers Latin heritage rather than Hispanic heritage. While Hispanic refers to Spanish-speaking people or those who have descended from Spanish-speaking populations, Latina refers to women who are from or who have descended from people from Latin America.

OBJECTIVE 3.1

Improve the quality of and access to postpartum care, especially mental health and substance use services

Postpartum care access is as equally important as prenatal care to the health of the mother. A number of serious complications that can arise well into the postpartum period and regular checkups and screenings with a health care provider create an opportunity for women to receive helpful information on how to prevent complications and understand what signs and symptoms to watch for. Postpartum checkups are also an opportunity to screen for social risk factors, such as intimate partner violence, that may be affecting the wellbeing of the woman and her child. Treating a condition rapidly can have both short- and long-term benefits for the woman, as well as her baby who benefits from having a healthy mother.

Below we discuss the Department's future initiatives to help facilitate continuous care during the postpartum period.

ACTION 3.1.1

Support policies to allow states to extend Medicaid coverage for postpartum women with SUD from 60 days to 365 days after birth. The Department will also pursue strategies to close coverage and care gaps for all postpartum women after pregnancy-related Medicaid coverage expires.

ACTION 3.1.2

Launch new non-hospital focused AIM maternal safety bundles to improve postpartum care for

maternal safety: Postpartum Care Basics I: From Birth to the Comprehensive Postpartum Visit and Postpartum Care Basics II: Transition from Maternity to Well-Woman Care.

ACTION 3.1.3

Scale practice improvements in outcomes related to maternal depression and intimate partner violence to additional home visiting programs, apply a health equity lens to home visiting quality improvement by developing quality playbooks that include key influences that impact changes in health equity and postpartum care, and develop resources to apply home visiting quality improvement methods to increase mothers' receipt of postpartum care through HRSA's Home Visiting Collaborative Improvement and Innovation Network (CoIIN). These investments will also include a measurement strategy to demonstrate real-time improvements in advancing health equity and increasing rates of postpartum care among Maternal, Infant, and Early Childhood Home Visiting Program-supported agencies.

ACTION 3.1.4

Launch the Agency for Healthcare Research and Quality's (AHRQ's) Cross Sectional Innovation to Improve Rural Postpartum Mental Health Challenge, which is a national \$175,000 prize competition to highlight local innovations to improve postpartum mental health care for rural American families.

ACTION 3.1.5

Encourage moms across the nation to report postpartum depression symptoms to a health care provider through a campaign that will feature video stories from real moms who have been treated for postpartum depression. This campaign will focus specifically on reducing the stigma of postpartum depression and anxiety so that more women will feel comfortable discussing depression or anxiety-related symptoms with their doctor, nurse, or midwife.

OBJECTIVE 3.2:

Improve infant health outcomes by promoting the development of strong parent-child relationships

In addition to addressing the mother's health care needs, children benefit from developing a strong bond with their parents. The quality of mother-child bond is crucial to children's development at an early age as well as in their later development. In turn, new parents benefit from receiving family supports that help them respond to the needs of infants and develop parenting skills that facilitate strong bonds with their children, all of which promote healthy development. HHS is pursuing the below initiatives to improve infant health and foster strong parent-child bonds.

ACTION 3.2.1

Deploy \$9 million from the Prevention and Public Health Fund for breastfeeding grants for hospitals.

ACTION 3.2.2

Advance a nationwide paid family leave plan so mothers can focus on their health and parents can develop a strong bond with their children.

ACTION 3.2.3

Increase breastfeeding rates and decrease disparities in breastfeeding by supporting a multi-year national campaign, *Breastfeeding Education and Promotion Campaign for African American Mothers and Families*, to encourage African American mothers to breastfeed for at least the first six months, with support from their families. The campaign will focus on using existing *It's Only Natural: Mother's Love, Mother's Milk* materials, which are specifically tailored for the African American community, and other breastfeeding support resources developed by the Office on Women's Health (OWH) within the Office of the Assistant Secretary for Health (OASH).

ACTION 3.2.4

Implement the Task Force on Research Specific to Pregnant Women and Lactating Women's (PRGLAC) recommendations made to the Secretary in September 2018 in coordination with representatives across government, academia, industry, and nonprofit organizations. The Task Force's recommendations include additional investment in research topics that affect pregnant and lactating women, including creating programs to drive discovery and development of new therapeutics.^x

ACTION 3.2.6

Launch a national competition to identify effective, pre-existing programs that increase breastfeeding initiation and continuation rates and decrease disparities among breastfeeding mothers. The Reducing Disparities in Breastfeeding Innovation Challenge will include an \$800,000 prize to a program with proven outcomes and the ability to replicate and/or expand.

ACTION 3.2.5

Make postpartum services more accessible to mothers with disabilities through programs like The National Research Center for Parents with Disabilities, Parent Empowering Parents and Through the Looking Glass.^y

^x Details on specific activities are available in the appendix.

^y A description of these programs is available in the Appendix.



GOAL 4:

IMPROVE DATA AND BOLSTER RESEARCH

HHS aims to enhance the quality and timeliness of maternal health data and metrics to strengthen surveillance and drive quality improvement. Although important efforts have been devoted to improving the quality of maternal and birth vital health statistics, much more can be done to advance the field by supporting states in addressing current shortfalls in data accuracy, improving the timeliness of data collection, ensuring the capture of race/ethnicity and other important patient characteristics, and developing better metrics for maternal health outcomes. Improving data will support research to better understand the causes of poor health outcomes and identify effective approaches to overcoming them, assist women in understanding the implications of risk factors and actions they can take to address them, help policymakers design public health solutions, and aid providers in recognizing when they need to redesign their care processes to align with evidence-based best practices that support value-based care.



DISPARITIES IMPACT:

The availability of quality maternal health data that is stratified by race and ethnicity, geography, and socioeconomic status is essential to understanding both the scope of current issues and where new or emerging issues are occurring. Similarly, we expect that the Department's investments in a disparities-informed research agenda will produce new insights, methods, and possible interventions to reduce disparities in maternal health care.

OBJECTIVE 4.1

Enhance maternal health surveillance by improving data collection transparency, timeliness, and standardization, to be able to stratify by risk factors

The ability to effect change in maternal health outcomes is highly dependent on having access to timely, high-quality data and measures on vital statistics and other types of health outcomes that are standardized in order to identify problem spots and to determine which interventions are effective to address a given challenge. Health and health care data used for surveillance and research purposes are complex and often drawn from multiple sources that may not have sufficient detail or information necessary for drawing strong inferences regarding topics such as identifying improvements in maternal health outcomes resulting from program participation. Analyzing maternal health data can help identify opportunities to better target resources and develop new interventions to improve care delivery.

Below are specific initiatives the Department will take to continue to improve the quality, timeliness, and availability of data for surveillance and health services research purposes.

ACTION 4.1.1

The President's FY 2021 Budget invests \$70 million in the CDC's Safe Motherhood and Infant Health Program, which includes the Pregnancy Risk Assessment Monitoring System (PRAMS), providing technical assistance to existing State MMRCs, and states planning MMRCs to build

stronger data systems to improve data collection at the State level and create consistency in data collection across State MMRCs.

ACTION 4.1.2

Pilot an initiative to map maternal health outcomes, risk factors, and relevant HRSA resources (e.g., health centers, home visiting, National Health Service Corps, and Nurse Corps providers) to optimize placement of current and future HRSA programs in areas with the highest maternal health needs.

ACTION 4.1.3

Designate an initial \$3 million to fund new projects related to maternal health data through the Office of the Secretary's Patient-Centered Outcomes Research Trust Fund (OS-PCORTF), including a pilot project involving multiple states that will support state-level linkages between data from the Pregnancy Risk Assessment Monitoring System (PRAMS) and clinical outcomes data that could be obtained from various sources, such as administrative claims or hospital discharge data. These data linkages will facilitate additional patient-centered outcomes research to further expand the evidence base on the effectiveness of interventions to improve maternal and infant health outcomes. This project will also support a learning collaborative to help facilitate the development and application of standardized approaches to generating data linkages across each of the participating states.

ACTION 4.1.4

Assist nine states with establishing state-focused Maternal Health Task Forces through HRSA's State Maternal Health Innovation Program to implement strategic maternal health plans that incorporate efforts to improve the collection and analysis of state-level data on maternal mortality and severe maternal morbidity, to accelerate change in maternity care service delivery and policies.

ACTION 4.1.5

Provide funding to thirteen health departments to conduct mother-baby surveillance for emerging infectious diseases and other health threats through the "Surveillance for Emerging Threats to Mothers and Babies" Network.

OBJECTIVE 4.2

Advance a research agenda to identify effective, evidence-based best practices in maternal health, including those addressing clinical, environmental, and socioeconomic factors

There have been varying levels of activity within states to better understand the root causes of maternal deaths that have occurred and what could have been done differently to prevent those that were preventable. The Department is currently supporting efforts to broaden the reach of these learnings across the nation and support the implementation of best practices at hospitals nationwide to prevent poor maternal health outcomes. While some states appear to be experiencing improvements in outcomes as

a result of these efforts, more work can be done to identify additional interventions and best practices that can improve maternal health, and to date, the evidence suggests that substantial disparities may persist even when across-the-board improvements occur. We need to press harder as a nation to address the root causes of disparities in maternal health outcomes and to identify effective solutions to overcome them.

The Department is working to support the next generation of research to inform these solutions as discussed below.

ACTION 4.2.1

Develop a maternal health research action plan in 2020, that will use an integrated social, biobehavioral, and fundamental science approach to engage local communities and stakeholders to expand the implementation and dissemination of promising practices to reduce maternal mortality and morbidity during pregnancy, labor and delivery, and the postpartum period, as well as to address the incomplete knowledge base regarding biological risk factors for maternal mortality and morbidity.

ACTION 4.2.2

Support research as described in the recently released funding opportunity announcement, "Addressing Racial Disparities in Maternal Mortality and Morbidity," to support original, innovative, multidisciplinary research aimed at advancing the understanding, prevention, and reduction of maternal mortality or morbidity among racial and ethnic minority women and socioeconomically disadvantaged women including those in rural settings

ACTION 4.2.3

Award five-year contracts to institutions to review and analyze scientific literature on a wide spectrum of maternal health-focused clinical and health services topics using a rigorous methodology through the agency's Evidence-based Practice Center Program.

ACTION 4.2.4

Award a 5-year contract to identify individual and/or collective strategies, interrelated activities, and common themes within and across HRSA funded maternal health programs that may be contributing to or driving improvements in key maternal health outcomes





CHALLENGES IN REDUCING MATERNAL MORTALITY AND MORBIDITY

In order to achieve HHS' vision for ensuring the U.S. is one of the safest countries in the world for women to give birth, future actions must confront critical challenges in addressing the maternal health crisis, including addressing contributors to the substantial disparities and supporting system change. We will not be able to achieve the ambitious key targets in this Action Plan without reducing disparities. Additionally, we recognize that a variety of system barriers are likely to limit progress if not addressed as part of a holistic solution. These include data issues, provider practice variation, lack of social supports and coordination between healthcare providers and community-based organizations, and Medicaid payment and coverage challenges.

IMPROVING OUTCOMES FOR AT-RISK POPULATIONS

RACIAL/ETHNIC DISPARITIES

From 2007-2016, the pregnancy-related mortality ratio for non-Hispanic black women (averaging 40.8 deaths per 100,000 live births^z) and American Indian and Alaska Native women (averaging 29.7 deaths per 100,000 live births) was two to three times higher than for non-Hispanic white (averaging 12.7 deaths per 100,000 live births), Hispanic women (averaging 11.5 deaths per 100,000 live births), and Asian/Pacific Islander women (averaging 13.5 deaths per 100,000 live births). As indicated in Figure 8, these disparities were persistent and did not change significantly between 2007-2008 and 2015-2016.

Even among women with a college degree or higher, the pregnancy-related mortality ratio^{aa} was over five times higher for black women compared to white, Asian Pacific/Islander, and Hispanic women between 2007 and 2016, and college-educated black women are more likely to experience a pregnancy-related death than white, Hispanic, and Asian Pacific/Islander women without a high school diploma (See Figure 9).²⁷ Although the PMSS is not able to provide an estimate of the pregnancy-related mortality ratio for AI/AN women with a college degree or higher, Figure 9 shows that the AI/AN population with less than a college education also experiences substantial disparities in mortality compared to white, Hispanic, and Asian/Pacific Islander women.

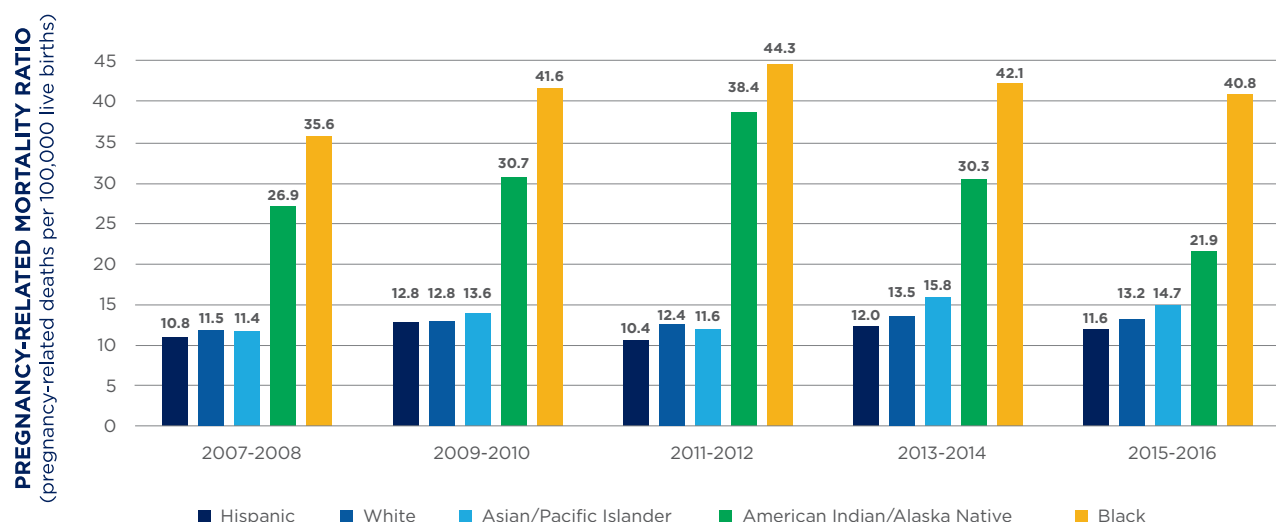
^z The 2007-2016 pregnancy-related mortality ratio cannot be calculated from the information presented in Figure 8 and is calculated based on taking the weighted average of deaths per live births across each of two-year periods shown in Figure 8.

^{aa} The pregnancy-related mortality ratio is an estimate of the number of pregnancy-related deaths per 100,000 live births.

Table 5 shows the percentage of pregnancy-related deaths where the cause was significantly different for black and/or AI/AN women when compared to white women (and vice versa), between 2007 and 2016. Cardiomyopathy, thrombotic pulmonary embolism, and hypertensive disorders of pregnancy contributed to a significantly higher proportion of pregnancy-related deaths among black women than among white women. Hypertensive disorders of pregnancy and hemorrhage contributed to a higher proportion of pregnancy-related deaths among AI/AN women than among white women. Infection contributed to a significantly higher proportion of pregnancy-related deaths among white women compared to black and AI/AN women.

FIGURE 8

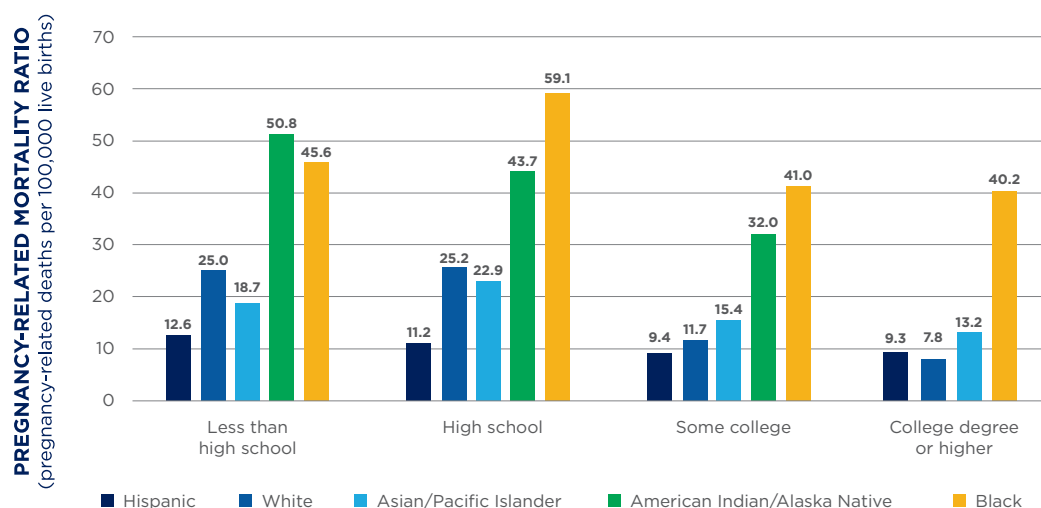
Racial/Ethnic Disparities in Pregnancy-Related Deaths, 2007-2016



Source: CDC PMSS. Infographic: Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007-2016. <https://www.cdc.gov/reproductivehealth/maternal-mortality/disparities-pregnancy-related-deaths/infographic.html>

FIGURE 9

Pregnancy-Related Mortality Ratio by Education Level, 2007-2016



Note: The sample size of AI/AN women with a college degree or higher is insufficient to generate a reliable estimate of the pregnancy-related mortality ratio for this population.

Source: Racial/Ethnic Disparities in Pregnancy-Related Deaths - United States, 2007-2016. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6835a3.htm>

TABLE 5.

Cause-Specific Pregnancy-Related Mortality, by Race/Ethnicity, 2007-2016

Cause of Death	Percent Attributed to Each Cause		
	White	Black	AI/AN
Hemorrhage	9.1%	9.7%	19.7%*
Infection	15.2%	9.7%†	8.5%†
Thrombotic pulmonary or other embolism	8.9%	10.9%*	7.7%
Hypertensive disorders of pregnancy	6.7%	8.2%*	12.8%*
Cerebrovascular accidents	7.5%	6.1%†	5.1%
Cardiomyopathy	10.4%	14.2%*	14.5%

* Indicates significantly higher proportion of pregnancy-related deaths compared with that among white women, $p < 0.05$.

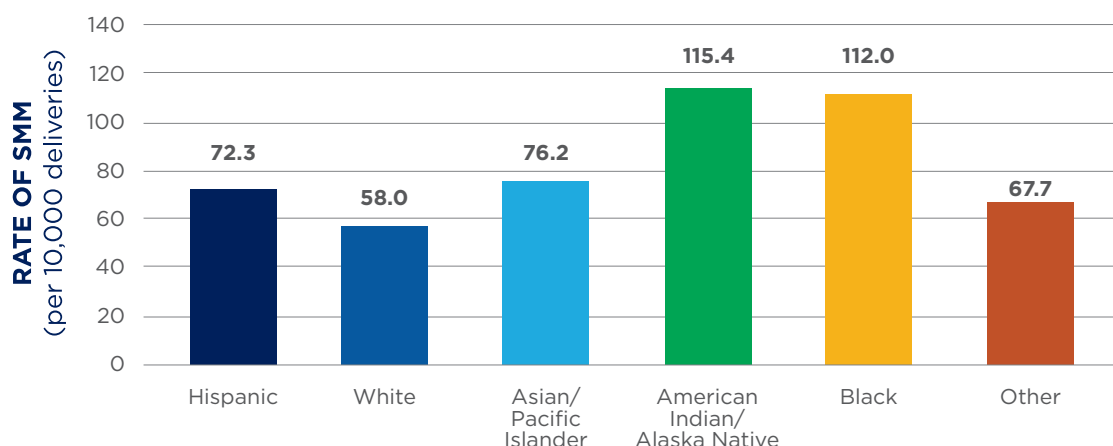
† Indicates significantly lower proportion of pregnancy-related deaths compared with that among white women, $p < 0.05$.

Source: Racial/Ethnic Disparities in Pregnancy-Related Deaths - U.S., 2007-2016: https://www.cdc.gov/mmwr/volumes/68/wr/mm6835a3.htm?cid=mm6835a3_w#T2_down.

Similar to pregnancy-related mortality, black and AI/AN women are also more likely to experience SMM. In 2017, rates of SMM among black and AI/AN women are approximately one and a half to two times as high as those among white, Hispanic, and Asian/Pacific Islander women (see Figure 10).²⁸

FIGURE 10

Severe Maternal Morbidity (SMM) Rate by Race/Ethnicity, 2017



Notes: Blood transfusions are excluded as an SMM indicator using ICD-10-CM/PCS in 2017. The Healthcare Cost and Utilization Project (HCUP) does not receive data from Indian Health Service hospitals or tribally operated facilities. Although, over 75 percent of AI/AN deliveries occur outside of these facilities^{ab,29,30} Indian health facilities may refer more complex deliveries to other hospitals that would be included in HCUP. The 2016 AI/AN SMM rate was 81.5 SMM per 10,000 deliveries, which is approximately 30 percent lower than the 2017 SMM estimate. Hence, readers should use caution when interpreting the SMM rate for AI/AN hospital deliveries, as it may not be representative of the SMM rate for all AI/AN hospital deliveries.

Source: Estimates provided by the Agency for Healthcare Research and Quality based on analysis of the Healthcare Cost and Utilization Project, State Inpatient Databases, 41 States and the District of Columbia, 2017 (from all states with reliable race reporting data in 2017 except Minnesota, Montana, North Dakota, Nebraska, Utah, and West Virginia). www.hcup-us.ahrq.gov/sidoverview.jsp

Disparities in SMM have been observed in relation to differences in the hospitals where deliveries occur.^{ac} One study found that black women are more likely than white women to deliver in hospitals with higher risk-adjusted SMM rates.³¹ The researchers found that in New York City, between 2011 and 2013, SMM rates varied six-fold and it was estimated that this variation accounted for nearly 50 percent of racial disparities in SMM in the city.³² The researchers also found that racial disparities in SMM existed within hospitals.

ab Data from 2018 from IHS and NVSS found there were 5,040 births in Tribal Facilities and 2296 births in Federal IHS facilities, out of 29,092 births in the U.S. to AI/AN.

ac Studies demonstrating that hospitals where a high percentage of black women give birth have higher risk-adjusted rates of SMM are based on data coded in ICD-9-CM and included blood transfusions. Future research is needed to determine whether this relationship continues to exist when using data coded in ICD-10-CM.

Some of these disparities are related to differences in quality of care and clinical practice. Studies have shown that black patients tend to receive care in hospitals with lower rates of effective evidence-based medical treatments and maternity care practices.^{33,34} It may be possible that health care organizations that serve a disproportionate number of racial and ethnic minorities tend to be underfunded and understaffed, and to the extent this is the case, some of these facilities may find it challenging to deliver a similar standard of care as what is available in more well-resourced facilities.³⁵

Efforts to standardize clinical practice and ensure that all women receive the same quality of care have been shown to improve maternal health outcomes. For instance, National Institutes of Health (NIH)-supported researchers studied the results of a quality improvement initiative undertaken at 99 California hospitals to reduce the risk of obstetric hemorrhage. The results showed that the effort reduced the risk of hemorrhage at these facilities, and helped reduce the disparity in hemorrhage rates between black and white women.³⁶ In addition to supporting quality improvement activities, providers and health institutions (i.e., hospitals and clinics) must also ensure that lower-quality care is not attributable to stereotyping, inequities, or mistreatment..

Complex personal, social, and structural conditions, sometimes referred to as social determinants of health (SDOH), have also been shown to impact racial and ethnic maternal health disparities. SDOH relates to the economic and social conditions in which people are born, live, work, play, worship, and age, which influence health and wellbeing.³⁷ Research has found that poor health outcomes are more likely to occur for economically and socially disadvantaged groups.³⁸ Racial and ethnic minority women have a lower likelihood of having health insurance, receiving timely or any prenatal care, and, as mentioned above, are likely to deliver in hospitals that offer a lower quality of care.^{39,40,41} Hispanic women and non-Hispanic black women are also less likely to have access to paid parental leave and thus often must return to work sooner after delivery.⁴²

Research also suggests that exposure to stressful life events, such as financial distress, death of a loved one, domestic violence, and discrimination may contribute to poor maternal health outcomes, especially for racial and ethnic minority women.⁴³ Stressful life events may increase the risk of having a lower birth weight infant and of postpartum depression, and can result in elevated blood pressure, heart rate, stress hormones, and telomere damage.^{44,45} Chronic stress increases the risk of dangerous medical conditions during pregnancy, such as hypertension, which is most prevalent among black individuals, or cardiovascular diseases, which have the highest mortality among black individuals.^{46,47,48}

Black women are more likely than non-Hispanic white women to develop these pregnancy comorbidities at earlier ages, and their conditions are less likely to be controlled and more likely to result in pregnancy complications or death.^{46,49}

RURAL DISPARITIES AND ACCESS TO CARE

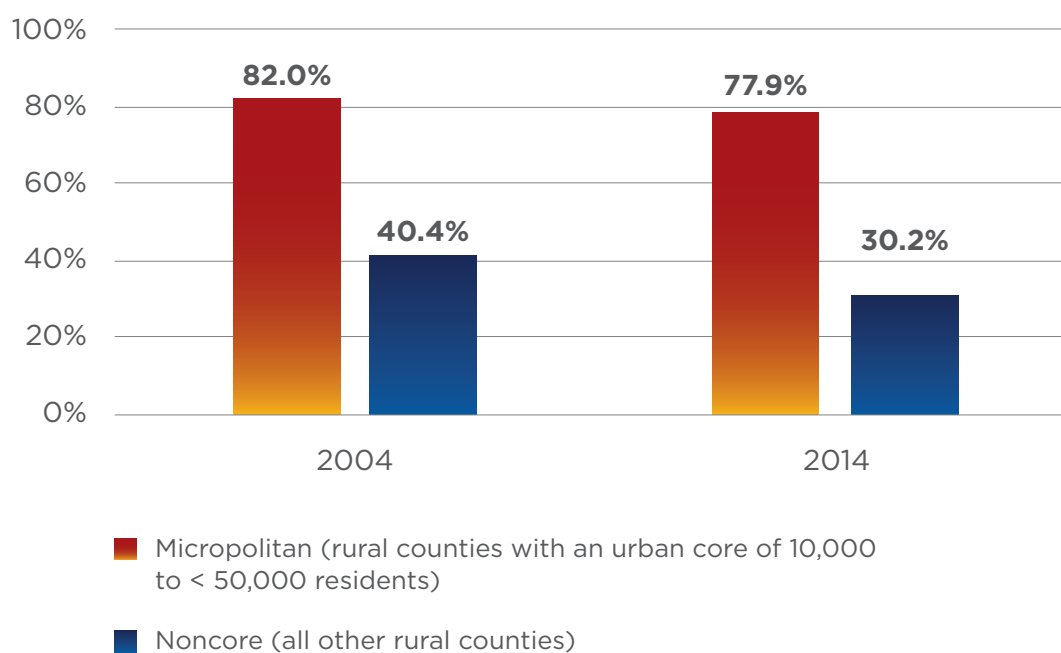
Compared to women living in urban areas, women living in rural areas experience higher rates of delayed prenatal care initiation.^{50,51} Delayed prenatal care initiation or attending fewer prenatal appointments increases the risk of unhealthy behaviors and adverse outcomes by up to 30 percent, including low gestational weight gain, prenatal smoking, labor complications, and poorer postnatal outcomes, such as postpartum smoking and not breastfeeding.⁵² Babies born to women in rural areas also have a higher likelihood of infant mortality, and racial and ethnic disparities in maternal mortality persist in rural areas.^{53,54}

One potential contributor to disparities in outcomes is shortages of maternal health care providers and services. Medically underserved areas (MUAs) and Health Professional Shortage Areas (HPSAs), which exist in all states in urban and rural areas identify geographic areas and populations with a lack of, and barriers to, access to health professionals and medical care services.^{55,56} These critical measures of access to care have been identified as markers of social determinants of health and associated with infant health outcomes.⁵⁷ This issue may be particularly salient in rural areas and is the focus of this section.⁵⁴ Over the past two decades, many rural counties have lost their hospital-based obstetric services. In these areas, women are more likely to have out-of-hospital births and to deliver in hospitals without obstetric units, as compared to those living in rural counties that maintained hospital-based obstetric services. For instance, while 15 percent of the U.S. population lives in rural areas, only 6 percent of OB/GYNs work in rural areas.^{52,57} Between January 2010 and May 2020, 129 rural hospitals have closed with many of these closures occurring in the South.⁵⁸ In addition, many rural hospitals that continue to operate have stopped providing obstetric and gynecologic services. Less than half of women living in rural areas were within a 30-mile drive of a hospital with obstetric services.⁵⁹ In addition, more than half of all rural counties lacked a hospital with obstetric services in 2014 and the decline in such services between 2004 and 2014 was greatest in more remote/noncore rural areas (see Figure 11). Although some hospitals have stopped offering obstetric services, many still end up performing deliveries in the emergency department, but may not be prepared to do deliveries. In addition, these facilities should have formal transport plans/protocols and established contacts at different levels of delivery facility capabilities, so mothers and babies can be transported to facilities that match their health needs. It is important for such facilities without obstetrical units to still be “OB Ready,”^{ad} in the event they need to perform an emergency delivery, and to have triage protocols in place when it is more appropriate to transfer expecting mothers to another facility with greater capacity.⁶⁰

ad “OB Ready” refers to facilities that are adequately equipped to handle a delivery, even if they do not support a full suite of obstetric services.

FIGURE 11

Percent of Rural Counties with Hospital OB Services, 2004 and 2014



Source: Kozhimannil, K. (2019). What's at Stake as Rural America Loses Its Hospitals. Presented at USC's Annenberg's Center for Health Journalism.

DIFFERENTIAL MORTALITY AND MORBIDITY RATES BY AGE

Women's age at conception contributes to the risk of mortality: older women are at higher risk than are younger women. As shown in Figure 12, the pregnancy-related mortality ratio ranges from 11.3 per 100,000 live births for those under age 20 to 76.5 per 100,000 live births for those ages 40 and older. Although the maternal mortality rate is highest for women above 40, this age group accounts for only 3 percent of all U.S. births. Women aged 25 to 39 account for the largest number of deaths. This is also the peak childbearing age cohort.⁶¹

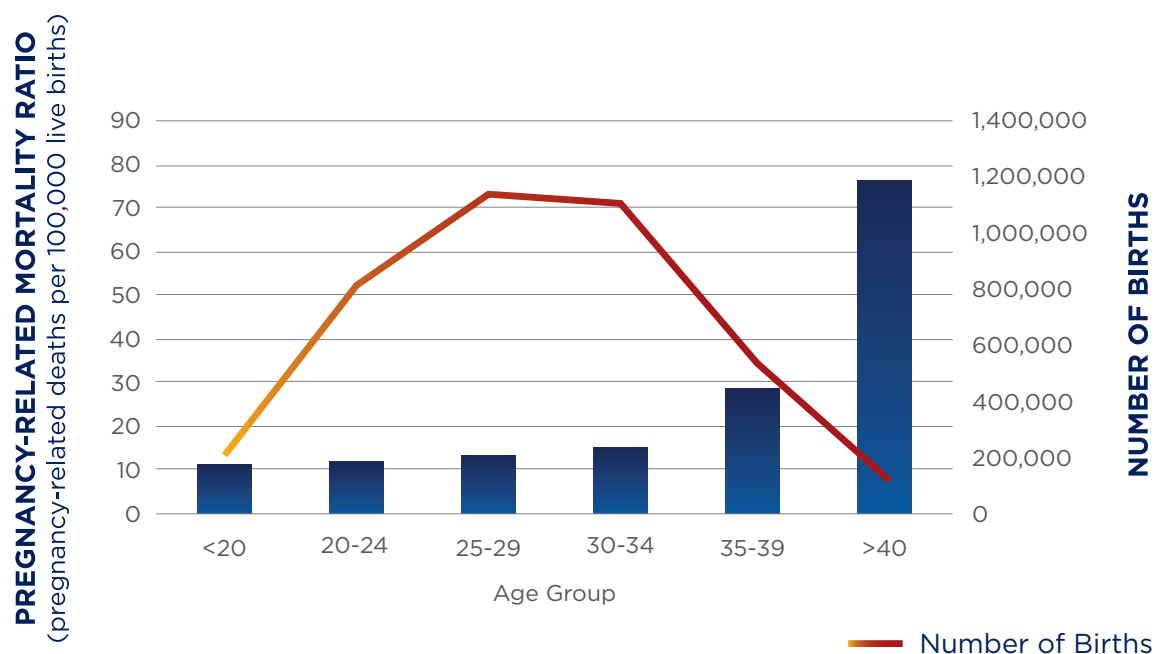
The magnitude of the impact of age on outcomes also varies by race. PMSS data from 2007-2016 shows the disparity ratio^{ae} for black women compared to white, Asian/Pacific Islander, and Hispanic women ranged from approximately 1.5:1 in the >20 age group to approximately 4:1 in women ages 30-34 (See Figure 13).²⁶ Figure 14 shows that black, AI/AN, Native Hawaiian/Pacific Islander, and

^{ae} The disparity ratio is the comparison between two pregnancy-related mortality ratios. In girls under 20, the black PRMR (16.8) divided by the white PRMR (10.8) is $16.8/10.8 = 1.5$, meaning black girls under 20 are 1.5 times more likely to have a pregnancy-related death than white girls under 20. Similarly, in women ages 30-34, the black PRMR (48.6) divided by the white PRMR (11.3) is $48.6/11.3 = 4.3$, meaning black women ages 30-34 are 4.3 times more likely to have a pregnancy-related death than white women of the same age range.

Hispanic women give birth at earlier ages, on average, than white or Asian women. If mortality rates by age were the same for all races/ethnicities, black and AI/AN women would have lower mortality, on average, than white, Asian/Pacific Islander, and Hispanic women. The data presented in these figures indicate that high overall mortality rates for black and AI/AN women appear to be because these populations have higher mortality rates than women from other races/ethnicities across all age brackets, and because the disparity in mortality rates increases substantially for women who are older.

FIGURE 12

Pregnancy-Related Mortality Ratio (2007-2016) and Total Number of Births (2016) by Mother's Age Bracket



Notes: Percentage of births accounted for by each age group

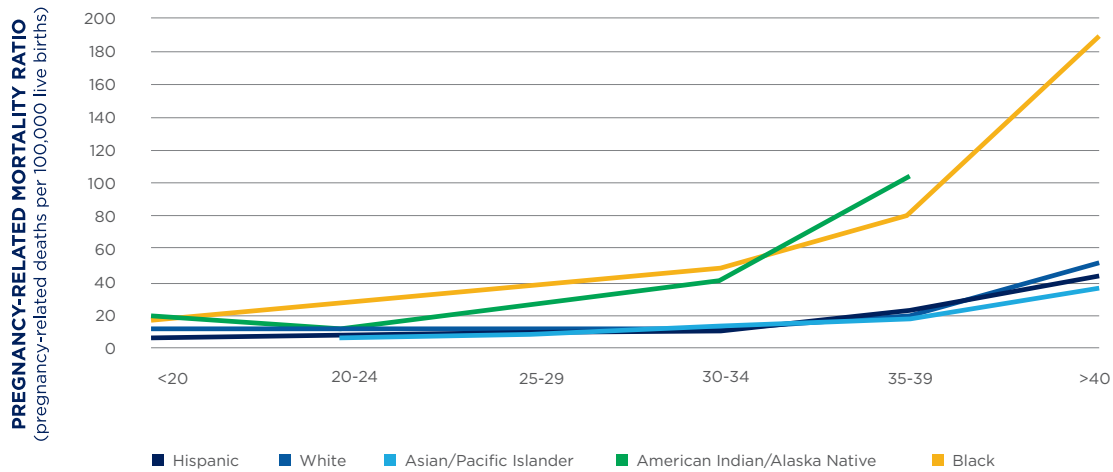
<20	-	5.4%
20-24	-	20.4%
25-29	-	29.1%
30-34	-	28.2%
35-39	-	13.9%
≥40	-	3.1%

Sources: Racial/Ethnic Disparities in Pregnancy-Related Deaths - United States, 2007-2016. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6835a3.htm>

Births: Final Data for 2016 (https://www.cdc.gov/nchs/data/nvsr/nvsr67/nvsr67_01.pdf)

FIGURE 13

Racial/Ethnic Disparities in Pregnancy-Related Mortality Ratios by Age, 2007-2016

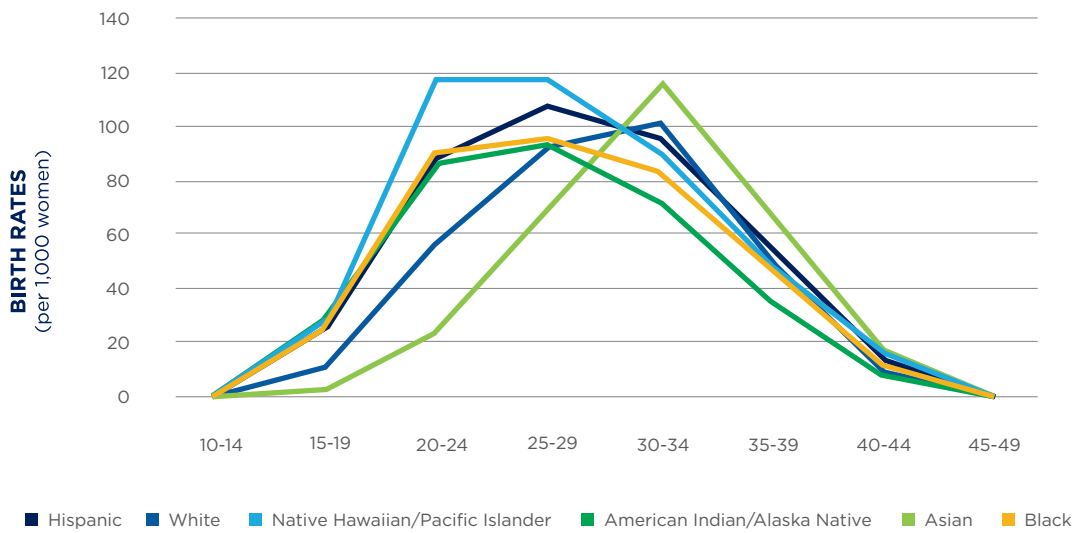


Note: The estimates for American Indian/Alaska Native women ≥ 40 and Asian/Pacific Islander < 20 are suppressed because of PMSS reporting rules.

Source: Racial/Ethnic Disparities in Pregnancy-Related Deaths – U.S., 2007-2016: <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm>

FIGURE 14

Birth Rates by Age and Race, 2018

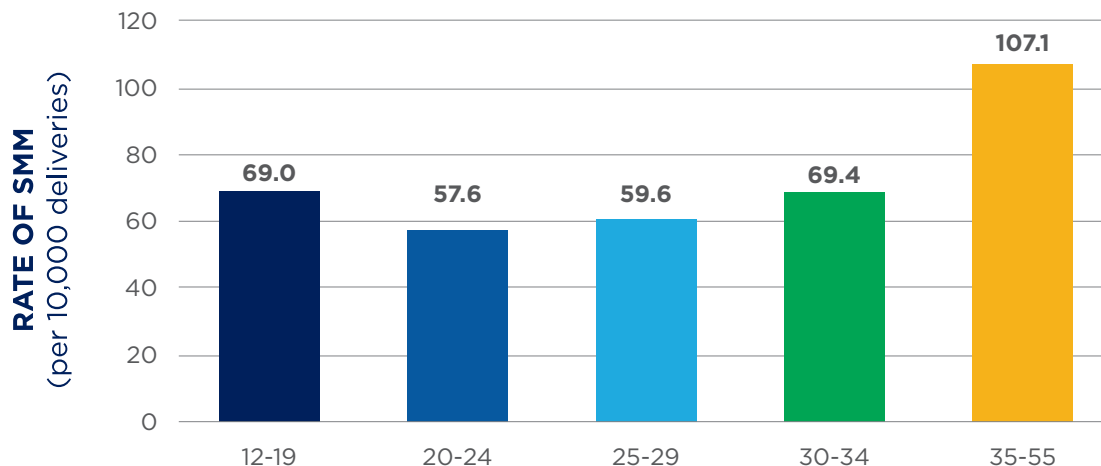


Source: Births: Final Data for 2018 https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_13-508.pdf

As with maternal mortality, rates of SMM vary by age (See Figure 15). Women in their twenties have the lowest rates of SMM at just under 60 cases per 10,000 deliveries, while teens and women in their early thirties have similar rates of approximately 69 cases per 10,000 deliveries.⁶³ Women above age 35 have a substantially higher rate of SMM than women in other age groups, at approximately 107 cases per 10,000 deliveries. Because women ages 30-34 have a higher rate of SMM than women in their twenties have, and account for more deliveries than teenagers and women age 35 and older, they account for the largest number of SMMs.¹⁷

FIGURE 15

Severe Maternal Morbidity (SMM) Rate by Age, 2017



Source: Estimates provided by the Agency for Healthcare Research and Quality based on analysis of the Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 47 States and the District of Columbia (from all states except Alabama, Idaho, and New Hampshire), 2017. www.hcup-us.ahrq.gov/sidoverview.jsp. HCUP SID Partners: <https://www.hcup-us.ahrq.gov/partners.jsp?SID>

IMPROVING CARE AND COVERAGE

MEDICAID ELIGIBILITY & COVERAGE

Medicaid covered 42 percent of all births in the U.S. in 2018, which gives state-run Medicaid programs a tremendous opportunity to drive change.⁶² Under current federal law, women eligible for Medicaid on the basis of pregnancy retain Medicaid coverage for approximately^{af} 60 days after delivery, after which, such women must re-qualify for Medicaid based on their income and categorical eligibility. Medicaid income eligibility requirements for pregnant and non-pregnant able-bodied individuals vary by state. Income eligibility limits for non-pregnant able-bodied parents and caretakers range from 14-138 percent of the federal poverty level (FPL) while income eligibility limits for pregnant women range from 138 to 380 percent of the FPL.

Women continue to experience and develop pregnancy-related health conditions that can lead to morbidity and mortality beyond 60 days postpartum. These complications are especially prevalent in at-risk populations such as women with SUD. Collaborative efforts to close coverage and care gaps for postpartum women can improve health outcomes and lead to cost savings by reducing preventable complications and delays of necessary care.

PRACTICE PATTERNS AND PAYMENT MISALIGNMENT

Maternal mortality and morbidity vary significantly across states and hospitals. A 2017 report on critical factors contributing to pregnancy-related deaths in nine states^{ag} found that provider^{ah} (34.8 percent) and systems of care^{ai} (21.7 percent) factors contributed to over half (56.5 percent) of all pregnancy-related deaths (See Figure 16).⁶³ Moreover, while patient factors were the most common contributor, they were often dependent on providers and systems of care.

The standard approach to care during pregnancy and childbirth contributes to negative trends in maternal mortality and morbidity. Misaligned payment structures drive unnecessary utilization and result in women receiving, in many cases, sub-optimal care.

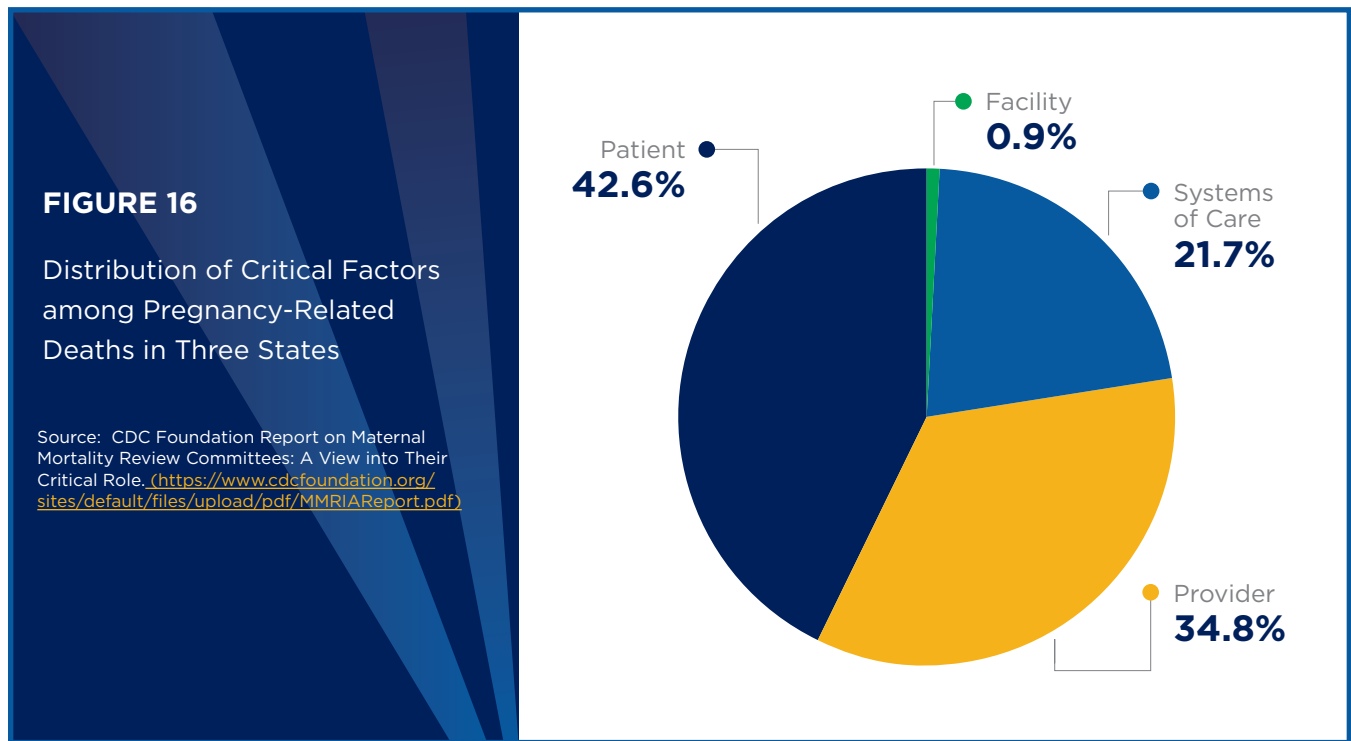
The most prevalent and costly example of unnecessary utilization is the use of cesarean delivery among pregnant women at low medical risk. The effects of medically unnecessary cesarean deliveries can extend beyond the immediate delivery period to affect the health of the mother

af Postpartum coverage extends until the last day of the month in which the sixtieth postpartum day falls.

ag The nine states were Colorado, Delaware, Georgia, Hawaii, Illinois, North Carolina, Ohio, South Carolina, and Utah. Only the first four states provided data and only three included data on critical factors.

ah Provider factors include issues such as knowledge, patient assessments, communication, care coordination, and referrals.

ai Systems of care factors include issues such as personnel, policies and procedures, communication, and care coordination.



and the baby, as well as the mother's future pregnancies. The use of cesarean deliveries increases the likelihood of maternal morbidity and increases the risks of anesthesia-related complications and thromboembolic disease. According to one CDC report, rates of three maternal morbidities^{aj} associated with labor and delivery—ruptured uterus, unplanned hysterectomy, and intensive care unit admission—were found to be higher for cesarean deliveries than vaginal deliveries for nearly all maternal age groups and for women of all races and ethnicities.⁶⁴

Decisions regarding labor and delivery, including at which facility to deliver, are often a function of the selected obstetrician's or other provider's (e.g. family physician, certified midwife) admitting privileges and approach to care. Settings outside of a hospital facility can be appropriate for pregnant women considered at low risk for developing obstetric complications. While most births occur in hospitals with obstetrical units, the number of births occurring outside of these facilities has been increasing in recent years. Drivers of this trend include women feeling more empowered and in control of their experience, perceiving out-of-hospital births as safer, wanting to avoid unnecessary medical interventions including cesarean deliveries, and negative prior experience giving birth in a hospital.⁶⁵ Although many of these births occur at home, a growing number are occurring in freestanding birth centers, which are facilities that provide services during pregnancy, labor and delivery, and the postpartum period for low-risk patients. Between 2004 and 2013, the number of births occurring in freestanding birth centers in the U.S. grew by 75 percent (from 9,620 to 16,913 births), but accounted for a small percentage (0.4 percent of the 3,932,181 births in 2013) of overall

^{aj} The CDC report also notes that rates of maternal transfusion are higher in cesarean delivery births than in vaginal deliveries, but maternal blood transfusion is not classified as a morbidity.

births.^{66,67} An evaluation of the HHS Strong Start for Mothers and Newborns Initiative found that women who received prenatal care in Strong Start Birth Centers (which included hospital-based centers as well as freestanding centers) had better birth outcomes and lower costs relative to similar Medicaid beneficiaries not enrolled in Strong Start, which aligns with other findings in the literature.⁶⁸

In contrast to the more medicalized setting existing in many hospital facilities, freestanding birth centers use a midwifery model of care (although midwives also perform deliveries in hospital settings). This model of care is predicated on the concept that pregnancy and birth are normal life processes, which should not be overly-medicalized unless clinically necessary. Certified midwives are trained health care professionals who help healthy women through pregnancy, delivery, and during the postpartum period. They perform deliveries in freestanding birth centers and at home, and frequently in hospitals. In addition to performing deliveries, depending on local scope of practice laws and regulations, certified midwives, especially certified nurse-midwives, may provide an array of women's health services such as gynecological exams, menopause management, well-woman care, and prenatal care, as well as newborn care services.

In addition to certified midwives and physicians, other types of professionals involved in coordinating and delivering maternal health care include advanced practice nurses (e.g., nurse practitioners specializing in OB/GYN), community health workers, and doulas. Each of these types of professionals can also play an important role in maximizing the capacity and effectiveness of maternal healthcare delivery systems, and efforts to further utilize their skills in new and expanded ways should be supported.





For instance, community health workers are typically frontline public health workers who have close familiarity with the communities in which they operate. In many cases, they help members of the community navigate both health care and social support services. With regards to maternal health, community health workers may help facilitate utilization of services such as prenatal care, educate women on breastfeeding and child care, provide initial screenings for conditions such as postpartum care, and link women to health care providers for services such as prenatal care and with other social supports.⁶⁹

Doulas are trained professionals who provide continuous support and education to mothers through pregnancy, delivery, and during the postpartum period. They are not considered health care professionals and cannot administer medical care or provide medical advice. Rather, they supplement care provided by medical professionals in a variety of settings, including homes, birth centers, and hospitals. A few state Medicaid programs are testing reimbursement for doula services. More research is needed to understand whether doulas improve quality of care and reduce costs.

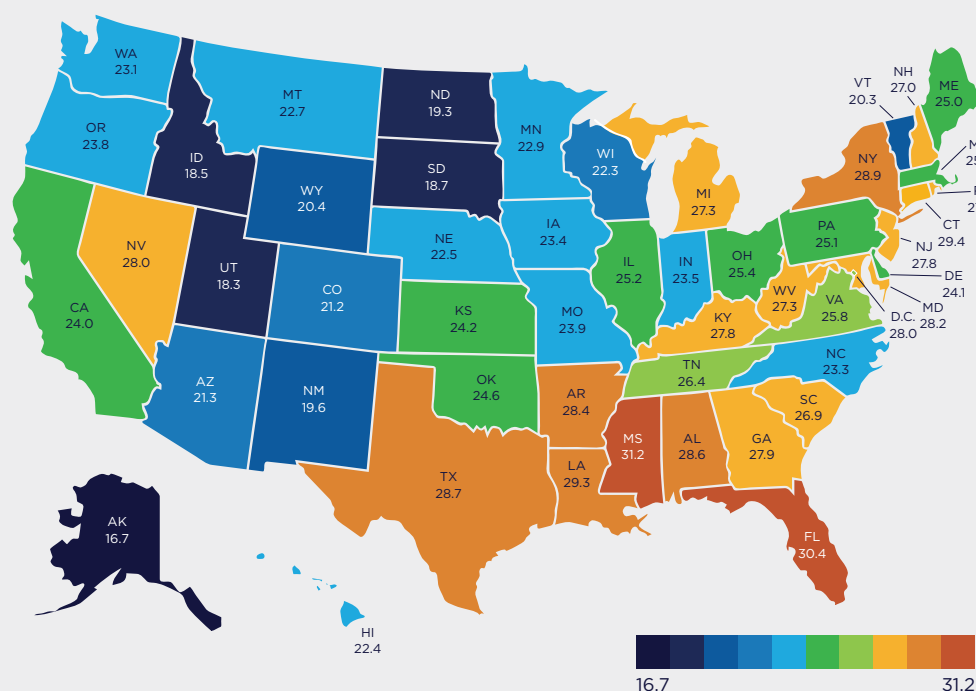
Under the appropriate circumstances, lower-cost professionals, especially certified midwives, can help expand the capacity of the health care system to address the needs of pregnant women and increase access to care. However, the breadth of their role depends, in part, on the scope of responsibilities that state legislative and regulatory authorities grant to these professionals, as well as payer reimbursement policies.

CESAREAN DELIVERIES IN THE U.S.

While cesarean deliveries are sometimes medically necessary, unnecessary cesarean deliveries pose higher risks and are more costly compared to a vaginal birth. Data indicate that women who are able to deliver vaginally after a previous cesarean delivery are less likely to experience birth-related morbidity.⁶⁴ Cesarean deliveries, overall (including both low-risk and other cesarean deliveries), increased by nearly 55 percent between 1997 and 2018, accounting for 31.9 percent of all births in the U.S. in 2018.⁷⁰ Based on 2018 birth certificate data, there is substantial state variation in rates of low-risk cesarean deliveries* (16.7 to 31.2 percent), exceeding the WHO's global target† of 10 to 15 percent (see Figure 17). There is even greater variation in cesarean delivery rates across hospitals.⁷¹ Research indicates that provider practice patterns are a predominant driver of cesarean delivery rates.

FIGURE 17

Rate of Low-Risk Cesarean Deliveries* per 100 Deliveries by State, 2018



* These rates are based on NTSV cesarean deliveries, which occur among women who are pregnant for the first time, are at a minimum 37 weeks of gestational age, giving birth to a single baby (no twins or multiples) that is in the vertex position (positioned in the uterus with the head down). The measure used to generate these rates differs from the measure used to calculate the 31.9 percent overall cesarean estimate, which includes all births.

† The WHO target rate range is based on all cesarean deliveries.

Source: Centers for Disease Control and Prevention, National Center for Health Statistics/National Vital Statistics System Birth Data, 2018. https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_13_tables-508.pdf

DATA QUALITY AND TIMELINESS

Achieving improvements in maternal health outcomes has been challenging, in part, due to a lack of data indicating where poor outcomes are occurring, what types of resources are available or lacking in these areas, and the extent to which deficiencies in quality of care exist. Analyzing this type of information can help identify opportunities to better target resources and develop new interventions to improve care delivery. However, operational barriers, such as resources and workforce capacity to abstract, link and analyze data, privacy concerns, and differences in data collection methodologies, can make it challenging to identify and analyze outcome measures, such as maternal mortality rates, pregnancy-related mortality ratios, or severe maternal morbidity rates.

MATERNAL MORTALITY DATA

Identifying deaths that are pregnancy-related (as opposed to occurring around the time of pregnancy for other reasons) necessitates a review of all contributing factors to the cause of death, which requires linking and/or reviewing the mother's death certificate, the child's birth certificate, and several other data sources, including health care utilization records.

The CDC defines maternal mortality as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.⁷² This metric, called the maternal mortality rate, is produced for the U.S. by NCHS. In 2003, a pregnancy checkbox was added to the U.S. Standard Certificate of Death to address identified underreporting of maternal deaths. Between 2003 and 2018, states began incorporating the pregnancy checkbox into their death certificates. Since implementation of the pregnancy checkbox took longer than anticipated, NCHS paused publication of annual maternal mortality rates beginning in 2008 until 2018 when all states had implemented the pregnancy checkbox (noting that California implemented a different checkbox from the U.S. Standard Certificate of Death). During this period, it became apparent that implementation of the pregnancy checkbox had resulted in overestimation of the number of maternal deaths, particularly for those age 45 and over. To correct for this finding when reporting deaths in 2018, NCHS restricted application of the pregnancy checkbox to those age 10 to 44. For those age 45 and over, the death certificate must include other indicators (e.g., a listed obstetric condition) that a death may have been related to the pregnancy beyond what is reported in the pregnancy checkbox.⁷³ NCHS is continuing to assess errors in utilization of the pregnancy checkbox and how to correct them.⁷⁴

A separate measure, of maternal mortality, the pregnancy-related mortality ratio, is produced by CDC's Division of Reproductive Health (DRH) based on data from the PMSS. They define a pregnancy-related death as the death of a woman while pregnant or within 1 year of the end of a pregnancy from any cause related to, or aggravated by, the pregnancy or its management, regardless



of the outcome, duration, or site of the pregnancy.¹³ This does not include accidental or incidental deaths, except where available documentation identifies a direct causal relationship (e.g., for example, placental abruption associated with a motor vehicle crash). To identify pregnancy-related deaths, CDC requests states, New York City, and Washington, D.C. to send copies of death certificates for all women who died during pregnancy or within 1 year of pregnancy, linked live birth or fetal death certificates, and additional data when available. This information is used by medically-trained epidemiologists to determine the cause and time of death related to the pregnancy. In addition to calculating the number of pregnancy-related deaths, these data are used to describe the causes of pregnancy-related deaths and associated risk factors. Given delays in receiving birth certificate data from states and the additional effort that is involved in identifying pregnancy-related deaths and their causes, there is a time lag in reporting on these data. Compared to the NCHS-reported maternal mortality rate, the PRMR is both more systematic, based on an in-depth review of each death for pregnancy-relatedness, and broader, tracking pregnancy related deaths up to a year after the end of pregnancy.

Maternal deaths are a relatively infrequent event; therefore, inaccuracies in counts can have large impacts on the accuracy of maternal mortality estimates. CDC works with states to improve the quality of the pregnancy checkbox on death certificates to obtain more accurate counts of pregnancy-related deaths. Using 2016 deaths, CDC supported a multi-state, quality assurance pilot of the pregnancy checkbox. This pilot found evidence of both under- and over-reporting of pregnancy status on the death certificate. It also identified ways that states can improve the identification of women who were pregnant at the time of death or in the past year by performing vital statistics linkages and confirming pregnancy status with death certifiers. These efforts will improve the accuracy of maternal mortality estimates. Although CDC and states are making ongoing improvements to the quality and timeliness of pregnancy-related death data, the implementation of the pregnancy checkbox and quality assurance efforts have varied over time and between states. Therefore, there is currently no way to uniformly compare state-based variations in maternal deaths.

SEVERE MATERNAL MORBIDITY (SMM) DATA

Information about severe maternal morbidity can be obtained from the Agency for Healthcare Research and Quality's (AHRQ's) Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) and its derivative the National Inpatient Sample (NIS).^{75,76,ak} The SID includes inpatient discharge records from community, non-rehabilitation hospitals from 48 participating states and the District of Columbia.⁷⁷ The SID files encompass discharge records from all patients, regardless of payer, providing a unique view of inpatient care. The encounter-level files include, but are not limited to, patient characteristics (age, sex, race/ethnicity, urban/rural location, median community-level income based on ZIP code, county and state of residence, ZIP code of residence), select hospital characteristics (bed size, teaching status, ownership), diagnoses and procedures, and stay characteristics (admission source, length of stay, charge for the encounter, discharge disposition). Some SID files also include an encrypted, de-identified patient identifier. HCUP national and most state data are available publicly approximately 18 and 12 months after the calendar year of services delivered, respectively. Thus, HCUP data can serve as a benchmark, but are limited in their ability to identify recent trends in SMM rates for many locations.

In partnership with the Centers for Disease Control and Prevention (CDC), AHRQ and the Health Resources & Services Administration (HRSA) have produced and published the 2008-2017 SMM rates as part of HRSA's Title V program.⁷⁸ These data can be used to compare states that may be experiencing maternal health challenges. However, SMM rates across years may not be comparable, largely due to the U.S. shifting from using the ICD, 9th Revision, Clinical Modification (ICD-9-CM) coding system to the ICD, 10th Revision Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) in October 2015. This change means SMM rates through the third quarter of 2015 are not comparable to SMM rates starting in 2016, because not all ICD-9-CM codes have a direct counterpart in ICD-10-CM/PCS.⁷⁹ Once the U.S. healthcare system transitions to using the 11th Revision of ICD, further modifications will be incorporated into the SMM indicator algorithm. As discussed in Section II, the Department also recently recommended focusing on a measure of SMM that does not include blood transfusions alone. Additional work is ongoing to study the impact coding changes have had on blood transfusion documentation in hospital discharge records. Prior to October 2015, hospital deliveries with a blood transfusion accounted for the greatest percentage of hospital deliveries with an SMM.

ak The authors would like to acknowledge the HCUP Partner organizations that participated in the HCUP National Inpatient Sample (NIS) and State Inpatient Databases (SID), <https://www.hcup-us.ahrq.gov/partners.jsp?NIS> and <https://www.hcup-us.ahrq.gov/partners.jsp?SID>



RECENT EFFORTS TO IMPROVE MATERNAL HEALTH

MATERNAL MORTALITY REVIEW COMMITTEES

States and localities first began to form MMRCs in the 1930s to examine maternal deaths in greater detail and develop prevention strategies.⁸⁰ Prior to this point, the only source of maternal health data came from death certificates, which are limited in detail. Efforts to establish MMRCs have gained additional momentum in recent years with 20 states passing legislation to set up, formally authorize, or reconstitute an MMRC from 2018 to 2019. As of September 2019, 43 states plus the District of Columbia, New York City, and Philadelphia have MMRCs.⁸¹ The seven states that have not yet implemented MMRCs are Maine, North Dakota, Nevada, Rhode Island, South Dakota, Vermont, and Wyoming.

The scope of operations of MMRCs can differ from state to state, but MMRC members typically include clinicians practicing obstetrics and gynecology, maternal-fetal medicine, midwifery, forensic pathology, mental health and behavioral health, as well as those involved in public health.⁸⁴ Data used to determine whether a death that occurs during pregnancy or within one year of pregnancy is pregnancy-related are collected from a variety of sources, which may include birth and death certificate data, prenatal records, hospital records, autopsy reports, key informant interviews, and social services records. These committees make voluntary recommendations and identify actions that can address similar contributing factors in the future, and they assess the anticipated impact if these actions were implemented.⁸² Significant progress has been made to try to address historical variability of MMRC operations, methodologies, and reporting, which had affected both the evidence that was collected and conclusions that could be drawn. While work remains, there is currently greater consistency between MMRCs than there has been in more than 50 years.

The President's FY 2021 Budget invests \$24 million in CDC to expand MMRCs to all 50 states to ensure every pregnancy-related death is examined. In addition, the Preventing Maternal Deaths Act, which became law in December of 2018, creates a federal infrastructure to improve maternal mortality data collection and surveillance.^{82,83} The legislation established and provided support to MMRCs, including \$12 million annually for five years in funding, in order to support state and tribal MMRCs to collect, analyze, and report data relating to pregnancy-associated deaths and pregnancy-related deaths. CDC currently provides funding to 25 states to support MMRC coordination and management through the ERASE MM Program.⁸⁴ A number of states also support their MMRCs with funding provided in the Maternal and Child Health Block Grants they receive from HRSA. To help facilitate standardization of data collection across states, CDC developed and maintains the Maternal Mortality Review Information Application (MMRIA), which is available to all MMRCs.

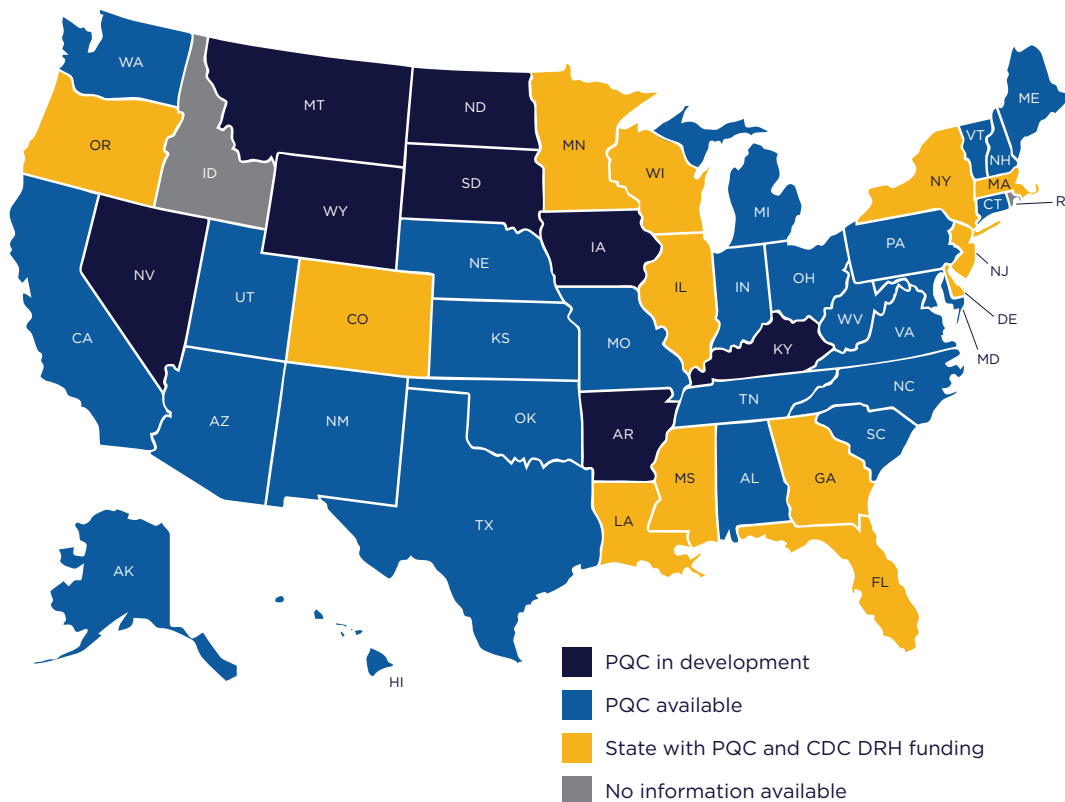


PERINATAL QUALITY COLLABORATIVES

PQCs are state or multi-state networks of teams working to improve quality of care for mothers and babies. The first PQC was formed in California in 1997 when certain neonatal intensive care units in the state agreed to work collaboratively to improve care for pregnant women and infants.⁸⁵ Subsequent PQCs were established by clinicians, public health departments, and other stakeholders in many other states. Starting in 2011, CDC began providing funding to support a number of PQCs. As can be seen in Figure 18, 40 states have PQCs as of 2020, including 13 that receive funding from CDC. Nine other states are in the process of developing PQCs.⁸⁶

FIGURE 18

PQC Development Status by State, January 2020



Source: CDC State Perinatal Quality Collaboratives <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pgc-states.html>

PQCs are composed of a range of relevant stakeholders: state departments of health, hospital and clinician associations, community-based organizations, and payers such as state Medicaid agencies.⁸⁷ While PQCs implement interventions to improve perinatal care, they also analyze data to examine human and systemic factors associated with quality of care and identify clinical risk factors for negative outcomes. Some common improvement targets for PQCs include reducing early elective deliveries and preventing maternal hypertension and hemorrhage.⁸⁶

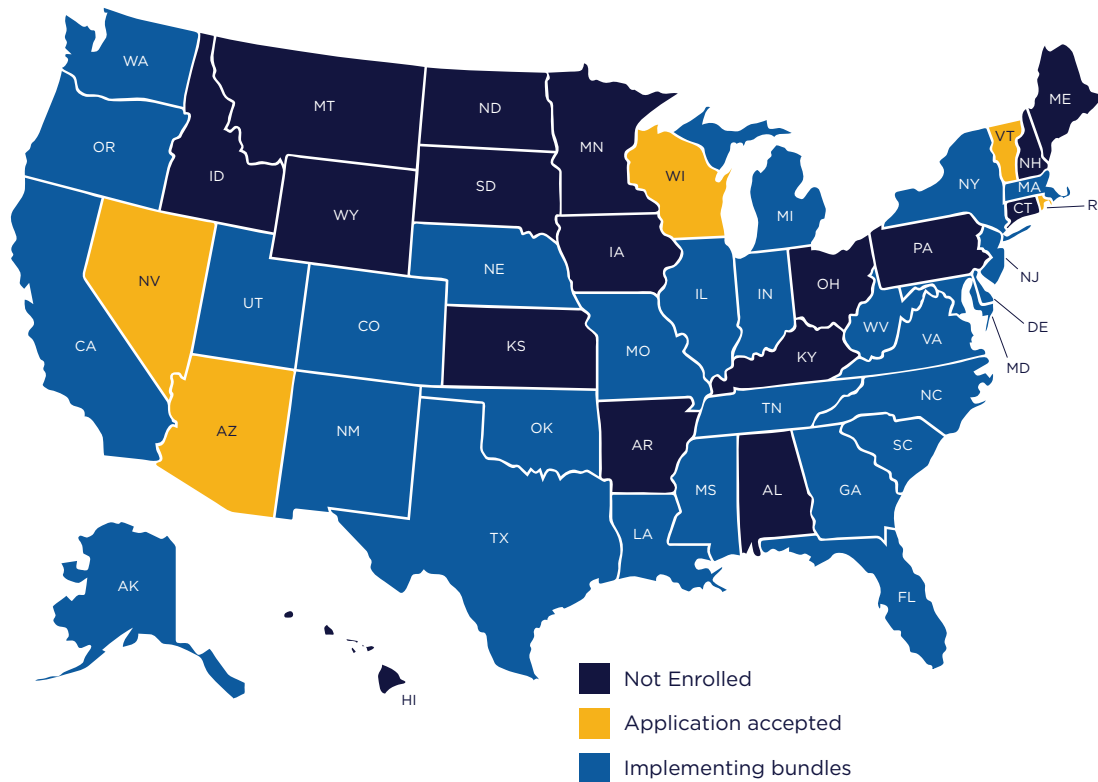
ALLIANCE FOR INNOVATION ON MATERNAL HEALTH (AIM)

The President's FY 2021 Budget proposes a total of \$15 million to expand the AIM Program, a national data-driven maternal safety and quality improvement initiative that strives to equip every state, PQC, hospital, birth facility, and maternity care provider with the ability to significantly reduce SMM and maternal mortality in the U.S.⁸⁸ The National Partnership for Maternal Safety, a group of multidisciplinary providers and stakeholders formed in 2013, worked with the Council on Patient Safety in Women's Health Care, an American College of Obstetricians and Gynecologists (ACOG)-founded collaboration between patient and health care organizations, to develop a comprehensive strategy to improve, protect, and promote the well-being of women and mothers. The conceptual framework for AIM was developed from these initial collaborative efforts to improve maternal health through the lens of patient safety, and HRSA awarded the first AIM implementation funding to the American College of Obstetricians and Gynecologists in 2014.⁸⁹

In addition to creating and helping facilitate their implementation, AIM provides guidance on evidence-based or informed best practices for maternity care. The current set of bundles addresses the following topics: maternal venous thromboembolism, OUD, obstetric hemorrhage, severe hypertension in pregnancy, reduction of primary cesarean birth, reduction of peripartum racial/ethnic disparities, and postpartum care from birth to the comprehensive postpartum visit and the transition from maternity to well-woman care.⁹⁰ Bundles are comprised of 10-13 best practices organized into four domains: readiness, recognition, response, and reporting and systems learning.⁹¹ The bundles are intended to ensure that relevant health care organizations are prepared for maternal events, understand the unique risks for such events, develop systems for early warning signs, and universally implement a given protocol across providers in response to an event. As of April 2020, 33 states are enrolled in AIM and approximately 1,400 hospitals are participating in the implementation of maternal safety bundles, similar to the California toolkits mentioned below, to improve the quality of maternity care service delivery (see Figure 19).⁹² The bundle with the highest uptake, addressing obstetric hemorrhage, has been adopted by 22 out of the 33 states participating in AIM and is in various phases of implementation. After a negative maternal event has occurred, staff conduct a formal and nonjudgmental debrief to identify actions that contributed to the outcome. Evaluation data for the implementation of these bundles are submitted to AIM to verify that the best practices implemented in each bundle are in fact effective.

FIGURE 19

AIM Enrollment Status by State, April 2020



Note: States implementing bundles are at various phases of implementation.

Source: Information provided by the Health Resources and Services Administration.

CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

The California Maternal Quality Care Collaborative (CMQCC) was founded in 2006 by the California Department of Public Health, the California Perinatal Quality Care Collaborative, and Stanford University.⁹³ This multi-stakeholder organization was tasked with responding to rising maternal mortality and morbidity rates in the state. Between 2005 and 2013, California reported that the state's maternal mortality rate had decreased by more than 55 percent.⁹⁴

The apparent success of the CMQCC can be attributed to four key steps: linking public health surveillance actions, mobilizing public-private partnerships, establishing a low-burden rapid-cycle data system, and implementing large-scale, multi-partner interventions.⁹⁵ The collaborative serves as a hub, which distributes resources to, and coordinates activities between, a broad set of partners, including state agencies, payers, and hospital systems.

The CMQCC's Maternal Data Center (MDC) provides near real-time maternity care data and performance metrics for hospital participants through an online tool.⁹⁶ Over 200 hospitals, accounting for approximately 90 percent of the state's births, are a part of the MDC.⁹⁷ On a monthly basis, the MDC links birth certificate data and mother and infant discharge diagnosis files for every birth at 95 percent of all hospitals in the state. This data transmission is almost entirely automated at the hospital level. Partially de-identified birth certificate data is transferred to a secure server at Stanford University 45 days after the end of each month and is automatically linked to discharge data sets provided by hospitals. In 98 percent of cases, the three data sets are successfully linked.

The California Pregnancy-Associated Mortality Review Project (California's Maternal Mortality Review Committee) uses these data to provide in-depth case reviews of each death to determine the cause, contributing factors, and opportunities for future improvement.⁹⁸ The first two years of review indicated that hemorrhage and preeclampsia were the two most important preventable causes of maternal mortality and morbidity. In response to these data, task forces were convened to develop prevention toolkits—compendia describing evidence-based best practices to address a given complication—for these conditions. In order to facilitate dissemination and uptake of best practices, regional perinatal program staff visit and provide technical support to hospitals to assist with implementation of toolkits. By 2016, 92 percent of California hospitals had adopted the hemorrhage toolkit and 75 percent had adopted the preeclampsia toolkit. Since then, toolkits have been developed to address other important drivers of maternal mortality and morbidity, such as primary cesarean deliveries, venous thromboembolism, and cardiovascular disease.

While the CMQCC has been successful in substantially reducing the overall number of pregnancy-related deaths per year, the impacts of change in surveillance methods are unknown and the organization's efforts have not yet reduced racial disparities in maternal mortality.



JOINT COMMISSION STANDARDS TO ADDRESS MATERNAL HEMORRHAGE AND SEVERE HYPERTENSION/PREECLAMPSIA

The Joint Commission, which accredits many of the nation's hospitals, introduced two new standards to address prevention, early recognition, and timely treatment of maternal hemorrhage and severe hypertension/preeclampsia. Among other activities, these standards require hospitals to:

- Develop written evidence-based procedures to identify and treat the conditions
- Stock easily-accessed hemorrhage supply kits
- Provide role-specific education to all staff and providers who treat pregnant/postpartum patients at least every two years
- Conduct response procedure drills at least annually
- Educate patients on signs and symptoms that warrant care during hospitalization and after discharge

The standards were developed based on recommendations from AIM bundles as well as advice from CMQCC and ACOG. The new standards will be effective in the Commission's hospital accreditation program on July 1, 2020 and can be found under the Provision of Care, Treatment and Services (PC) chapter at PC.06.01.01 and PC.06.01.03 in the *Comprehensive Accreditation Manual for Hospitals*.

MEDICAID PAYMENT AND DELIVERY SYSTEM REFORM EFFORTS

STRONG START

In 2012, the CMS Innovation Center launched the Strong Start for Mothers and Newborns Initiative.⁹⁹ This initiative included a public awareness campaign, engagement with providers and hospitals to spread best practices, efforts to increase data transparency, and investments in alternative prenatal care models.

One of three Strong Start funded models of care was a birth center model of care that provided pregnant women with midwifery care. The birth center model of care showed the most substantive and statistically significant improvements in outcomes, with participants having significantly lower costs of care along with lower rates of preterm birth, low-birthweight infants, and cesarean delivery as compared to risk-matched women receiving other types of Medicaid maternity care. Moreover, improved maternal health corresponded with improvements in infant health, including lower rates of preterm and low-birthweight infants. These improved outcomes also resulted in lower costs. In Strong Start, women enrolled in birth centers were significantly less likely than women of similar medical, demographic, and social risk in other models to develop pre-eclampsia and gestational diabetes, two conditions that can lead to medically-indicated preterm birth or abnormal infant birthweight, among other complications.¹⁰⁰

As a result of the significant conclusions of the Strong Start evaluation, CMS encouraged states to incorporate the findings from the initiative into their state Medicaid programs through release of a Center for Medicaid and CHIP Services (CMCS) Info Bulletin, which can be found online at: <https://www.medicaid.gov/sites/default/files/federal-policy-guidance/downloads/cib110918.pdf>.

PAYMENT CHANGES

There have also been significant efforts by state Medicaid agencies to reform payment practices to reduce non-medically indicated cesarean deliveries. Some states, for example, now pay the same rate for non-medically indicated cesarean deliveries and vaginal births or do not cover non-medically indicated cesarean deliveries. Other states have implemented episode of care payment strategies, bundled payments, or blended payments.¹⁰¹ While evidence on their efficacy is still being collected, these types of payment reforms can help reduce non-medically indicated cesarean deliveries and improve key quality of care indicators.

MATERNAL OPIOID MISUSE MODEL

As part of a broader strategy at the CMS Innovation Center to combat the opioid crisis, the Maternal Opioid Misuse (MOM) Model, announced in April 2019, is designed to address fragmentation in the care of participating pregnant and postpartum Medicaid and Children's Health Insurance Program (CHIP) beneficiaries with OUD through state-driven transformation of the delivery system surrounding this vulnerable population.

The primary goals of the model are to: (1) improve quality of care and reduce costs for pregnant and postpartum women with OUD as well as their infants; (2) expand access to service delivery capacity and infrastructure based on state-specific needs; and (3) create sustainable coverage and payment strategies that support ongoing coordination and integration of care. The model requires that women with OUD receive a comprehensive set of services such as maternity care, medication-assisted treatment, and mental health screening and treatment delivered in a coordinated and integrated approach by a team of health care professionals who work in different specialties. The

model will also require awardees to coordinate care, engage beneficiaries, and provide referrals for necessary services to meet the model population's comprehensive needs.

On December 10, 2019, CMS announced that the following 10 states were awarded MOM Model funding for a model performance period of five years: Colorado, Indiana, Louisiana, Maine, Maryland, Missouri, New Hampshire, Tennessee, Texas, and West Virginia. The first performance year, which is a pre-implementation year, began January 1, 2020. States receiving funding under the model will begin care delivery during Year 2, beginning July 1, 2021.

OTHER KEY HHS MATERNAL HEALTH PROGRAMS AND INITIATIVES

HHS operates many other maternal health-related programs not already discussed above. Programs such as the Maternal and Child Health Block Grant Program, Maternal, Infant and Early Childhood Home Visiting Program (MIECHV), and State Maternal Health Innovation touch the lives of millions of mothers and their children by providing funding to a wide variety of organizations that address maternal and child health. In addition, CMS offers various tools to evaluate quality including the Medicaid & CHIP Scorecard and measures in the Medicare Value-Based Purchasing program. These programs and many others are described in greater detail in the Appendix.





DEVELOPING HHS' ACTION PLAN TO IMPROVE MATERNAL HEALTH

In developing this Action Plan, the Department sought feedback from a wide variety of stakeholders during numerous meetings and listening sessions to hear their perspectives on what they view as important challenges in maternal health and how they might be addressed. This information helped inform the Department's strategic vision for improving maternal health described in this report. Below are some examples of stakeholder engagement activities and the recommendations we heard during these discussions:

HHS ROUNDTABLE DISCUSSIONS

The Department hosted a series of roundtable discussions between July and September of 2019 to help identify potential opportunities to reduce rates of maternal mortality and morbidity. Individuals including academics, state officials, providers, issuers, hospitals, health systems, advocacy groups, and moms, met with HHS leadership involved in maternal health care policymaking throughout the Department. Common themes and recommendations heard during these stakeholder sessions include the following:

Greater access to care, especially during the postpartum period, is needed to address co-morbid conditions (e.g., SUD, mental health issues, diabetes, hypertension), and to improve care coordination.

RECOMMENDATIONS TO ADDRESS ACCESS ISSUES INCLUDED:

Extending Medicaid coverage beyond the 60-day postpartum period; incentivizing providers to provide more timely postpartum care; using more interdisciplinary teams to provide care, especially in rural areas; creating more seamless transitions of care; increasing care management, especially for high-risk women; and integrating more community-based organizations to improve access to care for women.

Reducing disparity gaps among African-American, American Indian/Alaska Native, and rural women is essential to improving maternal health.

RECOMMENDATIONS TO ADDRESS DISPARITY ISSUES INCLUDED:

Determining methods to hold health systems accountable for how they treat patients; incorporating a patient experience metric into quality reporting; generating more opportunities to listen and hear from patients about their experience; and identifying state-based innovative solutions that show promising results for improving equity of care and reducing racial disparities.

Collection of additional fields of data and standardized data is needed on a more rapid basis to establish benchmarks and identify improvements.

RECOMMENDATIONS TO ADDRESS THE DATA GAPS INCLUDED:

Adding race/ethnicity fields to all administrative data systems for standardized collection, improving race/ethnicity on death records and improving standardization for race/ethnicity for all vital records across all states; collecting additional data at a hospital or ZIP code level; obtaining data more quickly from vital statistics agencies; and increasing data sharing and linkages among different provider types and settings pre and post the hospital visit.

REGIONAL LISTENING SESSIONS

HHS senior leadership traveled to urban, rural, and tribal areas in selected states to host regional listening sessions with the goal of engaging with stakeholders across the country to hear their localized perspectives on the opportunities and challenges they are facing to improve maternal health and to identify successful or innovative state-based initiatives to address maternal health. Information gathered from the events further informed the Department's strategic vision and Action Plan for improving maternal health. During these sessions, state and local leaders raised the below themes and offered the following recommendations for federal action:

Quality improvement activities across all settings will help to improve maternal health outcomes.

RECOMMENDATIONS TO IMPROVE QUALITY INCLUDED:

Continuing to implement and disseminate quality improvement activities by: using a checklist for hospital care; providing payment incentives to reduce cesarean delivery rates; implementing AIM bundles for inpatient quality improvement and medical home models for outpatient quality improvement; and considering how to adapt quality measures and reporting requirements for tertiary care facilities, especially those located in rural areas.

Increased access to care should be addressed generally and specifically during all phases of pregnancy (preconception and prenatal phases, during delivery and postpartum period).

GENERAL RECOMMENDATIONS TO IMPROVE ACCESS TO CARE INCLUDED:

Expanding use of telehealth programs for e-Care and remote monitoring of chronic conditions; expanding access to and reimbursement for midwives and doulas; addressing mental health issues before and after pregnancy; and weaving health care and human services agencies and programs together.

SPECIFIC TIME PERIOD RECOMMENDATIONS INCLUDED:

- **During the preconception and prenatal phases:** Utilizing local health departments to educate women and improve access to women's preventive health services (via group prenatal care programs or otherwise); identifying social determinants of health interventions; using telehealth for remote monitoring; and strengthening the role of family practice physicians.
- **During delivery:** Better utilizing all types of clinicians, including medical residents, to share information and educate patients; encouraging the use of birthing centers for low-risk births; and examining how to best use and integrate telehealth and e-Care, particularly for specialist needs for women in rural areas.
- **During the postpartum period:** Extending coverage of Medicaid; integrating the mom-baby visit; requiring mental health screenings during the postpartum visit; addressing chronic conditions; utilizing other family members, especially fathers, to monitor the health of mom and baby; discussing family planning and easing barriers for women to obtain contraception; and creating a stronger economic environment by implementing social supports for new moms (i.e., breast-feeding rooms, paid sick leave, child care credits).



States have identified best practices to increase the equitability of care and reduce disparities.

RECOMMENDATIONS TO ENSURE THAT CARE PROVIDED IS CULTURALLY COMPETENT AND EQUITABLE TO REDUCE DISPARITIES INCLUDED:

Continuing to train, teach, and talk about equity of care; showing hospitals their own data; improving training; and collecting data on racial measures to better understand where disparities exist and how to best address them.

State and local leaders continue to face challenges in delivering high-quality care to women.

THE ONGOING CHALLENGES RAISED DURING THE LISTENING SESSIONS INCLUDED:

Providing risk-appropriate care and right-size care; deliver safe care in low-volume areas; communicating and share public health programs with private providers; referring to mental health professionals more efficiently and effectively; measuring health equity; identify pregnancy earlier; increasing the rate of the postpartum visit among the Medicaid population; and addressing the non-medical drivers of health.



MATERNAL MORTALITY AND REVIEW COMMITTEE DISCUSSIONS

The Department spoke with state officials leading Maternal Mortality and Review Committees (MMRCs) in selected states. These conversations provided HHS with a better understanding of the resource intensive processes states undertake to identify, review, and compile a woman's history and cause of death and how to best draw conclusions and recommendations to prevent maternal mortality in the future. Throughout these conversations, HHS heard both challenges the MMRC's are facing and suggestions for making this process more efficient and effective. The challenges, recommendations, and best practices heard include:

Data, records collection, and staffing continue to be a time-consuming and challenging process.

RECOMMENDATIONS TO LESSEN THIS CHALLENGE INCLUDED:

Establishing common standards for the definitions of pregnancy-related death and preventability to ensure that all states are using the same definition for comparison purposes; improving record retrieval and data sharing processes to ensure records can be accessed in a timely fashion from hospital systems, payers, the criminal justice system, public health systems, and out-of-state records when relevant to support maternal mortality reviews; ensuring there is adequate funding for training and autopsies, and recruiting appropriately trained staff for medical chart abstraction and review of case files to support MMRC operations.

Consider going beyond medical records when conducting reviews.

RECOMMENDATIONS FOR TAKING A LIFE COURSE APPROACH TO MMRC REVIEWS INCLUDED:

Identifying social determinants of health to present a complete picture of a woman's life prior to her death; assessing whether racial inequities played a role in a given case; and determining and providing effective approaches to conducting training to address racial disparities.

Publicly share recommendations and findings from the reviews.

After completing reviews, most state MMRCs publish a report sharing their general findings and recommendations. However, states noted that it was difficult to ensure that the findings were reaching providers and other key stakeholders.

RECOMMENDATIONS ON THIS ISSUE INCLUDED:

Generating and broadly disseminating recommendations in easy-to-read formats (1-page fact sheets) and in ways that safeguard providers from undue liability while allowing for feedback on best practices to be acted on by relevant providers and stakeholders.





APPENDIX

HHS MATERNAL HEALTH PROGRAMS AND INITIATIVES

HHS MATERNAL HEALTH PROGRAMS AND INITIATIVES

ADMINISTRATION FOR CHILDREN AND FAMILIES (ACF)

HEAD START AND EARLY HEAD START PROGRAMS promote school readiness of children under age 5 from low-income families through education, health, social, and other services. These programs offer a variety of service models, depending on the needs of the local community. Head Start and Early Head Start programs are based in child care centers, schools, and family child care homes. Some programs offer home-based services that assign dedicated staff who conduct weekly visits to children in their own home and work with their parents. Other programs are located in child care centers and family child care homes. Some programs offer home-based services that assign dedicated staff who conduct weekly visits to children in their own home and work with the parent.

Head Start programs support children's growth and development in a positive learning environment through a variety of services, which include:

- **Early learning:** Children's readiness for school and beyond is fostered through individualized learning experiences. Through relationships with adults, play, and planned and spontaneous instruction, children grow in many aspects of development. Children progress in social skills and emotional well-being, along with language and literacy learning, and concept development.
- **Health:** Each child's perceptual, motor, and physical development is supported to permit them to fully explore and function in their environment. All children receive health and development screenings, nutritious meals, oral health, and mental health support. Programs

KEY TAKEAWAYS:

Head Start and Early Head Start programs support parents in their role as primary caregivers and teachers of their children. Programs assist families in meeting their own personal goals and achieving self-sufficiency across a wide variety of domains, such as housing stability, continued education, and financial security. Additionally, programs must provide a newborn visit for each mother and baby within two weeks of the birth, as well as prenatal and postpartum information, education and services.

FIND MORE ON

Head Start and Early Head Start at:

<https://www.acf.hhs.gov/ohs> and <https://eclkc.ohs.acf.hhs.gov/programs/article/early-head-start-programs>

connect families with medical, dental, and mental health services to ensure that children are receiving the services they need.

- **Family well-being:** Parents and families are supported in achieving their own goals, such as housing stability, continued education, and financial security. Programs support and strengthen parent-child relationships and engage families around children's learning and development.

Early Head Start programs provide similar services as preschool Head Start programs, but they are tailored for the unique needs of infants and toddlers. Early Head Start programs promote the physical, cognitive, social, and emotional development of infants and toddlers through safe and developmentally enriching caregiving.

Head Start programming is responsive to the ethnic, cultural, and linguistic heritage of each child and family. More than 80 percent of children served by Head Start programs are 3- and 4-year-olds. Infants, toddlers, and pregnant women make up just under 20 percent of Head Start enrollment, and are served through Early Head Start programs. Early Head Start programs are available to the family until the child turns 3 years old and is ready to transition into Head Start or another pre-K program.

RUNAWAY AND HOMELESS YOUTH PROGRAM MATERNITY GROUP HOMES continue to increase access to prenatal care and nutrition as well as postpartum care to reduce pregnancy complications and low birth weight for pregnant youth experiencing homelessness. One overarching goal for Maternity Group Homes (MGHs) is to achieve healthy pregnancies for these youth by identifying and treating risk factors that contribute to morbidity and complications during pregnancy. MGH projects work with pregnant youth to increase access to prenatal and postpartum care to reduce pregnancy complications and low birth weight for pregnant youth experiencing homelessness, which ACF highlights in the MGH Funding Opportunity Announcement. For parenting youth, MGHs also work to include the needs and safety of the dependent children to include providing parenting skills, child development classes, health and nutrition, and safety standards for infants and children to young mothers experiencing homelessness.

**FIND MORE ON
the Maternity Group Home at:**

[https://www.acf.hhs.gov/fysb/programs/
runaway-homeless-youth/programs/maternity-
group-homes](https://www.acf.hhs.gov/fysb/programs/runaway-homeless-youth/programs/maternity-group-homes)

ADMINISTRATION FOR COMMUNITY LIVING (ACL)

THE CENTER FOR HUMAN DIGNITY AND HEALTH ACCESS FOR INDIVIDUALS WITH DISABILITIES

addresses the health disparities of Americans with disabilities that result from inequities in care across the lifespan. This center is a first-of-its-kind investment aimed at educating medical professionals about the civil rights and support needs of Americans with disabilities as they access routine and lifesaving care from the beginning of life until its natural end. The Center will develop resources for medical professionals to address and prevent health care discrimination, including policies, protocols, and resources. They will also develop resources for reporting health care discrimination and advocacy in partnership with people with intellectual and developmental disabilities (I/DD) and their families. The Center will ensure that Americans with I/DD experience improved access to health care, including maternal health care services, life-saving treatments, and to mental health care, leading to greater equitable health care across the nation.

KEY TAKEAWAYS:

Providing resources to the medical community will help to ensure equal access to health care for mothers with disabilities.

FIND MORE ON

Center for Human Dignity and Health Access for Individuals with Disabilities at:

<https://acl.gov/grants/human-dignity-and-civil-rights-people-disabilities>

ACL is conducting an awareness campaign on the U.S. Access Board finalized voluntary standards for **ACCESSIBLE MEDICAL DIAGNOSTIC EQUIPMENT (MDE)** to make the business case for the adoption of increased use of accessible MDE equipment such as examination tables. People with disabilities experience much higher rates of a variety of illnesses compared to their non-disabled peers. People with mobility disabilities experience difficulties in accessing health care because of inaccessible MDE and furniture including radiological diagnostic equipment, such as MRI, PET, X-ray, CAT scan, and mammography machines; weight scales; medical examination tables and chairs; and hospital beds and lifts. With the finalization of standards for Accessible MDE in 2017, medical equipment manufacturers can now manufacture to voluntary industry standards that help providers to safely address the medical diagnostic needs of most older

KEY TAKEAWAYS:

Empowering consumers with disabilities, including pregnant women, can help them to advocate for their providers to adopt new technology that better meets their needs.

FIND MORE ON

accessible medical diagnostic equipment at:

<https://acl.gov/news-and-events/acl-blog/x-rays-meet-ada-making-case-accessible-health-care>

adults and people with disabilities who require the use of wheelchairs or scooters. A number of manufacturers are building to these specifications. Yet, studies show that provider adoption and deployment of this cutting-edge technology has been slow, which is why ACL is conducting an awareness campaign that is designed to educate providers on the business case for procuring and utilizing accessible MDE, while empowering consumers with disabilities, including pregnant women and mothers, to advocate for their providers to adopt this technology that better meets their needs.

A national network of 68 **UNIVERSITY CENTERS FOR EXCELLENCE IN DEVELOPMENTAL DISABILITIES (UCEDD)** is implementing projects and creating products addressing various aspects of women's and maternal health. Centers, such as the Oregon Institute on Development & Disability, conduct numerous projects analyzing the factors that contribute to safe and healthy pregnancies in women with disabilities and have produced papers such as "Pregnancy among U.S. women: Differences by presence, type, and complexity of disability." The Rural Institute for Inclusive Communities at the University of Montana partners with women with disabilities to deliver high-quality reproductive health information using innovative web-based platforms, all developed through input from women with disabilities. From local technical assistance for community organizations to detailed multi-year studies, UCEDDs are highly engaged in the process of generating and promoting knowledge in the area of maternal and women's health. Many medical practitioners lack education and experience with mothers with disabilities, so the UCEDDs also provide training to medical and allied health students to help raise their awareness and knowledge of women with disabilities thereby enhancing their access to care.

KEY TAKEAWAYS:

UCEDDs are generating a variety of resources and provide training that encourages evidence-based preventive and disease management services that enable women with disabilities to enter pregnancy in good health.

Women with physical and cognitive disabilities struggle to find support with breastfeeding, postpartum planning, and other childcare skills that account for their specific needs. HHS will continue to identify opportunities to help make postpartum services more accessible to mothers with disabilities. For example:

- The **National Research Center for Parents with Disabilities, Parent Empowering Parents** is a National Institute on Disability, Independent Living, and Rehabilitation Research funded grantee which conducts research and provides training and technical assistance to improve the lives of parents with disabilities and their families. They offer resources to support parents with disabilities and information about working with parents with disabilities for social workers, researchers, and legal professionals. They have released a series of briefs on the intersection between reproductive health, sex education, contraception use, and disability. These materials provide information on a variety of topics relating to the sexual

and reproductive health of women with intellectual and developmental disabilities in the U.S. This information was compiled by researchers from The Lurie Institute for Disability Policy and provides summaries of some of the barriers women with disabilities face in receiving high-quality reproductive care and sex education.

- **Through the Looking Glass** (TLG) is a nationally recognized center that has pioneered research, training, and services for families in which a child, parent, or grandparent has a disability or medical issue. TLG is a disability community-based nonprofit organization, which emerged from the independent living movement, and was founded in 1982 in Berkeley, California.

FIND MORE ON

The National Research Center for Parents with Disabilities, Parents Empowering Parents at:

<https://heller.brandeis.edu/parents-with-disabilities>

FIND MORE ON the TLG at

<https://lookingglass.org/national-services/national-center>

Certain populations are ‘invisible’ in population-based studies because their unique characteristics make it difficult to identify them in large data sets. For example, individuals with intellectual and developmental disabilities are often not easily identified in large population based surveys which means that critical information about their health and well-being is not well understood. ACL and CDC are collaborating to **IMPROVE**

DATA COLLECTION AND HEALTH

SURVEILLANCE on this population. With support from ACL, NCHS is developing questions that would help to identify the intellectual disability and developmental disability (ID/DD) population in the National Health Interview Survey (NHIS). If the questions can be validated and added to the NHIS, then data can be collected on the health status of the ID/DD population and used on other population based surveys. Additionally, NIH and CDC are working together to add questions on disabilities to CDC’s Pregnancy Risk Assessment Monitoring System (PRAMS, discussed later in this Action Plan) to better understand the experiences and health needs of women with disabilities before, during, and after pregnancy.

KEY TAKEAWAYS:

To ensure health equity, underrepresented populations must be included in national population surveys.

AGENCY FOR HEALTHCARE RESEARCH AND QUALITY (AHRQ)

Women's preventive health care services identified in the **U.S. PREVENTIVE SERVICES TASK FORCE (USPSTF)** must be covered by most health plans without cost sharing when provided in-network. General women's health services receiving a rating of 'A' or 'B' by the USPSTF, and therefore qualifying for coverage without cost sharing when provided in-network, include screening for depression, diabetes, HIV, other sexually transmitted diseases, high blood pressure, unhealthy alcohol use, various cancers and infectious diseases, and intimate partner violence, as well as counseling related to weight loss to prevent obesity-related mortality and morbidity, healthful diet to prevent cardiovascular disease, unhealthy alcohol use, sexually transmitted diseases, tobacco cessation, and recommendations of preventive medications such as folic acid supplementation. Pregnancy-related services receiving an 'A' or 'B' rating by the USPSTF include screening for perinatal depression, gestational diabetes, Hepatitis B, asymptomatic bacteriuria, preeclampsia along with use of low-dose aspirin for the prevention of morbidity and mortality from preeclampsia, tobacco use screening and treatment, and Rh(D) incompatibility.

The USPSTF is currently updating reviews on the following topics:

- Bacterial Vaginosis in Pregnancy to Prevent Preterm Delivery: Screening
- Aspirin Use to Prevent Preeclampsia and Related Morbidity and Mortality: Preventive Medication
- Chlamydial and Gonococcal Infections: Screening
- Gestational Diabetes Mellitus: Screening
- Healthful Diet and Physical Activity to Prevent Cardiovascular Disease in Adults With Risk Factors: Behavioral Counseling Interventions
- Healthy Weight and Weight Gain During Pregnancy: Counseling
- Hepatitis C Virus Infection in Adolescents and Adults: Screening
- High Blood Pressure in Adults: Screening
- Sexually Transmitted Infections: Behavioral Counseling
- Tobacco Smoking Cessation in Adults, Including Pregnant Women: Interventions

**FIND MORE ON
the USPSTF at:**

<http://www.uspreventiveservicestaskforce.org>

The **EVIDENCE-BASED PRACTICE CENTERS (EPC)** program awards 5-year contracts to institutions to review and analyze scientific literature on a wide spectrum of clinical and health services topics using a rigorous methodology. The findings are summarized in evidence reports. Federal agencies and other organizations, such as clinical professional societies and the USPSTF, use these evidence reports to promote practice change by developing coverage decisions, quality measures, educational materials and tools, clinical practice guidelines, and research agendas. The EPC program has published reports on a number of maternal health-related topics, including management of infertility, the effectiveness of programs and policies aimed at increasing uptake of breastfeeding and to determine the association between breastfeeding and maternal health, screening for gestational diabetes mellitus, low-dose aspirin use for the prevention of morbidity and mortality, and preeclampsia. Reports in development include management of primary headaches during pregnancy, maternal and fetal effects of mental health treatments during pregnancy, cervical ripening in the outpatient settings, and labor dystocia.

KEY TAKEAWAYS:

The EPC Program is developing a number of evidence reports on maternal health-related topics. These will inform health care decisions through practice guidelines, coverage decisions, quality measures, and a research agenda.

FIND MORE ON the EPC program at:

<https://www.ahrq.gov/research/findings/evidence-based-reports/index.html>



The **SAFETY PROGRAM FOR PERINATAL CARE (SPPC)** toolkit, which was released in November 2014, was designed to improve the patient safety culture of labor and delivery units and decrease maternal and neonatal adverse events resulting from poor communication and system failures. The SPPC is organized around three program pillars, which include: Teamwork and Communication Skills, Perinatal Safety Strategies, and In Situ Simulation Training. This toolkit was developed to support implementation of the three program pillars. The toolkit helps labor and delivery units improve patient safety, team communication, and quality of care for mothers and their newborns. It builds on knowledge gained from AHRQ's Comprehensive Unit-based Safety Program and the TeamSTEPPS® teamwork system, and from findings from AHRQ's Patient Safety and Medical Liability Initiative demonstration grants. The tools can be customized to local unit processes and procedures. An implementation and impact evaluation of the SPPC toolkit occurred in 46 labor and delivery units across 10 states between 2014 and 2016. The evaluation showed that the SPPC had a favorable impact on unit patient safety culture and processes and maternal outcomes and mixed findings on neonatal outcomes. Specifically, improvements were observed for primary cesarean delivery rates and obstetric trauma without instrumentation; however, the overall rate of unexpected newborn complications was unchanged. Results from this initial implementation of SPPC showed the promise of this approach and highlighted the importance of a long-term evaluation and partnership.

KEY TAKEAWAYS:

Use of the SPPC toolkit in labor and delivery units can create or enhance a culture of patient safety to reduce preventable errors. AHRQ is partnering with HRSA and AIM on the SPPC-II Demonstration Project. SPPC-II complements the AIM maternal safety bundles by emphasizing essential teamwork and communication skills to improve unit-level patient safety culture and the quality of obstetric care to improve SMM and mortality. The project includes a rigorous, mixed-methods evaluation to build the evidence base for SPPC and AIM.

FIND MORE ON the SPPC at:

<https://www.ahrq.gov/hai/tools/perinatal-care/index.html>

AHRQ's **SPECIAL EMPHASIS NOTICE** requests research grant applications that are designed to help advance the goal of achieving a high-value health care system. As part of this emphasis, AHRQ has prioritized the following types of research related to maternal health:

- Factors influencing racial/ethnic disparities in infant and maternal health outcomes, including access to care, quality of care, and system fragmentation.
- Approaches to optimizing delivery of care (e.g., care coordination, systems integration of medical-social factors, innovative payment models) to address chronic health conditions in mothers and to reduce adverse infant and maternal health outcomes.
- The role of maternal care experiences in variations in quality of care, costs, and maternal and infant health outcomes.

KEY TAKEAWAYS:

As part of its broader efforts to fund research intended to inform improvements to the overall health care system, AHRQ is prioritizing maternal and child health outcomes, including better understanding the drivers of outcome disparities and strategies to overcome these challenges.

FIND MORE ON AHRQ's Special Emphasis Notice at

<https://grants.nih.gov/grants/guide/notice-files/NOT-HS-19-011.html>

The **NATIONAL HEALTHCARE QUALITY AND DISPARITIES REPORT** (QDR) tracks health care quality and health care disparities, including adverse maternal events, and identifies strengths and opportunities for improvement in health care. The QDR Interagency Maternal mortality and morbidity Measures Working Group recently identified, prioritized, and recommended a list of supplemental measures for the 2018 National Healthcare Quality and Disparities Report and future reports to monitor trends in maternal mortality and morbidity. The additional measures included in-hospital deaths per 100,000 delivery hospitalizations and percent cesarean deliveries among low-risk first births.

FIND MORE ON the National Healthcare Quality and Disparities Report at:

<https://nhqrnet.ahrq.gov/inhqrdr/>

AHRQ has funded investigator-initiated research on a wide variety of topics focused on building evidence to inform best practices and efforts to **IMPROVE THE SAFETY AND QUALITY OF MATERNAL HEALTH CARE AND REDUCE DISPARITIES**, including the following recently completed projects:

FIND MORE ON
the AHRQ's maternal and child health research
portfolio at

<https://prod.ahrq.gov/projectsearch/index.jsp>

Safety in Childbirth

This project aimed to determine whether regionalization of obstetrical care had the potential to impact steadily rising rates of maternal mortality and morbidity.

The published findings of this AHRQ-funded study are available with a subscription at:
<https://pubmed.ncbi.nlm.nih.gov/26275353/>

Impact of Obstetric Unit Closures on Pregnancy Outcomes

The purpose of this research was to understand the impact of obstetric unit closures on pregnancy outcomes by examining (1) the importance of obstetric care on pregnancy outcomes; (2) the impact of other reductions in health care services on the outcomes of hospitalizations; and (3) the potential explanations for the relationship between hospital closures and changes in outcomes.

The published findings of this AHRQ-funded study are available with a subscription at:
<https://www.ncbi.nlm.nih.gov/pubmed/?term=25489034>

Hospital Variation in Costs and Outcomes of Care for Childbirth

The objective of this study was to examine hospital variation in cost and outcomes of care for childbirth-related hospitalizations and to identify hospital attributes associated with high-value care.

The published findings of this AHRQ-funded study are available with a subscription at:
<https://pubmed.ncbi.nlm.nih.gov/31502407/>

Personal Health Information Needs and Practices for Maternal Fetal Care

This research investigated the characteristics, information needs, and information management practices of pregnant women and their caregivers to inform the design of health information technologies.

The published findings of this AHRQ-funded study are available with a subscription at:

<https://www.ncbi.nlm.nih.gov/pubmed/?term=31094327>

Economic and Policy Assessment Regarding the Impact of Changes to State Laws Regarding Standard Operating Procedures for Certified Nurse Midwives

The overall goal of this project was to use the ‘natural experiment’ that occurs as states change their laws affecting scope of practice for CNMs (certified nurse midwives) over the 1994-2013 time period to evaluate the effect of these changes on the CNM supply and practice and in turn, maternal and infant outcomes.

The published findings of this AHRQ-funded study are available with a subscription at:

<https://www.ncbi.nlm.nih.gov/pubmed/?term=28778349>

The **HEALTHCARE COST AND UTILIZATION PROJECT (HCUP)** consists of a series of

databases derived from hospital inpatient and outpatient billing data from across the U.S. These data have been used to do research on a wide variety of topics, including analyses on maternal health, some of which are mentioned elsewhere in this Action Plan. AHRQ also develops quality indicators that can be used in conjunction

with their databases to analyze birth outcomes such as primary uncomplicated cesarean delivery, birth trauma, and obstetric trauma. Related recent HCUP briefs and analyses include topics like substance use and clinical outcomes among delivery stays, delivery stays with SMM, and delivery hospitalizations involving preeclampsia and eclampsia.

**FIND MORE ON
HCUP at:**

<https://www.hcup-us.ahrq.gov/>

OFFICE OF THE ASSISTANT SECRETARY FOR PLANNING AND EVALUATION (ASPE)

ASPE coordinates intradepartmental data infrastructure projects and manages funding provided by the **OFFICE OF THE SECRETARY'S PATIENT-CENTERED OUTCOMES RESEARCH TRUST FUND (OS-PCORTF)**. A portion of the trust fund has been designated to build data capacity for research that generates new scientific evidence that can inform decisions about the effectiveness of interventions on patient health outcomes. The common interest in building data capacity for patient-centered research brings together the expertise of HHS agency leaders, informaticians, technologists, and researchers to identify priorities, share expertise and resources, and collaborate on projects. In 2020, representatives from each HHS agency decided to include improvements to maternal health data as one of its OS-PCORTF funding priorities, designating an initial \$3 million to fund new projects related to maternal health data. In addition, ASPE is commissioning a report that will review data for conducting patient-centered outcomes research on maternal health. The purposes of the paper are to better understand a) the types of state-level activities that are underway to improve maternal health outcomes, b) the data capacity to conduct such activities, and c) the existing gaps for conducting patient-centered outcomes research on maternal health.

**FIND MORE ON
the portfolio of intradepartmental projects
funded by the OS-PCORTF at:**

<https://aspe.hhs.gov/patient-centered-outcomes-research-trust-fund>

CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)

The **ENHANCING REVIEWS AND SURVEILLANCE TO ELIMINATE MATERNAL MORTALITY (ERASE MM) PROGRAM** is providing funding covering 25 states, to directly fund their Maternal Mortality Review Committees (MMRCs) to obtain better data on the details and circumstances surrounding each maternal death in order to develop actionable recommendations to prevent future deaths. Maternal Mortality Review is a process by which a multidisciplinary committee at the state or city-level identifies and reviews deaths that occur during or within one year of pregnancy. MMRCs have access to multiple sources of information that provide a deep understanding of the details and circumstances surrounding each death in order to develop actionable recommendations to prevent future deaths. CDC also developed the Maternal Mortality Information Application (MMRIA), which is a data system to facilitate MMRC standardized review through a common data language. It is available to all MMRCs, as well as technical assistance. In addition, HRSA's Maternal and Child Health (MCH) Block Grant also supports MMRCs in some states. In FY 2018, 37 State Title V programs provided funding to support comprehensive maternal mortality reviews to identify contributing factors, monitor trends, and initiate appropriate action to reduce such events in the future. An additional 14 states were in the planning process to use Title V funds to support maternal mortality reviews.

KEY TAKEAWAYS:

The ERASE MM Program and HRSA's MCH Block Grant help support MMRCs that use a wide variety of data to understand each maternal death and develop actionable recommendations to prevent future deaths. As states and jurisdictions analyze maternal mortality data and identify preventable causes of maternal death, state PQC then implement quality improvement efforts, which may include utilizing AIM maternal safety bundles in birthing facilities across the state.

FIND MORE ON ERASE MM and MMRIA at:

<https://www.cdc.gov/ERASEMM>

CDC is supporting 13 state **PERINATAL QUALITY COLLABORATIVES (PQCS)** as well as a National Network of Perinatal Quality Collaboratives that supports non-funded states. PQCs are state or multi-state networks of perinatal care providers and public health professionals working to improve the quality of care for mothers and babies. They identify health care processes that need to be improved and use the best available methods to make changes as quickly as possible to help avert poor health outcomes moving forward. PQCs have contributed to important improvements in health and outcomes for mothers and babies, such as reducing severe pregnancy complications and

non-medically indicated deliveries before 39 weeks of pregnancy. In many states, PQCs act as the action arm of MMRCs to implement solutions identified by the MMRCs to prevent pregnancy-associated and pregnancy-related deaths. For instance, PQCs have been instrumental in certain states in helping to implement AIM safety bundles at hospitals electing to adopt such bundles. State Title V MCH Block Grant programs may be valuable partners in advancing these efforts, and in some states, they may contribute additional funding.

KEY TAKEAWAYS:

State and multi-state PQCs primarily supported by CDC are assessing local maternal health care processes that need to be improved and helping implement evidence-based practices to advance care delivery.

FIND MORE ON PQCs at:

<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pqc.htm>

CDC is working with states and partners to implement the **CDC LEVELS OF CARE ASSESSMENT TOOL (LOCATE)**. This tool, implemented through commonly used web-based survey tools, helps states and other jurisdictions create standardized assessments of levels of maternal and neonatal care based on guidelines and policy statements issued by the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists, and the Society for Maternal-Fetal Medicine. This tool further ensures that pregnant women and infants at high risk of complications receive care at a birth facility that is prepared to meet their health needs. It can identify gaps within the state that need to be strengthened to better serve women and infants.

KEY TAKEAWAYS:

Whenever possible, it is important that pregnant women receive care from a birthing facility that is adequately equipped to match the health needs of the mother and the neonate. CDC is helping states and other jurisdictions assess facility resource availability and capacity in order to improve delivery planning and emergent transport for expecting mothers that ensure they deliver in a facility that best meets their health needs.

FIND MORE ON the LOCATE tool at:

<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/cdc-locate/index.html>

CDC is working to support implementation of **ALCOHOL SCREENING AND BRIEF INTERVENTION** (SBI) in primary care settings, improve tracking of alcohol SBI implementation, and identify and partner with health care providers, health systems, and health plans to develop and implement system-level strategies that foster alcohol SBI implementation. Key activities include integration of alcohol SBI into electronic health records within health systems and the implementation of performance measures, including the 2018 Healthcare Effectiveness Data and Information Set measure, *Unhealthy Alcohol Use Screening and Follow-Up* by health insurance plans. CDC is also working to develop standards-based, vendor-neutral clinical decision support tools for alcohol screening and brief intervention to incorporate within electronic health record systems to guide clinical decisions needed to deliver this clinical preventive service.

KEY TAKEAWAYS:

CDC is working to monitor uptake of alcohol SBI and increase the use of this service through system-level approaches, including electronic health record integration, development of clinical decision support, and implementation of performance measures.

FIND MORE INFORMATION AND RESOURCES AT:

<https://www.cdc.gov/ncbddd/fasd/alcohol-screening.html>

CDC collaborates with partners to improve health care provider awareness and practice behaviors related to the prevention, identification, and care of **FETAL ALCOHOL SPECTRUM DISORDERS (FASDs)**. Activities include implementing alcohol SBI in health systems serving pregnant women and women of reproductive age and engaging national professional and medical organizations to promote and disseminate effective resources to a wide range of health care professionals. Related efforts include the development of training courses that are available free-of-charge to health care providers on the prevention, identification, and treatment of FASDs. Continuing education is also available through CDC. Courses include:

- FASD Primer for Healthcare Professionals
- Diagnostic Overview of FASDs: Recognition and Referral

KEY TAKEAWAYS:

CDC is working to prevent, identify, and treat FASDs by improving provider awareness and practice behaviors.

FIND MORE ON FASD AT:

<https://www.cdc.gov/ncbddd/fasd/>

FIND ALL FASD TRAINING COURSES AT:

www.cdc.gov/FASDtraining

- Preventing Alcohol-Exposed Pregnancies (AEPs)
- Implementing Alcohol Screening and Brief Intervention in Clinical Practice
- Interprofessional Collaborative Practice as a Model for Prevention of AEPs.

In addition, supplemental learning in the form of brief videos has been developed on How to Begin a Conversation about Alcohol Use and Making a Referral for a FASD Assessment: How to Talk with Families. Additional brief courses are in development.

Blood clots are a leading cause of pregnancy-related death in the U.S., and women face up to a five-fold increased risk of blood clots compared to women who are not pregnant. One of the three arms of the national **STOP THE CLOT, SPREAD THE WORD** campaign is focused on generating awareness and education about the risk, signs, and symptoms of venous thromboembolism for pregnant women.

**FIND MORE ON
the “Stop the Clots, Spread the Word”
campaign at:**

<https://www.stopthecлот.org/spreadtheword>

CDC’s **NATIONAL DIABETES PREVENTION PROGRAM (DPP)** is a partnership of public and private organizations working together to build a nationwide delivery system for a lifestyle change program proven to prevent or delay onset of type 2 diabetes in adults with prediabetes. The lifestyle change program is founded on the science of the Diabetes Prevention Program research study, and subsequent translation studies, which showed that making realistic behavior changes cut participants’ risk of developing type 2 diabetes by 58 percent (71 percent for individuals aged 60 and older) compared to a placebo. This was nearly twice as much as the reduction experienced among the group taking an oral diabetes medication, metformin (31 percent). A 15-year follow-up study showed that participants were still nearly one-third less likely to develop type 2 diabetes a decade later than individuals who took a placebo.¹⁰²

KEY TAKEAWAYS:

The National DPP lifestyle change program can prevent or delay onset of type 2 diabetes in adults with prediabetes or at risk of developing type 2 diabetes, such as women with gestational diabetes.

**FIND MORE ON
the National DPP at:**

<https://www.cdc.gov/diabetes/prevention/index.html>

MILLION HEARTS® 2022 is a national initiative to prevent 1 million heart attacks and strokes within 5 years (2017-2022), which focuses on implementing a small set of evidence-based priorities and targets to improve cardiovascular health for all Americans. CDC collaborates extensively with CMS, sets priorities, and leads the communications, partnership development, research, translation, and evaluation efforts for the initiative. Million Hearts priorities include keeping people healthy, optimizing care, and addressing the needs of priority populations. The initiative includes a number of targets such as reducing average daily sodium intake, decreasing the use of combustible tobacco, increasing physical activity, improving blood pressure control and cholesterol management, and increasing participation in cardiac rehabilitation. Priority populations include African Americans with high blood pressure, people aged 35 to 64, people who have had a heart attack or stroke, and people with mental and/or SUDs who use tobacco. Improving control of hypertension has been a main priority of the Million Hearts initiative, including for maternal health. Chronic poorly controlled high blood pressure before and during pregnancy puts a pregnant woman and her baby at risk for problems. One in three pregnancy related deaths are caused by heart disease. In June 2020, Million Hearts® published the second edition of the Hypertension Control Change Package with a listing of process improvements that health systems and clinicians can implement, including tools for postpartum management of hypertension.

KEY TAKEAWAYS:

While death rates due to heart disease have been declining steadily for the last 40 years, this trend appears to be stalling. Through Million Hearts 2022, CDC and CMS have an established plan to improve the cardiovascular health of all Americans by helping people avoid unhealthy behaviors that put them at risk of heart attack and stroke and improving the care of those with key risk factors.

FIND MORE ON Million Hearts 2020 at:

<https://millionhearts.hhs.gov/>

FIND THE Hypertension Prevalence Estimator Tool at:

<https://millionhearts.hhs.gov/tools-protocols/hiding-plain-sight/index.html#tool>

The **NATIONAL ADULT AND INFLUENZA IMMUNIZATION SUMMIT** consists of over 700 partners, including 130 public and private organizations, and is dedicated to addressing adult immunization issues and improving the use of vaccines recommended by CDC's Advisory Committee on Immunization practices. CDC and the Summit's partners have championed maternal immunization, and promote CDC's communication strategies that are specifically tailored to pregnant women to prevent infections related to vaccine preventable diseases.

CDC has guidelines for the vaccines that are needed before and during pregnancy. The Tdap vaccine (to help protect against whooping cough) should be given during each pregnancy, preferably during weeks 27- 36. CDC recommends that women who are, or will be, pregnant during influenza season get a flu shot. The flu shot can be given before or during pregnancy, once the vaccine is available. CDC collaborates with professional organizations, such as ACOG; through this collaboration, these guidelines have become incorporated into ACOG's recommendations as the Standard of Care. Influenza and whooping cough can be deadly, especially in a baby's first few months of life. Vaccinating women against these diseases during each pregnancy helps protect both them and their babies. Studies show flu and whooping cough vaccines are safe for pregnant women and developing babies.

KEY TAKEAWAYS:

It is important that all women of childbearing age be up-to-date on their immunizations to avoid serious complications associated with preventable infections that can arise during pregnancy. CDC is working with outside partners to ensure all women are aware of the importance of immunization.

CDC, in collaboration with NIH, supports Sudden Unexpected Infant Death (SUID) monitoring programs as part of the **SUID AND SUDDEN DEATH IN THE YOUNG (SDY) CASE REGISTRY** in 22 states and jurisdictions, covering about 1 in 3 SUID cases in the U.S. Participating states and jurisdictions use data about SUID and SDY trends and circumstances to develop strategies to reduce future deaths.

**FIND MORE ON
the SUID and SDY Case Registry at:**

<https://www.cdc.gov/sids/case-registry.htm>

At the National Institute for Occupational Safety and Health, scientists regularly evaluate occupational reproductive health research gaps via the **NATIONAL OCCUPATIONAL RESEARCH AGENDA (NORA) CANCER, REPRODUCTIVE, CARDIOVASCULAR, AND OTHER CHRONIC DISEASE PREVENTION PROGRAM**. The mission of the NORA program is to provide national and international leadership for the prevention of work-related diseases using a scientific approach to gather and synthesize information, create knowledge, provide recommendations, and deliver products and services to those who can affect prevention.

KEY TAKEAWAYS:

Identifying the causative agents, mechanisms by which they act, and any potential target populations will present the opportunity to intervene and better protect the reproductive health of workers.

FIND MORE ON NORA at:

<https://www.cdc.gov/niosh/programs/crcd/description.html> and <https://www.cdc.gov/niosh/programs/crcd/impact.html>

The **MATERNAL AND CHILD HEALTH EPIDEMIOLOGY PROGRAM** was established in 1987 jointly with HRSA to enhance the epidemiologic capacity of MCH programs in state health agencies. Through this program, epidemiologists and fellows are assigned to state, local, and tribal areas to build capacity and support applied epidemiologic research to improve MCH programs and policies. Since its inception, the program has assigned more than 40 senior MCH epidemiologists in 20 states and six other public health agencies and organizations. These positions are often funded by the Title V Maternal and Child Health Block grant. Currently, 12 epidemiologist assignees and 3 fellows from the Council of State and Territorial Epidemiologists, and an Epidemic Intelligence Service Officer are working in public health agencies or institutions. In some states, these epidemiologists are conducting analyses for the Maternal Mortality Review Committee, but overall, they work on a wide range of host agency-identified priority maternal health issues.

KEY TAKEAWAYS:

State-assigned epidemiologists are working hand-in-hand with various states and jurisdictions to help build epidemiologic capacity to address local maternal and child health priorities.

FIND MORE ON the Maternal and Child Health Epidemiology Program at:

<https://www.cdc.gov/reproductivehealth/mche/pi/index.htm>

The **NATIONAL VITAL STATISTICS SYSTEM (NVSS)** collects birth and mortality data based on death certificates filed in 57 jurisdictions in the U.S. (50 states, New York City, Washington, DC and 5 territories). NVSS mortality data collects information on all deaths, including maternal deaths (which include deaths of women while pregnant or within 42 days of being pregnant), and is the official source of mortality statistics for the U.S. Due to staggered implementation of the revised death certificate, including improved ascertainment of maternal deaths via a checkbox item indicating recent pregnancy, official maternal mortality rates from NVSS recently resumed in January 2020 with 2018 data. NVSS also currently receives linked data between infant birth and death records, which provide the best source of information on infant mortality by race and ethnicity. These linkages are performed by the jurisdictions and submitted to NCHS for compilation of national statistics. The NVSS birth data provide information on all births in the U.S. and official statistics on measures including the preterm birth rate, cesarean and low-risk cesarean rates, and general birth and fertility rates. The birth data also serve as the denominator for the calculation of the maternal mortality rate. Recent efforts have focused on improving the timeliness and quality of the data collected. Implementation of electronic registration systems have been a key factor in such improvements, especially for timeliness. With regard to maternal mortality, further improvements could be made by targeting cause of death certifiers (physicians, medical examiners and coroners) with training on how to properly certify the cause of death (training materials are already being developed), improving electronic registration systems with prompts to reduce errors in specifying pregnancy status, and fostering collaboration between state vital statistics and state maternal health agencies to detect maternal deaths and ensure accurate information appears on death certificates.

The Department's Healthy People initiative, which provides science-based, 10-year national objectives for improving the health of all Americans, has included measures related to the health of infants and children since its inception in 1979. In May 2019, NCHS data from the NVSS (Natality) and the linked infant birth/death data set were highlighted to assess progress for the Healthy People Leading Health Indicators on maternal, infant, and child health: infant mortality (infant deaths in the first year of life) and preterm births (less than 37 weeks gestation). The infant mortality rate decreased by 13.4 percent between 2006 and 2017, from 6.7 to 5.8 infant deaths per 1,000 live births, exceeding the Healthy

KEY TAKEAWAYS:

NVSS has resumed publication of official maternal mortality statistics with the 2018 data release. The Healthy People 2020 initiative goal for maternal, infant, and child health is to improve the health and well-being of women, infants, children, and families. This goal is being tracked, in part, using data from NVSS.

FIND MORE ON NVSS at:

<https://www.cdc.gov/nchs/nvss/index.htm>

FIND MORE ON Healthy People at:

www.healthypeople.gov

People 2020 target. The infant mortality rate experienced by infants born to non-Hispanic black mothers was more than 2.5 times the rate experienced by infants born to Asian or Pacific Islander mothers (10.9 versus 4.2 deaths under one year of age, respectively). Between 2007 and 2017, the total preterm birth rate decreased 4.8 percent, from 10.4 percent to 9.9 percent of live births, but still above the Healthy People 2020 target of 9.4 percent.

CDC's **PREGNANCY MORTALITY SURVEILLANCE SYSTEM (PMSS)** collects data annually from the 52 reporting areas (50 states, New York City, and Washington, DC). Reporting areas voluntarily send copies of death certificates for all women who died during pregnancy or within one year of pregnancy, and copies of the matching birth or fetal death certificates. This information is summarized, and medically-trained epidemiologists determine the cause and time of death related to the pregnancy. Causes of death are coded by using a system established in 1986 by the American College of Obstetricians and Gynecologists and the CDC Maternal Mortality Study Group. These data have been used to monitor trends over time and are currently the best national data available on pregnancy-related deaths (as noted above, NVSS produces the official maternal mortality rate which include deaths of women while pregnant or within 42 days of being pregnant) in the U.S.

KEY TAKEAWAYS:

CDC's PMSS provides national data on pregnancy-related deaths (during pregnancy or within one year of the end of pregnancy) in the U.S.

FIND MORE ON PMSS at:

<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-mortality-surveillance-system.htm>

FIND DATA FROM PMSS:

<https://www.cdc.gov/vitalsigns/maternal-deaths/index.html> and https://www.cdc.gov/mmwr/volumes/68/wr/mm6835a3.htm?cid=mm6835a3_w

The **PREGNANCY RISK ASSESSMENT MONITORING SYSTEM (PRAMS)** is a maternal health surveillance project funded by CDC and conducted in partnership with the states. PRAMS collects state-specific, population-based data on maternal attitudes and experiences before, during, and shortly after pregnancy. PRAMS surveillance currently covers approximately 83 percent of all U.S. births and can be used to identify groups of women and infants at high risk for health problems, to monitor changes in health status, and to measure progress towards goals in improving the health of mothers and infants. PRAMS data are used by researchers to investigate emerging issues in the field of reproductive health and by state and local governments to plan and review programs and policies aimed at reducing health problems among mothers and babies. NIH is partnering with PRAMS to fund the collection of information on disabilities for women participating in the PRAMS survey.

KEY TAKEAWAYS:

CDC's PRAMS data system provides critical information on the health and well-being of women with a recent birth, supporting research on emerging reproductive health issues and helping states and local governments evaluate policies and programs aimed at improving the health of mothers and babies.

FIND MORE ABOUT the PRAMS at

<https://www.cdc.gov/prams/index.htm>

To counter the implications the opioid epidemic has had on maternal health, CDC is supporting a three-part effort called **RAPID ASSESSMENT OF MATERNAL OPIOID USE AND OVERDOSE TO IMPROVE OUTCOMES AND SAVE LIVES**, which consists of: (1) adding questions to PRAMS to rapidly collect and disseminate data on non-fatal opioid use and misuse; (2) supporting MMRCs with funding and technical assistance to review pregnancy-associated overdose deaths; (3) funding a learning community to address opioid use among women during the pregnancy and postpartum periods; and (4) expanding the work of CDC-funded PQC to improve quality of care and outcomes for pregnant and postpartum women with OUD and newborns with Neonatal Abstinence Syndrome (NAS).

KEY TAKEAWAYS:

As part of the Department's overall efforts to counteract the opioid epidemic, CDC is better leveraging existing resources and supporting a learning community to address opioid use among women during the pregnancy and postpartum periods.

FIND MORE ON the Rapid Assessment of Maternal Opioid Use and Overdose to Improve Outcomes and Save Lives effort at:

<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/substance-abuse/opioid-use-disorder-pregnancy/working-with-states-partners-organizations.htm>

CDC identifies hospital deliveries involving **SEVERE MATERNAL MORBIDITY (SMM)** using administrative hospital discharge data and International Classification of Diseases (ICD) diagnosis and procedure codes. The original list of 25 SMM indicators based on the 9th Revision of ICD was published in 2012. CDC updated the list of indicators in 2015 to account for the transition to the 10th Revision of ICD. There are currently 21 indicators and corresponding ICD codes that can be used to track hospital deliveries involving SMM when using administrative hospital discharge data from October 2015 and beyond.

KEY TAKEAWAYS:

CDC maintains a series of indicators that can be used to track and analyze trends in SMM using hospital discharge data such as AHRQ's HCUP data discussed above. Such analyses can support monitoring of severe complications in U.S.

FIND MORE ON

CDC's surveillance of SMM at :

<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html>

Breastfeeding reduces the risk of ear, respiratory, stomach, and intestinal infections, asthma, obesity, and sudden infant death syndrome (SIDS). Mothers who breastfeed are less likely to develop breast cancer, ovarian cancer, type 2 diabetes, and hypertension. Hospitals play an important role in supporting women to start breastfeeding. The Baby-Friendly Hospital Initiative, which is based on the Ten Steps to Successful Breastfeeding, the global standard for hospital support for breastfeeding outlines evidence-based policies and practices that support mothers and their babies to breastfeed. Approximately 28 percent of babies in the U.S. are born in Baby-Friendly designated hospitals (approximately 600 facilities in the U.S. currently have Baby-Friendly designation, indicating they have gone through a rigorous external evaluation process). CDC's **MATERNITY PRACTICES IN INFANT NUTRITION AND CARE (MPINC) SURVEY** tracks hospital policies and practices supportive of breastfeeding. Participating hospitals also receive a customized report with feedback on how to improve maternity care practices that support breastfeeding.

FIND MORE ON

CDC's efforts to provide hospital support for breastfeeding at:

<https://www.cdc.gov/breastfeeding/about-breastfeeding/index.html>

NCHS' **NATIONAL AMBULATORY MEDICAL CARE SURVEY (NAMCS)** abstracts information from patient medical records and includes data on patients and the characteristics of their clinical visits to a variety of ambulatory care providers, as well as emergency departments of noninstitutional general and short-stay hospitals, including the reason for a visit, diagnoses, services that were ordered or provided during a visit for the purpose of screening or diagnosis, and medications that were ordered or provided. In the context of maternal health, preventive services and chronic disease management that women of childbearing age are receiving can be assessed on an annual basis and the survey includes a specific indicator on pregnancy status of patients (including the week of gestation). For instance, it is possible to track the provision of medications used to treat hypertension during pregnancy. Preliminary analyses demonstrate approximately one quarter of visits by hypertensive pregnant patients aged 13-55 years received a prescription for an antihypertensive medication during 2012-2015. Visits for prenatal care can be determined using reason for visit codes and ICD codes. Specifically, NAMCS can be used to measure the following pregnancy-related services receiving an 'A' or 'B' rating by the USPSTF:

- Perinatal depression screening
- Depression screening indicator variable (DEPRESS): assessment of whether the patient has signs or symptoms of depression.
- Gestational diabetes screening
- Glucose, serum indicator variable (GLUCOSE): blood glucose test measures the amount of glucose in serum and plasma.
- Hepatitis B screening
- Hepatitis panel indicator variable (HEPTEST): tests for infection by one of the hepatitis viruses (Hep A, HAV, Hep B, HBV, HBsAg, Hep C, or HCV).
- Asymptomatic bacteriuria screening
- Urinalysis indicator variable (URINE): checks for different component of urine to identify potential problems, including specific gravity, color, clarity, odor, pH, protein, and glucose.
- Preeclampsia screening
- Systolic (BPSYS) and diastolic (BPDIAS) blood pressure measurements. Limitation: only the most recent blood pressure measurement is collected.

In addition, the survey's Community Health Center Component, which is a national probability sample survey of visits to health centers, can be used to examine the care that pregnant women and newborn infants receive, including tests, screening, medications, chronic conditions, diagnoses, and the reason for a visit.

KEY TAKEAWAYS:

NAMCS can be used to monitor a wide range of preventive and chronic disease management services for women of reproductive age across a variety of ambulatory care settings.

FIND MORE ON NCHS's NAMCS at:

https://www.cdc.gov/nchs/ahcd/about_ahcd.htm

The **HEALTH, UNITED STATES** annual report is compiled by NCHS and is submitted on behalf of the Secretary of HHS to the President and the Congress of the U.S. The report uses data from national vital statistics and nationally representative data collection programs to track key indicators in the nation's health. Long-term trends in vital statistics are compiled, including birth rates, preterm births, teen births, infant mortality rates, and leading causes of death by age group. Where possible, trends are presented by race and Hispanic origin to examine disparities between these population groups.

KEY TAKEAWAYS:

*National trends are used to develop policies and to evaluate existing programs. **Health, United States** brings together comprehensive information on trends in vital statistics, with sufficient detail to allow investigation of disparities in these trends by race and Hispanic origin.*

**FIND MORE ON
the Health, United States program at:**

<https://www.cdc.gov/nchs/hus/>

CDC-funded **CENTERS FOR BIRTH DEFECTS RESEARCH AND PREVENTION (CBDRP)** are collecting data from women in 7 states (Arkansas, California, Iowa, Georgia, Massachusetts, New York, and North Carolina) for a case-control study of risk factors for 17 to 22 birth defects called the **BIRTH DEFECTS STUDY TO EVALUATE PREGNANCY EXPOSURES (BD-STEPS)**. Two CBDRPs are also collecting data on stillbirths. BD-STEPS began with 2014 births and builds on the **NATIONAL BIRTH DEFECTS PREVENTION STUDY (NBDPS)**, which collected data and specimens from families with approximately 30 birth defects in 10 states who had pregnancies between 1997 and 2011. Cases are selected from established state surveillance systems. Eligible women complete a standardized computer assisted telephone interview in English or Spanish between 6 weeks and 24 months after the estimated delivery date to collect information on exposures before and during pregnancy. Collected data are stored centrally at CDC and released at regular intervals for use in statistical analyses by CBDRP collaborators. Findings are submitted to peer-reviewed journals, national and international conferences, and are made available to research participants in a study newsletter.

KEY TAKEAWAYS:

Data and specimens collected as part of the CDC-funded NBDPS and BD-STEPS provide critical information to assess risk factors for birth defects and stillbirths and play an important role in the decision-making process that determines federal research agendas, birth defects and stillbirth prevention activities, and the direction of funding programs such as cooperative agreements.

**FIND MORE ON
the CBDRP, NBDPS, and BD-STEPS at:**

<https://www.cdc.gov/ncbddd/birthdefects/cbdrp.html>

CDC's **ACTIVE BACTERIAL CORE SURVEILLANCE (ABCS)** is an active laboratory- and population-based surveillance system for invasive bacterial pathogens of public health importance including group B *Streptococcus*. ABCs currently operates surveillance for group B streptococcal disease in infants in 10 Emerging Infections Programs sites across the U.S., representing a population of approximately 37 million and over 400,000 live births annually. ABCs data are useful in monitoring rates of perinatal invasive disease due to group B *Streptococcus* in infants. The data are also useful for professional organizations such as ACOG in reviewing and updating obstetric care guidelines targeted to prevent perinatal group B streptococcal disease in infants.

KEY TAKEAWAYS:

ABCs data are useful in monitoring rates of perinatal invasive disease due to group B Streptococcus in infants and for reviewing and updating guidelines.

FIND MORE ON ABCs at

<https://www.cdc.gov/abcs/index.html>

NCHS conducts the **NATIONAL HOSPITAL CARE SURVEY (NHCS)**, which collects data on patient care in hospital-based inpatient and emergency department settings to describe patterns of health care delivery and utilization in the U.S., including information on hospital visits related to maternal and newborn health. The collection of patient identifiable information allows for patients to be tracked over time and across hospitals settings. NHCS data have also been linked to outside data sources including the National Death Index, which provides information on in-hospital and post-acute mortality related to adverse maternal events and infant mortality. NHCS data are not yet nationally representative as hospitals are still being recruited to participate.

KEY TAKEAWAYS:

The NHCS is a future data source to analyze maternal and infant health care received at hospitals over time and various outcomes, including those related to adverse maternal events as well as maternal and infant mortality.

FIND MORE ON the National Hospital Care Survey:

<https://www.cdc.gov/nchs/nhcs/index.htm>

CDC's **COMMUNITY COUNTS BLEEDING DISORDERS SURVEILLANCE PROJECT** is gathering and sharing information about common health issues, medical complications, and causes of death that affect people with bleeding disorders cared for in U.S. Hemophilia Treatment Centers. As parts of this effort, CDC collects information about bleeding complications during menses, pregnancy, and child birth for pregnant women with bleeding disorders. The Community Counts data visualization tool displays de-identified data on patients with bleeding disorders who are enrolled in Community Counts in a new interactive, visual format. This tool can be used by clinicians, patients, and policymakers to learn more about the burden of bleeding disorders in the United States. This project also disseminates resources and information that support education and awareness, and standards of care for women with bleeding disorders through data reports and scientific manuscripts.

KEY TAKEAWAYS:

Community Counts is reducing complications from bleeding disorders by gathering and sharing valuable information on bleeding events and complications, inhibitor development (a condition that makes treatments less effective), treatment practices and patterns, blood-borne infections, diseases from aging, causes of death, and health care utilization.

FIND MORE ON

CDC's Community Counts Bleeding Disorders Surveillance Project at:

<https://www.cdc.gov/ncbddd/hemophilia/communitycounts/about.html>

CDC's "**SURVEILLANCE FOR EMERGING THREATS TO MOTHERS AND BABIES**" NETWORK conducts longitudinally linked mother-baby surveillance for emerging infectious diseases and other health threats. CDC currently funds thirteen state, territorial, and local health departments, including Arizona, California, Florida, Georgia, Kentucky, Los Angeles County, Massachusetts, New York, New York City, Pennsylvania, Puerto Rico, Tennessee, and U.S. Virgin Islands, for surveillance of hepatitis C, syphilis, and/or Zika either through CDC's Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases Cooperative Agreement or a contractual mechanism. This effort builds upon the [U.S. Zika Pregnancy and Infant Registry](#), which is an enhanced surveillance system to monitor pregnancy and fetal/infant/child outcomes among pregnant women and their

babies/infants with laboratory evidence of possible Zika virus infection. CDC's **LOCAL HEALTH DEPARTMENT INITIATIVE**, established in 2016, is also providing resources to hire local contract staff in high burden and high-risk local jurisdictions to support surveillance activities of emerging infectious disease threats to mother and babies within their community, including hepatitis C, syphilis, and Zika.

KEY TAKEAWAYS:

CDC's "Surveillance for Emerging Threats to Mothers and Babies" Network funds health departments to enhance surveillance of health threats, birth defects, developmental problems, and other disabilities caused by hepatitis C, syphilis, and/or Zika. CDC is also providing local jurisdictions with supplemental funding to strengthen their surveillance capacity.

FIND MORE ON

CDC's Surveillance for Emerging Threats to Mothers and Babies at:

<https://www.cdc.gov/ncbddd/aboutus/pregnancy/emerging-threats.html>

CDC received funding from OS-PCORTF to implement the **MATERNAL AND INFANT NETWORK TO UNDERSTAND OUTCOMES ASSOCIATED WITH TREATMENT FOR OPIOID USE DISORDER DURING PREGNANCY (MAT-LINK)**. MAT-LINK aims to improve our understanding of the spectrum of maternal, infant, and child health outcomes following treatment for OUD during pregnancy by establishing a surveillance network, consisting of 3-4 clinical sites, to collect existing data on maternal, infant, and child health outcomes associated with treatments for OUD during pregnancy.

KEY TAKEAWAYS:

CDC has implemented MAT-LINK to examine maternal, infant, and child health outcomes following treatment for OUD during pregnancy.

FIND MORE ON

CDC's MAT-LINK at:

<https://www.cdc.gov/ncbddd/aboutus/mat-link.html>

The Council of State and Territorial Epidemiologists (CSTE) recently developed an **APPROVED STANDARD SURVEILLANCE CASE DEFINITION FOR NAS** in collaboration with CDC. As a result of this effort, health departments and hospital systems around the country may use the same NAS definition to report cases of NAS to public health, producing consistent and comparable data. CDC recently funded CSTE to pilot this case definition with states. CSTE is funding four health departments to conduct NAS surveillance using the CSTE Standardized Case Definition (Tier 1) while leveraging existing surveillance infrastructure. CSTE will post a funding opportunity for 4-8 states in the coming months.

KEY TAKEAWAYS:

The new standardized case definition will allow for better collection of consistent and comparable data on NAS as new funding opportunities are supporting the rapid implementation of NAS surveillance.

Workforce is one of CDC's **FIVE CORE CAPABILITIES: ELITE PUBLIC HEALTH EXPERTISE** ensures we have the capacity to address complex diseases and swiftly respond to new threats. To accomplish our mission, CDC and the nation needs to maintain an elite, highly trained, cutting edge, deployable, and flexible scientific and programmatic workforce. Specific challenges such as the changing information technology landscape, shifting demographics, and outdated career models drove CDC to address the **FUTURE OF WORK** for the agency. CDC's the Future of Work initiative is aimed at ensuring adequacy of the workforce needed to address current and future priorities in the CDC Strategic Framework. For example, to ensure that CDC adequately addresses the activities laid out in the HHS Action Plan to Improve Maternal Health in America, CDC is focusing on five primary work segments (data science/informatics, laboratory science, field support, global health, project officer), to enable 5 functions (communications, finance, human capital, policy, and safety/security/asset optimization) and address

KEY TAKEAWAYS:

Virtually every strategy in the HHS Action Plan to Improve Maternal Health in America either explicitly or implicitly requires a public health workforce of adequate capacity and modern capabilities. The public health workforce is declining, the skills they need are broadening, and the locales they are needed in are growing. Yet members of the public health workforce are the ones on the front line improving maternal health in America. CDC through the Future of Work initiative is working to ensure CDC is adequately prepared to address specific workforce challenges such as the changing information technology landscape, shifting demographics, and outdated career models. A well-rounded public health workforce at the state, local, and federal levels is one that has the skills and aptitudes to address infectious diseases along with chronic diseases, as well as social determinants of health, and that combines the traditional disciplines of public health with a focus on strategic skills (strategic and systems thinking, communication, behavioral sciences, and translating science to policy).

10 critical success factors (comprehensive and integrated workforce data, data savvy workforce, professional skills, refined CDC career model, innovative mechanisms to access talent, continuous learning, workforce engagement, integrated technology and automation, organizations as networks of teams, and cross-sector collaboration). Within the CDC Center for Surveillance, Epidemiology, and Laboratory Services, the Division of Scientific Education and Professional Development is helping the agency make aggressive strides through agency-wide programs supporting fellows, learning, and the science of public health workforce development.

**FIND MORE ON
CDC's Five Core Capabilities and CDC's
Strategic Framework at:**

<https://www.cdc.gov/about/organization/strategic-framework/index.html>

CDC-funded **CENTERS FOR AUTISM AND DEVELOPMENTAL DISABILITIES RESEARCH AND EPIDEMIOLOGY (CADDRE)** currently collect data from mothers of young children in locations in six states (Colorado, Georgia, Maryland, Missouri, North Carolina, and Michigan) for a study to help identify factors that may put children at risk for autism spectrum disorder (ASD) called the **STUDY TO EXPLORE EARLY DEVELOPMENT (SEED)**. SEED is a multi-phase, multi-site, case-control study comparing children with ASD, identified at ages 2 through 5 years, to children with other non-ASD developmental disabilities, and from the general population. Currently in its third phase, comprehensive data collected through SEED includes study participant data (including information on pregnancy and early childhood exposures, services and treatments, maternal medical history, family socio-demographic characteristics, and child health and development), standardized functional assessments, and biological specimens. ASD status of children in the study is based on the results of the comprehensive standardized evaluations. While SEED 3 data collection started in 2016 and is ongoing through mid-2021, analyses of data and biological specimens from SEED 1 (2006-2011) and SEED 2 (2011-2016) have increased our understanding of the associations between maternal health and childhood autism. Findings are submitted to peer-reviewed journals, national and international conferences, and are made available to research participants in a study newsletter.

KEY TAKEAWAYS:

Data and specimens collected as part of the CDC-funded SEED provide critical information to assess risk factors for autism and play an important role in the decision-making process that determines federal research agendas and informs services and activities to help children with autism and their families.

**FIND MORE ON
the CADDRE and SEED at:**

<https://www.cdc.gov/ncbddd/autism/seed.html>

CDC's **"LEARN THE SIGNS. ACT EARLY."** program improves early identification of children with developmental delays and disabilities by promoting parent-engaged developmental monitoring and facilitating early action on concerns through a health education campaign, collaboration with early childhood programs and providers, and research and evaluation. The program encourages parents and providers to learn the signs of healthy development, monitor every child's early development, and take action where there is a concern. "Learn the Signs. Act Early." resources are available to support parents and families of children aged 2 months to 5 years. The program offers free checklists and other tools to make developmental monitoring practical and easy for parents and providers. Materials are available in English and Spanish. Act Early Ambassadors expand the reach of the "Learn the Signs. Act Early." program and support their respective state's work toward improving early identification of developmental delays and disabilities, including autism.

KEY TAKEAWAYS:

CDC's "Learn the Signs. Act Early." program supports parents in their role as primary caregivers and teachers of their children and early childhood providers in monitoring development of young children.

FIND MORE ON

"Learn the Signs. Act Early." at:

<https://www.cdc.gov/ncbddd/actearly/index.html>

HHS has developed the **ENDING THE HIV EPIDEMIC** initiative to reduce new HIV infections in the U.S. by 75 percent in five years and by 90 percent by 2030. CDC continues to invest in eliminating mother-to-child transmission of HIV, primarily through its efforts with health departments, in jurisdictions with recent perinatal HIV cases or a high number of HIV infected women of childbearing age. CDC continues to increase screening in women at risk, monitor women infected with HIV and their infants, and conduct real-time investigations of perinatal acquisition cases to understand and address where the system failed. Further, CDC has published a framework to guide federal agencies and other organizations in their efforts to reduce the rate of perinatal transmission of HIV to less than 1 percent among infants born to women with HIV and less than 1 perinatal transmission per 100,000 live births.

FIND MORE ON

"Ending the HIV Epidemic" at:

<https://www.hiv.gov/federal-response/ending-the-hiv-epidemic/overview>

FIND MORE ON

the CDC-published framework at:

<https://www.ncbi.nlm.nih.gov/pubmed/22945404>

FIND MORE ON

screening for HIV in pregnant women, at:

<https://www.cdc.gov/nchhstp>

To address viral hepatitis, HHS is developing the next iteration of a **NATIONAL VIRAL HEPATITIS STRATEGY FOR THE UNITED STATES** to guide stakeholders from all sectors in collaborative efforts focused on key strategies to achieve our national viral hepatitis goals. Pregnant women are listed as a priority population because of the risk of women with infections transmitting the virus to their infants unless proper steps are taken. CDC recommends all pregnant women be tested for hepatitis B during an early prenatal visit in each pregnancy, even if they have been vaccinated or tested previously. CDC recommends HCV screening for all pregnant women during each pregnancy, except in certain settings.

**FIND MORE ON
the national viral hepatitis strategy at:**

<https://www.hhs.gov/hepatitis/action-plan/national-viral-hepatitis-action-plan-overview/index.html>

**FIND MORE ON
screening for hepatitis B and hepatitis C in
pregnant women, at:**

<https://www.cdc.gov/nchhstp>

Screening for sexually transmitted infections for women of reproductive age and pregnant women is critical for maternal and infant health. CDC recommends **SCREENING FOR SYPHILIS IN ALL PREGNANT WOMEN AT THEIR FIRST PRENATAL VISIT**. Congenital syphilis, passed from a pregnant woman to her baby, is rapidly increasing even though it is entirely preventable. Pregnant women should access prenatal care early, and their healthcare provider should screen them for syphilis at the first visit and treat them immediately, if infected. CDC also recommends repeat syphilis testing for “high risk mothers” during the third trimester. **CDC RECOMMENDS CHLAMYDIA AND GONORRHEA SCREENING OF ALL SEXUALLY ACTIVE WOMEN UNDER 25**. Chlamydia and gonorrhea are important preventable causes of pelvic inflammatory disease and infertility. To prevent new sexually transmitted infections (STIs), reduce STI-related disparities and reduce adverse-health outcomes from STIs, HHS is currently developing the first ever federal action plan to protect the nation from STIs by developing actionable strategies to increase access to STI-related health services, remove barriers to care and treatment for populations most affected by STIs, and improve monitoring and evaluation method.

**FIND MORE ON
the federal action plan at:**

<https://www.hhs.gov/programs/topic-sites/sexually-transmitted-infections/action-plan-overview/index.html>

**FIND MORE ON
screening for STDs in pregnant women, at:**

<https://www.cdc.gov/nchhstp>

CENTERS FOR MEDICARE & MEDICAID SERVICES (CMS)

In 2012, CMS undertook a major initiative to improve perinatal health outcomes: the **STRONG START FOR MOTHERS AND NEWBORNS** Initiative. One component of the initiative was a public-private partnership and awareness campaign to reduce the rate of early elective deliveries prior to 39 weeks for all populations. Between 2013 and 2017, the initiative funded 27 projects to provide enhanced prenatal care to Medicaid and CHIP beneficiaries at high risk for preterm births. The second component of the initiative was a funding opportunity to test the effectiveness of three enhanced prenatal care models (i.e., group prenatal care, prenatal care delivered at birth centers, and prenatal care delivered at maternity care homes) to reduce the frequency of premature births among pregnant women at high-risk for preterm births.

The findings of an evaluation of the second component demonstrated that women who received prenatal care in Strong Start Birth Centers under the midwifery model of care had better birth outcomes and lower costs relative to similar Medicaid beneficiaries not enrolled in Strong Start. As discussed in Section V, the midwifery model of care is predicated on the concept that pregnancy and birth are normal life processes, which should not be overly-medicalized unless clinically necessary. Beneficiaries served in the Birth Center track of the model showed a savings of \$2,010 through the birth and year following for each mother-infant pair. The birth center model of care also showed the most substantive and statistically significant improvements in outcomes, with participants having significantly lower costs along with lower rates of preterm birth, low-birthweight infants, and cesarean delivery as compared to risk matched women in other Medicaid maternity care. In Strong Start, women enrolled in Birth Centers were significantly less likely than women of similar medical, demographic and social risk in other models to develop pre-eclampsia and gestational diabetes, two conditions that can lead to medically-indicated preterm birth or abnormal infant birthweight, among other complications.⁹⁹

Given the success of the initiative, CMS issued a Joint Informational Bulletin to summarize these findings, reiterate that coverage of nurse-midwife services under Medicaid is mandatory (CFR 440.165), and outline options for covering freestanding birth center services under Medicaid. These promising Birth Center results may be useful to state Medicaid programs seeking to improve the health outcomes of their covered populations. Separate research funded by NIH using birth certificate data

KEY TAKEAWAYS:

The Medicaid program, as a whole, is the largest single payer of pregnancy-related services in the U.S., financing approximately 42 percent of all births. As such, CMS is helping facilitate state-based Medicaid program innovations to improve postpartum care and other maternal health and pregnancy planning objectives. In addition, initial research indicates that standalone birth centers have good outcomes for low-risk pregnancies.

FIND MORE ON the Strong Start at:

<https://innovation.cms.gov/Files/reports/strongstart-prenatal-fg-finalevalrpt.pdf>

has found that the number of U.S. out-of-hospital births rose 75 percent between 2004 and 2017, and by 2017, one of every 62 births occurred at home or in a birth center. The study also found that women who planned such out-of-hospital births were less likely to have higher-risk characteristics, such as smoking, obesity, and multiple births. NIH is currently working with the National Academy of Medicine on a study, “Assessing Health Outcomes by Birth Settings,” the findings of which will be reported on in 2020.

CMS undertook a second major initiative to improve perinatal health outcomes in 2012 by convening an **EXPERT PANEL ON IMPROVING MATERNAL AND INFANT HEALTH OUTCOMES IN MEDICAID AND CHIP**. Based on recommendations from the Expert Panel to increase the rate of postpartum visits among women covered by Medicaid and CHIP and increase effective pregnancy planning, CMS established the Maternal and Infant Health Initiative in 2014. The goals of this initiative are to collaborate with states to promote coverage of women before and after pregnancy, strengthen technical assistance to promote policies that enhance provider service delivery, and expand beneficiary engagement in their care through enhanced outreach mechanisms. The Initiative recently released an issue brief describing lessons learned from state-based efforts, facilitated by CMS, to develop and implement quality improvement projects to improve postpartum care in Medicaid and CHIP.¹⁰³

In June 2019, CMS convened a **NEW MATERNAL AND INFANT HEALTH (MIH) EXPERT WORKGROUP** to accelerate improvements in maternal and infant health. The Workgroup is comprised of both new and returning members from the original Expert Panel. This workgroup will: (1) make recommendations on how to improve maternal and infant health outcomes for Medicaid and CHIP populations using evidence-based strategies; (2) propose maternal and infant health quality improvement goals for Medicaid and CHIP as well as options for monitoring progress; and (3) recommend resources, data, and other materials to support Medicaid and CHIP agencies’ work on quality improvement.

KEY TAKEAWAYS:

CMS is working with the MIH Expert Workgroup to update recommendations on strategies to improve maternal and infant health outcomes as part of CMS’s Maternal and Infant Health Initiative.

**FIND MORE ON
the Maternal and Infant Health Initiative at:**

<https://www.medicaid.gov/medicaid/quality-of-care/improvement-initiatives/maternal-and-infant-health/index.html>

In 2016, CMS sponsored the **HEALTH CARE PAYMENT LEARNING & ACTION NETWORK (HCP LAN)** to increase adoption of value-based payments and alternative payment models across sectors, which published a paper with recommendations designed to accelerate development of a clinical episode payment model for maternity care. The paper outlined a payment model focused on reducing the number of cesarean deliveries and achieving a greater percentage of full-term babies born at healthy weights. A study showed that total payments for cesarean deliveries were 50 percent higher for commercial and Medicaid payers compared to vaginal births. The paper recommended that such models begin 40 weeks before a birth occurs and end 60 days postpartum for the woman (and 30 days post-birth for the baby) and include all services provided during pregnancy, labor and birth, the postpartum period, and for newborn care. The accountable entity would assume upside and downside risk and payments would be made either through a single prospectively established payment to an accountable entity or through an upfront fee-for-service payment to individual providers within the episode with a potential for shared savings/losses. Payment would also be driven by quality measures, such as prenatal visits, screening tests, cesarean delivery rates, pre-term births, and patient complications.

**FIND MORE ON
the HCP LAN at**

<http://hcp-lan.org/workproducts/cep-whitepaper-final.pdf>

MEDICARE QUALITY PROGRAMS – CMS can establish strong incentives and levers to improve maternal health through Medicare quality measurement, including quality reporting programs, public reporting of quality measures (including star ratings), and incorporation of measures into value-based purchasing programs. CMS's **HOSPITAL INPATIENT QUALITY REPORTING (IQR) PROGRAM** currently includes a measure on early elective delivery and an electronic clinical quality measure on exclusive breast milk feeding. In addition, under the Merit-based Incentive Payment System (MIPS) Quality Payment Program, there are five measures related to maternal health that clinicians can report.

CMS is currently prioritizing the development of quality measures related to maternal mortality and morbidity in the hospital setting. This includes consideration of and work on development of a comprehensive maternal morbidity electronic clinical quality measure, a structural measure on participation in a Perinatal Quality Improvement Collaborative Program, and a cesarean delivery measure. When developed, and if adopted into the Hospital IQR program (which requires notice and comment rulemaking), these measures would be reported on Hospital Compare, after which consideration would be given to incorporation into the hospital value-based purchasing program and

the hospital star ratings. All these actions are critical to public transparency of the quality of maternal health care provided by hospitals, and can act as an emphatic lever for incentivizing improvements by hospitals. CMS will also look to align appropriate quality measures for maternal care across CMS programs, including Medicare and Medicaid.

KEY TAKEAWAYS:

CMS is prioritizing the development of Medicare quality measures related to maternal morbidity and mortality.

**FIND MORE ON
MIPS at:**

<https://qpp.cms.gov/mips/overview>

Through the **CORE QUALITY MEASURES COLLABORATIVE (CQMC)**, CMS works in partnership with America's Health Insurance Plans (an association that represents various health insurance companies), the National Quality Forum, medical associations, consumer groups, and purchasers such as employer associations to align quality measures across payers, thereby reducing reporting burden on providers. As part of this effort, CQMC has identified 8 core quality measure sets, including one for OB/GYN. The OB/GYN measure set focuses on care provided in ambulatory and hospital /acute care settings and includes 11 measures: frequency of ongoing prenatal care, cervical cancer screening, non-recommended cervical cancer screening in adolescent families, chlamydia screening and follow up, breast cancer screening, appropriate work up prior to endometrial ablation procedure, incidence of episiotomy, elective delivery, cesarean delivery, antenatal steroids, and exclusive breast milk feeding.

KEY TAKEAWAYS:

CMS is working with other stakeholders to align quality measures that can be used by all payers and that will incentivize improvements in maternity care.

**FIND MORE ON
CQMC at:**

<http://www.qualityforum.org/cqmc/>

CMS continues to engage with states to encourage reporting on all 11 maternal and perinatal health measures in the **ADULT AND CHILD CORE SETS**. The Maternity Core Set includes seven measures from CMS's Child Core Set and four measures from the Adult Core Set, including elective delivery, cesarean deliveries, prenatal and postpartum care, and contraceptive care. CMS will use these measures to evaluate progress toward improvement of maternal and perinatal health in Medicaid and CHIP. The recently updated Medicaid and CHIP Scorecard, which includes measures of state health performance, state administrative accountability, and federal administrative accountability, also includes a maternal health measure on postpartum care reported by 37 states. Currently, reporting on these metrics is voluntary. However, beginning in 2024, reporting on the Child Core Set will be mandatory as required by the Bipartisan Budget Act of 2018 (P.L. 115-123). Additionally, the Substance Use-Disorder Prevention that Promotes Opioid Recovery and Treatment (SUPPORT) for Patients and Communities Act (P.L. 115-127) will require mandatory reporting of all behavioral health measures on the Adult Core Set.

KEY TAKEAWAYS:

CMS works with State Medicaid agencies on an ongoing basis to support efforts to track quality measures and provide flexibility for states to tailor approaches to meet their populations' needs related to maternal care.

FIND MORE ON the Adult and Child Core set at:

<https://www.medicaid.gov/medicaid/quality-of-care/performance-measurement/adult-and-child-health-care-quality-measures/index.html>

FIND MORE ON the Maternity Core Set at:

<https://www.medicaid.gov/medicaid/quality-of-care/downloads/performance-measurement/2020-maternity-core-set.pdf>

FIND MORE ON the Medicaid and CHIP Scorecard at:

<https://www.medicaid.gov/state-overviews/scorecard/index.html>

Complementing CMS' Maternal and Infant Health Initiative, from 2017-2019, the **MEDICAID INNOVATION ACCELERATOR PROGRAM (IAP)** provided a technical assistance opportunity for state Medicaid/CHIP agencies to select, design, and test value-based payment approaches to sustain care delivery models that demonstrate improvement in maternal and infant health outcomes. IAP selected Colorado, Maine, Mississippi, and Nevada to participate and explore ways to incorporate value-based payment approaches into their state programs.

In addition, IAP is currently providing technical assistance to Delaware, Kentucky, Massachusetts, North Carolina, South Dakota, Texas, and Wyoming to support their development of data analytic

capacity to better understand maternal mortality and SMM among Medicaid beneficiaries, as well as establish and strengthen partnerships with key stakeholders to: (1) identify needs, resources, and goals related to emerging efforts to address MM and SMM and (2) define shared goals based on data analytic collaborations. This technical assistance will end September 2020.

KEY TAKEAWAYS:

CMS has supported state Medicaid programs in driving innovation in evidence-based and value-based care for mothers and infants.

**FIND MORE ON
Medicaid Innovation Accelerator Program
opportunity at:**

<https://www.medicaid.gov/state-resource-center/innovation-accelerator-program/iap-functional-areas/value-based-payment/index.html>

On July 26, 2019, CMS issued two Center for Medicaid and CHIP Services (CMCS) Informational Bulletins to provide guidance on sections 1007 and section 1012 of the SUPPORT for Patients and Communities Act. Section 1007 added an optional provider type of residential pediatric recovery center (RPRC) for treatment of infants with Neonatal Abstinence Syndrome (NAS) without any other significant medical risk factors. RPRCs may treat infants with less severe NAS or care for infants with NAS who are not medically stable and ready to go home, but who are stable enough to transfer to a lower level of care and can be

KEY TAKEAWAYS:

Two recent changes in Medicaid law allow certain pregnant and postpartum beneficiaries residing in IMDs who have a SUD to receive covered services outside of the IMD, and the addition of an optional provider type of “residential pediatric recovery center” or RPRC for treatment of infants with NAS.

safely discharged from the hospital. Section 1012 created a new limited exception to the institution for mental diseases (IMD) exclusion for certain pregnant and postpartum women with SUDs. Generally, federal financial participation is not available for services provided to beneficiaries while they reside in an IMD; however, this limited exception allows for coverage of Medicaid services provided outside of the IMD, including prenatal care, for certain pregnant and postpartum women residing in an IMD for treatment of a SUD.

**FIND MORE ON
the State Guidance for Implementation of the
Treatment for Infants with Neonatal Abstinence
Syndrome in Residential Pediatric Recovery
Centers informational bulletin at:**

<https://www.medicaid.gov/federal-policy-guidance/downloads/cib072619-1007.pdf>

**FIND MORE ON
the Help for Moms and Babies information
bulletin at:**

<https://www.medicaid.gov/federal-policy-guidance/downloads/cib072619-1012.pdf>

CMS will apply a rural lens as it implements provisions of the **SUPPORT FOR PATIENTS AND COMMUNITIES ACT** related to maternal health. These provisions include expanding access to and coverage for telehealth, mental health, and SUD services.

CMS is supporting states with a variety of maternal health-related measurement and quality improvement activities. For instance, CMS is working with CDC, HRSA, and states to implement a **DATA LINKAGE TRAINING** series to improve states' abilities to report on Medicaid quality measures.

As part of a broader strategy at the CMS Innovation Center to combat the opioid crisis, the **MOM MODEL** announced in April 2019 is designed to address fragmentation in the care of participating pregnant and postpartum Medicaid and CHIP beneficiaries with OUD through state-driven transformation of the delivery system surrounding this vulnerable population. The following 10 states have been awarded MOM Model funding: Colorado, Indiana, Louisiana, Maine, Maryland, Missouri, New Hampshire, Tennessee, Texas, and West Virginia. The primary goals of the model are to: (1)

improve quality of care and reduce costs for pregnant and postpartum women with OUD as well as their infants; (2) expand access service delivery capacity and infrastructure based on state-specific needs; and (3) create sustainable coverage and payment strategies that support ongoing coordination and integration of care. The model requires that women with OUD receive a comprehensive set of services such as maternity care, medication-assisted treatment, and mental health screening and treatment delivered in a coordinated and integrated approach by a team of health care professionals with different specialties. The model will also require awardees to coordinate care, engage beneficiaries, and provide referrals for necessary services to meet the model population's comprehensive needs.

KEY TAKEAWAYS:

A number of interventions have been implemented across the department to counteract the ongoing opioid epidemic. CMS is working to address the needs of pregnant and postpartum women with OUD by providing 10 states with additional resources to improve care delivery systems for this vulnerable population.

FIND MORE ON the MOM Model at:

<https://innovation.cms.gov/initiatives/maternal-opioid-misuse-model>

The **INTEGRATED CARE FOR KIDS (INCK) MODEL** was developed as a part of the CMS's strategy to fight the opioid crisis and address its impact on vulnerable Medicaid and CHIP-covered children and their caregivers. InCK began in early 2020 in seven states: Connecticut, Illinois, New Jersey, New York, North Carolina, Ohio, and Oregon. As CMS's first pediatric model, InCK supports a focus on assessing and serving the needs of the "whole child" from the prenatal stage to age 21 across multiple service systems. InCK will provide states with the flexibility to design interventions for their local communities that align health care delivery with child welfare support, educational systems, maternal and child health systems, and other relevant service systems.

KEY TAKEAWAYS:

The InCK Model will empower states and local providers to better address the behavioral health care needs of Medicaid and CHIP-covered children and their caregivers, and address the impact of opioid addiction through care integration across all types of health care providers.

FIND MORE ON the InCK model at:

<https://innovation.cms.gov/initiatives/integrated-care-for-kids-model>

State Medicaid programs can pursue section 1115(a) demonstration authority or state plan authority to provide Medicaid family planning services to women who do not qualify for full Medicaid or CHIP coverage with access to a targeted benefit package of contraceptive and related women's health services. Medicaid family planning demonstrations/state plan options are intended to improve access to and use of Medicaid family planning services by women who are otherwise not eligible for full Medicaid or CHIP coverage. Increased access and uptake of services will help to improve birth outcomes and the health of women by increasing the child spacing interval and reducing the number of unintended pregnancies that would be paid by Medicaid or CHIP among women in this population. These outcomes would accordingly decrease expenditures for Medicaid paid prenatal, delivery, and newborn services. Thus, Medicaid family planning programs can result in overall savings attributable to providing preventive family planning and related women's health services to women that would become eligible for pregnancy-related state plan coverage upon pregnancy.

CMS and HRSA will coordinate a joint effort to help facilitate the dissemination of best practices and lessons learned in maternal health to rural hospitals, with an additional focus on emergency medical services. One option may be to develop a coordinated system that allows hospitals, clinics, providers, and community organizations to engage in best practice sharing and by providing technical assistance support. HRSA will also share with health centers best practices in prenatal care, delivery, and postpartum care through the Primary Health Care Digest and national technical assistance partners.



CMS and HRSA will support an **“OB READINESS INITIATIVE.”** Since January 2010, more than 100 rural hospitals have closed with many of these closures occurring in the South. In addition, many rural hospitals that continue to operate have stopped providing obstetric and gynecologic services. Nearly half of all rural counties in the U.S. do not have a hospital with obstetric services. Although some hospitals have stopped offering obstetric services, many still end up performing deliveries in the emergency department, but may not be prepared to do deliveries. There has also been an increase in the number of non-hospital births. As a first step towards increasing the number of hospitals that are “OB Ready,” meaning they are adequately equipped to handle a delivery, even if they do not support a full suite of obstetric services, the Department posted a Request for Information and convened a workgroup of government organizations and external rural and maternal health experts to develop recommendations on how to expand the number of rural hospitals that are “OB Ready.” Recommendations will be evidence-based, such as drawing from lessons learned on the provision of emergency medical services for children.

KEY TAKEAWAYS:

In areas where there are shortages of providers, women do not always have the option to deliver at hospitals that have fully equipped and staffed obstetrical units, especially in emergency situations. It is important for facilities who may serve these women to still be equipped with appropriate training to handle emergency deliveries. CMS and HRSA will convene experts from across the country to discuss options to expand the number of “OB Ready” facilities.

The **TRANSFORMED MEDICAID STATISTICAL INFORMATION SYSTEM (T-MSIS)** is a Medicaid data set using a modernized technology platform to collect Medicaid and CHIP data from the states and territories, including data on maternal health-related services. Because of the size and complexity of T-MSIS data files, and the frequency of updates, CMS has created a series of publicly available research-ready files optimized for analytics, known as the T-MSIS Analytic Files (TAFs), consisting of research identifiable files. Data elements include enhanced information about Medicaid and CHIP beneficiary eligibility and enrollment, fee-for-service claims, and managed care service use and spending data. Future releases of the TAFs will soon include managed care plan and provider information.

FIND MORE ON T-MSIS data:

<https://www.medicaid.gov/medicaid/data-systems/macbis/medicaid-chip-research-files/transformed-medicaid-statistical-information-system-t-msis-analytic-files-taf/index.html>

U.S. FOOD AND DRUG ADMINISTRATION (FDA)

FDA provides consumer friendly resources to educate pregnant and postpartum women about medication, food, and other products. For example, a [Pregnancy Social Media Toolkit](#) informs pregnant women about medication safety. The toolkit includes resources for pregnant women and health professionals, including sample social media messages and blog posts.



FIND MORE ON FDA's pregnancy resources at:

<https://www.fda.gov/consumers/womens-health-topics/pregnancy>

FIND MORE ON brexanolone at:

<https://www.fda.gov/news-events/press-announcements/fda-approves-first-treatment-postpartum-depression>

FIND MORE ON FDA-funded research related to pregnancy at:

<https://www.fda.gov/science-research/womens-health-research/owh-funded-research-pregnancy-preventionexposure>

FIND MORE ON Risk Evaluation and Mitigation Strategies (REMS) at:

<https://www.accessdata.fda.gov/scripts/cder/remis/index.cfm?event=IndvRemsDetails.page&REMS=387>
and <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=b40f3b2a-1859-4ed6-8551-444300806d13>

FDA has issued several guidance documents regarding clinical research involving pregnant or lactating women. This builds on a recommendation published by NIH to include pregnant women in clinical trials. The FDA's **PREGNANT WOMEN: SCIENTIFIC AND ETHICAL CONSIDERATIONS FOR INCLUSION IN CLINICAL TRIALS** guidance provides recommendations on how and when to include pregnant women in drug development clinical trials. The FDA's **POST-APPROVAL PREGNANCY SAFETY STUDIES GUIDANCE FOR INDUSTRY** provides sponsors and investigators with recommendations on how to design investigations to assess the outcomes of pregnancies in women exposed to drugs and biological products regulated by FDA (i.e., pregnancy safety studies). The goal of post-approval pregnancy safety studies is to provide clinically relevant human safety data that can inform health care providers treating or counseling patients who are pregnant or anticipating pregnancy about the safety of drugs and biological products through inclusion of the information in a product's labeling. The FDA's **CLINICAL LACTATION STUDIES: CONSIDERATIONS FOR STUDY DESIGN** guidance provides recommendations for sponsors conducting clinical lactation studies to assess presence of drugs in breastmilk and their safety in breastfeeding infants.

KEY TAKEAWAYS:

FDA provides guidance documents regarding clinical research involving pregnant or lactating women, including when they should be included in drug development clinical trials, pregnancy safety studies, and how to assess the presence of drugs in breastmilk and their safety in breastfeeding infants.

FIND MORE ON

the Pregnant Women: Scientific and Ethical Considerations for Inclusion in Clinical Trials Guidance at:

<https://www.fda.gov/regulatory-information/search-fda-guidance-documents/pregnant-women-scientific-and-ethical-considerations-inclusion-clinical-trials>

FIND MORE ON

the Post-approval Pregnancy Safety Studies Guidance at:

<https://www.fda.gov/regulatory-information/search-fda-guidance-documents/postapproval-pregnancy-safety-studies-guidance-industry>

FIND MORE ON

the Clinical Lactation Studies: Considerations for Study Design Guidance at:

<https://www.fda.gov/regulatory-information/search-fda-guidance-documents/clinical-lactation-studies-considerations-study-design>

FDA funds research relevant to pregnancy and lactation. For example, funding was provided for a project to develop an artificially intelligent virtual pregnant woman modeling suite to support regulatory decisions.

FIND MORE ON

FDA funded research related to pregnancy at:

<https://www.fda.gov/science-research/womens-health-research/owh-funded-research-pregnancy-preventionexposure>

FDA maintains several consumer resources for pregnant and lactating women on food safety and nutrition. These include several educational materials. Examples include:

- **How to Store Mother's Milk and Ways to Heat Breast Milk** available at: <https://www.fda.gov/food/people-risk-foodborne-illness/once-baby-arrives-food-safety-moms-be>
- **Eating Fish: What Pregnant Women and Parents Should Know** available at: <https://www.fda.gov/food/consumers/eating-fish-what-pregnant-women-and-parents-should-know>
- **Preventing Listeriosis in Pregnant Hispanic Women in the U.S.** available at: <https://www.fda.gov/food/health-educators/preventing-listeriosis-pregnant-hispanic-women-us>
- **Food Safety for Pregnant Women** available at: <https://www.fda.gov/food/people-risk-foodborne-illness/food-safety-pregnant-women>
- **Food Safety for Moms-To-Be Health Educator Kit** available at: <https://www.fda.gov/food/people-risk-foodborne-illness/educator-tools-moms-be>

FDA uses multiple approaches to routinely monitor the safety of medications and vaccines used in women of reproductive age in the postmarket setting (i.e., once a drug/vaccine has been approved for use and is available on the market). There are dedicated teams that address the review of adverse event reports and medication errors, which include pregnant women. In addition, FDA runs a medical product active surveillance system for monitoring drug safety, called the **SENTINEL INITIATIVE**. Sentinel relies on electronic health care data in a standard data structure in conjunction with pre-defined, parameterized, reusable routine querying tools. Sentinel has undertaken a series of projects to enhance the system's analytic capabilities in the areas of drug exposure during pregnancy, and in utero drug exposure and infant outcomes. Sentinel has developed tools to conduct descriptive

and inferential analyses and has conducted health outcome validation projects. Examples of these project include:

- Identification of pregnant women with live birth outcomes in the Sentinel Distributed Database (SDD) and determination of drug use among pregnant and non-pregnant women in ICD-10-CM, available at: <https://www.sentinelinitiative.org/sentinel/methods/identification-pregnant-women-sentinel-distributed-database-and-determination-drug>
- Development of linkage between mothers/deliveries and infants to evaluate effects of drug exposures during pregnancy on outcomes infants using a propensity-score-based tool, available at: <https://www.sentinelinitiative.org/communications/sentinel-initiative-events/drug-safety-pregnancy-large-multisite-database-advances>
- Development of an ICD-10 based algorithm to identify gestational age for live births, available at: <https://www.sentinelinitiative.org/communications/sentinel-initiative-events/drug-safety-pregnancy-large-multisite-database-advances>
- Ongoing work to validate an algorithm for stillbirth events in the SDD in ICD-10-CM, available at: <https://www.sentinelinitiative.org/communications/publications/drug-safety-pregnancy-large-multisite-database-validation-icd-10-based>
- Evaluation of prenatal tests and fertility coding to estimate pregnancy start in the SDD, available at: <https://www.sentinelinitiative.org/communications/publications/2019-icpe-presentation-utility-prenatal-tests-and-fertility-coding>

The **BIOLOGICS EFFECTIVENESS AND SAFETY (BEST) INITIATIVE**, a component of the larger Sentinel Initiative, has developed and validated algorithms using ICD10-CM, to identify certain vaccine-related pregnancy outcomes in health insurance administrative and claims data as well as electronic health records. The BEST Initiative expands and enhances the Center for Biologics Evaluation and Research's access to new and better data sources, methods, tools, expertise, and infrastructure to conduct surveillance and epidemiologic studies. The BEST Initiative is also currently examining the prevalence of exposure to different vaccines during pregnancy using multiple sources of health care data.

KEY TAKEAWAYS:

Beyond FDA's role in evaluating the results of premarket clinical trials, FDA continues to monitor the safety of medications and vaccines, including those used in women of reproductive age, after they become available on the market.

FIND MORE ON the BEST Initiative at

<https://www.fda.gov/vaccines-blood-biologics/safety-availability-biologics/cber-biologics-effectiveness-and-safety-best-system#:~:text=The%20Biologics%20Effectiveness%20and%20Safety,conduct%20surveillance%20and%20epidemiologic%20studies.>

FDA supports a public website listing **PREGNANCY EXPOSURE REGISTRIES**.

Pregnancy exposure registries collect information on prescription drug or biological product exposure during pregnancy and associated pregnancy outcomes. This information may be compared with women who have not taken prescription drugs during pregnancy. This effort is ultimately intended to help improve safety information for medicines used during pregnancy and can be used to update drug labeling.

KEY TAKEAWAYS:

Women who become pregnant while taking a prescription drug can contribute health information to a pregnancy exposure registry. These data will be used to help identify prescription drug exposure risk for future expecting mothers.

**FIND MORE ON
pregnancy exposure registries at:**

<https://www.fda.gov/science-research/womens-health-research/pregnancy-registries>

FDA has published a draft guidance on **ENHANCING THE DIVERSITY OF CLINICAL TRIAL POPULATIONS: ELIGIBILITY CRITERIA, ENROLLMENT PRACTICES, AND TRIAL DESIGNS**. This guidance addresses expansion of eligibility criteria in clinical trials to improve access to research participation by understudied populations, including pregnant and lactating women.

**FIND MORE ON
the draft guidance at:**

<https://www.fda.gov/media/127712/download>

FDA actively provides guidance to companies and investigators during drug development to ensure that drugs and therapeutic biologics intended for the prevention or treatment of conditions during pregnancy are safely evaluated in clinical trials. For a drug to be approved for marketing, FDA must determine that the drug is effective and that its expected benefits outweigh its potential risks to patients. Internal expertise is also provided on pregnancy-related disease and treatments. For example, the **OBSTETRICS AT FDA** working group, an advisory forum that provides consultative advice to FDA staff on regulatory submissions, scientific issues, and public communications related to pregnant women.

FDA has approved **RISK EVALUATION AND MITIGATION STRATEGY (REMS)** programs to manage teratogenic risks for certain medications to ensure their benefits outweigh their risks. A REMS is a drug safety program that the FDA can require for certain medications with serious safety concerns to help ensure the benefits of the medication outweigh its risks. REMS are designed to reinforce medication use behaviors and actions that support the safe use of a medication. While all medications have labeling that informs health care stakeholders about medication risks, only a few medications require a REMS. REMS@fda provides a centralized, standardized and up-to-date information on all approved REMS programs.

In March 2019, FDA approved the first drug specifically developed to treat postpartum depression, brexanolone. The drug is administered intravenously by health care providers in certified health care facilities under strict safety conditions. According to clinical studies brexanolone takes effect quickly and lasts at least 30 days. Brexanolone was approved with a REMS for the risks of excessive sedation and sudden loss of consciousness.

KEY TAKEAWAYS:

Postpartum depression is a serious condition that can be life-threatening that affects approximately 400,000 women in the U.S. each year. The recent approval of brexanolone represents a significant advance in treatment options available for women suffering from postpartum depression.

FIND MORE ON

Zulresso (brexanolone) REMS at:

<https://www.fda.gov/news-events/press-announcements/fda-approves-first-treatment-post-partum-depression> and <https://www.accessdata.fda.gov/scripts/cder/remis/index.cfm?event=IndvRemisDetails.page&REMS=387>

FDA and NIH are conducting a long-term study entitled the **POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY**.

The ongoing study results contain data on tobacco use during pregnancy, as well as alcohol use and past year illicit drug use during pregnancy. Although not designed to be representative of all pregnant women in the U.S., the information gathered from this study could be used in conjunction with other data sources to help determine tobacco, alcohol, and illicit drug use in pregnancy.

FIND MORE ON

the PATH study at:

<https://www.fda.gov/tobacco-products/research/fda-and-nih-study-population-assessment-tobacco-and-health>

HEALTH RESOURCES AND SERVICES ADMINISTRATION (HRSA)

The **TITLE V MATERNAL AND CHILD HEALTH (MCH) BLOCK GRANT PROGRAM** aims to improve the health and well-being of the nation's mothers, children (including children with special health care needs), and their families through formula block grants to state and jurisdictional MCH agencies. In Fiscal Year 2018, the MCH Block Grant Program funded 59 states and jurisdictions to provide health care and public health services for an estimated 55 million people, which included pregnant women, infants, children, including children with special health care needs, and their families. Approximately 91 percent of pregnant women, 99 percent of infants, and 54 percent of children (including 1.6 million children with special health care needs) nationally benefited from the program in Fiscal Year 2018. MCH Block Grant funds awarded to states and jurisdictions serve to complement State-supported efforts in addressing the individual maternal and child health needs of a State across three levels of service: direct, enabling, and public health services and systems. With an emphasis on addressing the needs of low-income, at-risk, and/or medically underserved women and children with special health care needs, the MCH Block Grant represents a federal-state partnership to support access to quality, coordinated family-centered health care and wrap-around services for women and children. The program also supports comprehensive public health services and systems of care, including quality improvement initiatives, workforce training, program outreach and population-based disease prevention and health promotion education campaigns.

The MCH Block Grant plays an important role as the payer of last resort to address gaps in coverage and services not reimbursed by Medicaid/CHIP and other third-party payers, including providing gap-filling prenatal and postpartum care for women who otherwise would not have access to such services, among a number of other services for women and children. There is a longstanding history of partnership between the MCH Block Grant and Medicaid programs, which have contributed to increased MCH services delivery and reduced duplication of effort. State Medicaid programs often rely on the public health foundation that is supported by the MCH Block Grant program, the program's expertise in MCH population needs and services delivery, and its partnership and support in conducting Medicaid outreach and enrollment.

With regards to infant health, the MCH Block Grant Program creates federal/state partnerships in all states that support service systems for significantly reducing infant mortality; providing preventive and primary care services for infants, including those with special health care needs; immunizing all children; and meeting the nutritional and developmental needs of children. Family engagement and

KEY TAKEAWAYS:

The federal-state partnership created by the MCH Block Grant provides states with the flexibility to respond to a wide variety of maternal and child health needs of each state through targeted, evidence-based interventions and assure accountability through annual performance reporting.

FIND MORE ON the MCH Block Grant program at:

<https://mchb.hrsa.gov/maternal-child-health-initiatives/title-v-maternal-and-child-health-services-block-grant-program>

leadership are longstanding priorities in maternal and child health programs. Increasing emphasis is being placed on demonstrating the value of family partnership in improving health outcomes for all sectors of the MCH population.

States have discretion in the types of activities they support under their MCH Block Grant, which may include addressing mental and/or behavioral health. Many states implement activities that address MCH behavioral health (e.g., youth suicide, SUD, bullying and maternal depression) based on a state's identified priority needs. This flexibility is balanced with financial and performance accountability, as documented through annual financial, programmatic, and performance reporting. The program incorporates a three-tiered performance measure framework to enable states to demonstrate the impacts of MCH Block Grant funding on selected health outcomes. Reporting has found that access to health services for mothers has improved with support of the MCH Block Grant program. For instance, the percentage of women who received early prenatal care in the first trimester of pregnancy increased from 71.0 percent in 2007 to 77.5 percent in 2018.

The President's FY 2021 Budget continues enacted funding (\$400 million) for the **MATERNAL, INFANT AND EARLY CHILDHOOD HOME VISITING (MIECHV) PROGRAM**, administered by HRSA in collaboration with ACF, funds states, territories, and tribal entities to develop and implement voluntary, evidence-based home visiting services for pregnant women and families in at-risk communities to give them the necessary resources and skills to raise children who are physically, socially, and emotionally healthy. Some states have expanded and implemented the MIECHV Program in their Medicaid program through section 1115(a) demonstration authority. In Fiscal Year 2019, the MIECHV Program served all 50 states, the District of Columbia, and five U.S. territories. The Program served approximately 154,000 parents and children in 79,000 families. States and territories provided over one million home visits, and have provided a total of over 6.2 million home visits over the past eight years. The MIECHV Program reached many at-risk communities in Fiscal Year 2019-1,005 counties, which is 31 percent of all U.S. counties. The Program funded services in 40 percent of all urban counties, and 25 percent of all rural counties; 51 percent of all counties served by the MIECHV program were rural. Grantees deliver services by implementing one or more of 19 evidence-based home visiting service delivery models identified by the Administration for Children and Families' Home Visiting Evidence of Effectiveness Review as meeting HHS criteria for evidence of effectiveness based on the research literature. MIECHV home visiting services include education and support to promote preventive health practices, including prenatal and postpartum care.

Within the MIECHV Program, home visitors address a number of maternal health outcomes. They work with pregnant and postpartum women to improve overall health and access to care, reduce use of tobacco and substances, and screen for maternal depression and intimate partner violence and refer to community services. Home visitors also evaluate families' strengths and needs and provide services tailored to those needs, such as sharing information and guidance on a wide range of topics including breastfeeding, safe sleep practices, injury prevention, and nutrition; teaching positive parenting skills and parent-child interactions; promoting early learning in the home; screening children for developmental delays and facilitating early diagnosis and intervention for autism and other developmental disabilities; and connecting families to other services and resources as appropriate.

The **HOME VISITING COLLABORATIVE IMPROVEMENT AND INNOVATION NETWORK (HVCOIN 2.0)** is a five-year cooperative agreement to support states and local home visiting programs to apply continuous quality improvement methods and practice innovations to improve home visiting services and outcomes among low-income families with young children in key areas impacting maternal and child health. New efforts focused on maternal health outcomes include scaling practice improvements in outcomes related to maternal depression and intimate partner violence to additional home visiting programs, applying a health equity lens to home visiting quality improvement, and developing resources to apply home visiting quality improvement methods to increase mothers' receipt of postpartum care.

MIECHV grantees are required to report data on several performance measures related to maternal health, including maternal depression and intimate partner violence screening and referral and receipt of postpartum care. Results from the **MOTHER AND INFANT HOME VISITING PROGRAM EVALUATION (MIHOPE)**, the national evaluation of the MIECHV Program led by ACF in partnership with HRSA, suggest that home visiting improves maternal health. Specifically, MIHOPE found improvements in women's general health, increases in health insurance coverage, and reductions in symptoms of depression among mothers who were offered home visiting services compared to mothers who were not offered home visiting services. ACF's **TRIBAL MIECHV PROGRAM** strengthens tribal capacity to support and promote the health and well-being of AI/AN families, expand the evidence base around home visiting in tribal communities, and support cooperation and linkages between programs that serve Native children and their families. The 23 Tribal MIECHV Program grantees are tribes, consortia of tribes, tribal organizations, and urban Indian organizations.

KEY TAKEAWAYS:

The MIECHV Program, administered by HRSA in partnership with ACF, is built on decades of scientific research, which shows that home visiting by a nurse, a social worker, or early childhood educator during pregnancy and in the first years of life improves a whole host of maternal and child health outcomes.

FIND MORE the MIECHV program at:

<https://mchb.hrsa.gov/maternal-child-health-initiatives/home-visiting-overview>

FIND MORE ON ACF's Mother and Infant Home Visiting Program Evaluation at:

<https://www.acf.hhs.gov/opre/research/project/maternal-infant-and-early-childhood-home-visiting-evaluation-mihope>

FIND MORE ON ACF's Home Visiting Evidence of Effectiveness Review at:

<https://homvee.acf.hhs.gov/>

THE ALLIANCE FOR INNOVATION ON MATERNAL HEALTH (AIM),

funded since 2014, works to improve the quality of maternity care services provided in birthing facilities. The mission of AIM is to promote safe maternal care through the development and implementation of evidence-based maternal safety bundles within hospitals and other birthing facilities. AIM works in partnership with multi-disciplinary state-based teams, with enrollment of 33 states and participation from approximately 1,400 hospitals as of April 2020 (See Table 6). The AIM Program has created eight maternal safety bundles that address the following topics: maternal venous thromboembolism, OUD, obstetric hemorrhage, severe hypertension in pregnancy, reduction of primary cesarean birth, reduction of peripartum racial/ethnic disparities, and postpartum care from birth to the comprehensive postpartum visit and the transition from maternity to well-woman care. Program evaluation activities are currently underway. HRSA has partnered with AHRQ to integrate teamwork and communication skills within the bundles to improve the culture of patient safety.

TABLE 6:

States Enrolled in AIM and Their Selected Bundles, 2020

ENROLLMENT	AIM STATE	ADOPTED BUNDLE(S)
STATE APPLICATION HAS BEEN ACCEPTED	Arizona	Hemorrhage
	Nevada	Hypertension
	Rhode Island	Hemorrhage
	Vermont	Hemorrhage
	Wisconsin	Hypertension
STATE IS IN VARIOUS STAGES OF IMPLEMENTING BUNDLES	Alaska	Hemorrhage
	California	Safe Reduction of Primary Cesarean Birth, Hemorrhage, Opioid Use Disorder
	Colorado	Safe Reduction of Primary Cesarean Birth
	Delaware	Hemorrhage
	Florida	Safe Reduction of Primary Cesarean Birth and Hypertension
	Georgia	Hypertension, Hemorrhage
	Illinois	Opioid Use Disorder, Hypertension
	Indiana	Hemorrhage
	Louisiana	Hemorrhage, Hypertension
	Maryland	Safe Reduction of Primary Cesarean Birth and Opioid Use Disorder
	Massachusetts	Opioid Use Disorder
	Michigan	Hemorrhage, Hypertension
	Mississippi	Hemorrhage
	Missouri	Hypertension
	Nebraska	Hypertension
	New Jersey	Hemorrhage, Hypertension
	New Mexico	Hemorrhage, Hypertension
	New York	Opioid Use Disorder
	North Carolina	Hemorrhage
	Utah	Hypertension, Hemorrhage, Opioid Use Disorder
	Oklahoma	Hemorrhage, Hypertension
	Oregon	Hemorrhage
	South Carolina	Hemorrhage, Hypertension
	Tennessee	Opioid Use Disorder
	Texas	Hemorrhage
	Virginia	Hemorrhage
	Washington	Hemorrhage
	West Virginia	Hemorrhage, Hypertension

Source: Information provided by the Health Resources and Services Administration, current as of April 2020

In addition, recognizing that two thirds of all pregnancy-related deaths occur outside of the hospital setting, HRSA devoted \$2M to the AIM-Community Care Initiative to expand the scope of the safety bundles to address care provided in outpatient and other community settings. AIM-Community Care Initiative is currently finalizing development of the AIM bundles to improve postpartum care for maternal safety: Postpartum Care Basics I: From Birth to the Comprehensive Postpartum Visit and Postpartum Care Basics II: Transition from Maternity to Well-Woman Care to prepare for implementation outside of hospital settings.

KEY TAKEAWAYS:

Through AIM, HRSA is supporting efforts to develop and increase adoption of evidence-based maternity care practices throughout the U.S., which have been shown to improve health outcomes for mothers and infants.

FIND MORE ON AIM at

<https://safehealthcareforeverywoman.org/>

Women's preventive health care services identified in the **WOMEN'S PREVENTIVE SERVICES GUIDELINES** supported by HRSA must be covered by most health plans without cost sharing. HRSA-supported preventive care and screenings recommended by the HRSA-funded Women's Preventive Services Initiative include breastfeeding services and supplies, contraception, well-women preventive visits, screenings for breast and cervical cancer, urinary incontinence, gestational diabetes mellitus, diabetes mellitus after pregnancy, HIV, interpersonal and domestic violence, counseling for sexually transmitted infections, and screening for anxiety. The Women's Preventive Services Initiative also recently released the updated **WELL WOMAN CHART**, a resource that includes age-based preventive service recommendations for women from adolescence to maturity to provide a framework for incorporating preventive health services for women into clinical practice. HRSA is preparing to disseminate and translate the Women's Preventive Services Guidelines and the Well Woman Chart into Spanish, create billing and coding guides to accompany the recommendations to support utilization in the clinical setting, and publish additional patient-facing materials for each of the existing 12 preventive service recommendations. HRSA's cooperative agreement with the American College of

FIND MORE ON the Women's Preventive Services Initiative at:

<https://www.hrsa.gov/womens-guidelines/index.html>

Obstetricians and Gynecologists (ACOG) will continue to develop additional tools and resources for both clinicians and consumers to provide needed guidance on women's preventive health care services. HRSA seeks to explore new and innovative ways to communicate the recommendations, as well as other products to support dissemination and implementation efforts to help clinicians incorporate the Guidelines into practice, and ultimately, advance women's preventive health care.

The mission of the **HEALTHY START INITIATIVE: ELIMINATING DISPARITIES IN PERINATAL HEALTH (HEALTHY START)** is to support community-based strategies to improve health outcomes before, during, and after pregnancy; and to reduce racial and ethnic disparities in rates of infant death and other adverse perinatal outcomes among women and children in high-risk communities across the nation. Healthy Start funds 101 grantees serving communities in 34 states, Washington, D.C., and Puerto Rico over a 5-year performance cycle. Healthy Start focuses on communities with high rates of poor perinatal outcomes, including infant mortality rates at least 1.5 times the U.S. national average. Program sites offer services during the perinatal period (before, during, and after pregnancy) and work with women, infants, and families through the first 18 months after birth. Healthy Start leverages four key approaches to achieve programmatic goals: (1) improve women's health; (2) improve family health and wellness; (3) promote systems change; and (4) assure impact and effectiveness.

Healthy Start provides funding for pre-pregnancy and prenatal care and education, as well as postpartum services including screening for postpartum depression and referral to appropriate services, childbirth education, parenting skill- and self-esteem building for pregnant women and their spouses, breastfeeding and nutrition education, father support, housing assistance, and job training services. Healthy Start also seeks to improve infant health outcomes by promoting the development of strong parent-child relationships by using a two generation approach to care and service delivery. The program acknowledges that family health is interrelated, and promotes social support services that protect and advance parental and infant/child health and wellbeing. Specifically, this program goal is met through the delivery of parenting education, curricula and tools; promotion of protective factors such as nurturing attachment, appropriate limit setting, knowledge of child development, parental resilience, social connections, and the creation of concrete support for parents; and through the collaboration and integration with other community organizations providing parenting education (e.g., home visiting, Early Head Start, Strengthening Families).

Every Healthy Start site also has a Community Action Network composed of neighborhood residents, community leaders, perinatal care clients or consumers, medical and social service providers, and faith-based and business community representatives to identify and address fragmented service delivery, lack of appropriate health and social services for high-risk populations, and barriers to accessing care. In 2017, the Healthy Start program initiated an evaluation to determine the effect of the program on changes in participant-level characteristics, including behaviors, service use, and health outcomes. By collaborating with CDC and state vital records offices, the evaluation includes non-participant comparison groups through linked Vital Statistics and CDC PRAMS data that will allow for assessments of program impact. Final results are expected in 2020.

HRSA is expanding pre-pregnancy health screening and care delivery at Healthy Start sites. Promising practices found through the Preconception Collaborative Improvement and Innovation Network (discussed below) will be promoted and disseminated by HRSA. In addition, Healthy Start sites recently received supplemental funding to support the hiring of clinical providers working to increase program capacity, clinical care, and education; and in turn, address maternal mortality and reduce health disparities among high-risk and underserved women.

KEY TAKEAWAYS:

HRSA's Healthy Start sites address underlying factors that contribute to poor maternal and infant health outcomes through a holistic approach that incorporates the community's voice. The program also supports community-based strategies to reduce disparities in maternal and infant health, which disproportionately affect communities of color.

**FIND MORE ON
the Healthy Start program at:**

<https://mchb.hrsa.gov/maternal-child-health-initiatives/healthy-start>

The **SECRETARY'S ADVISORY COMMITTEE ON INFANT MORTALITY** advises the Secretary and the Administrator of HRSA on various Department programs designed to reduce infant mortality and improve the health status of pregnant women and infants such as the Healthy Start Initiative and relevant objectives of Healthy People 2020. The Committee is a public and private partnership that provides advice on how best to coordinate the variety of federal, state, local, and private programs and efforts that are designed to deal with the health and social problems impacting health outcomes of infants and pregnant women. It is also dedicated to eliminating health disparities and other environmental, social, and economic factors that contribute to infant mortality through continuous research and public health efforts.

HRSA has funded a number of maternal health-related prize challenges in recent years as part of the Maternal and Child Health Bureau Grand Challenges, which are generally implemented in three phases: design, development and testing, and scaling for broader reach. One example is the **REMOTE PREGNANCY MONITORING CHALLENGE**, which is currently in phase three, and supports the development of innovative technology-based solutions that help providers remotely monitor the health of pregnant women, while empowering women to make informed decisions about their own care. This challenge targets women with OUD; however, some of the solutions aim to connect women with SUD services more broadly, inclusive of opioid use disorder treatment options. Solutions target women who live in rural and medically underserved areas who have limited access to on-

site prenatal care. These technologies are intended to create an alternative for women who may face barriers to attending prenatal care visits, when patient monitoring generally occurs. A second example is HRSA's **ADDRESSING OPIOID USE DISORDER IN PREGNANT WOMEN AND NEW MOMS CHALLENGE**, also currently in phase 3, which supports the development of innovative, technology-based solutions to improve access to quality health care for pregnant women and new mothers struggling with opioid use disorder. Solutions are designed to increase access to SUD treatment, recovery support, and other support services for women with OUD, their infants, and their families, especially those in rural and geographically isolated areas.

KEY TAKEAWAYS:

Similar to prize challenges issued in other parts of the Department to address specific, high-priority objectives, such as catalyzing innovation in kidney treatments, HRSA is employing this strategy to stimulate innovation in maternal health.

FIND MORE ON HRSA's prize challenges at:

<https://mchbgrandchallenges.hrsa.gov/>

HRSA-FUNDED HEALTH CENTERS are community-based, patient-directed organizations that provide access to high-quality, comprehensive primary and preventive health care to the nation's most vulnerable individuals and families, including people residing in medically underserved areas and special populations consisting of people experiencing homelessness, agricultural workers, and residents of public housing. The nation's veterans also receive health services from these HRSA-funded health centers. Health centers receive approximately 17 percent of their funding through the Health Center Program and, in 2018, nearly 1,400 health centers served more than 28 million individuals across the country through approximately 12,000 service delivery sites in every U.S. state, the District of Columbia, Puerto Rico, the Virgin Islands, and the Pacific Basin. Health centers are essential medical homes that integrate access to pharmacy, mental health, SUD, and oral health services in areas where economic, geographic, or cultural barriers limit access to affordable services. Health centers must provide certain required primary and preventive health care services, including obstetrics, gynecology, and voluntary family planning services. HRSA also funds training and other resources for health centers.

With regards to pre-pregnancy and general well-woman care, health centers provided contraceptive management services for approximately 1.6 million patients, mammograms for over 833,000 patients, and pap tests for approximately 1.8 million patients. To help prevent hypertension-related diseases among health center patients, of which 4.5 million were diagnosed with hypertension, HRSA examines how many patients achieve blood pressure control based on measures set by the Million Hearts initiative hypertension clinical quality measure and the Healthy People 2020 hypertension objective. The Million Hearts initiative recognized five HRSA-funded health centers as 2018 Hypertension Control Champions. These Champions were able to achieve blood pressure control for

at least 80 percent of their adult patients with hypertension through innovative approaches. In 2018, 826 health centers met or exceeded the Million Hearts goal for appropriate aspirin use; 54 met or exceeded the blood pressure control goal; and 1,060 met or exceeded the smoking cessation goal.

With regards to pregnancy care and deliveries, HRSA-funded health centers provided such services using approximately 2,080 Obstetrician/Gynecologists and 1,016 Certified Midwives, who provided prenatal care to over 563,700 patients and performed over 172,100 deliveries. Health centers also measure early entry into prenatal care in the annual Uniform Data System. Evidence has shown that the probability of adverse birth outcomes is reduced when women enter prenatal care in their first trimester. In 2018, 74 percent of health center patients received a prenatal visit in the first trimester. In addition to prenatal services, HRSA-funded health centers provide intrapartum care, which includes ongoing assessment and potential transfer to an appropriate delivery and postnatal care setting for the mother and/or newborn, and postpartum care that includes the mother's postpartum checkup(s), along with appropriate follow-up treatment and education. Most health centers also provide both mental health and substance use services, such as screening for mental health and SUD, developmental screenings, counseling and psychiatry, crisis intervention, medication assisted treatment (MAT) SUD, detoxification, and recovery support.

Health centers are increasingly integrating behavioral health services, including SUD treatment, into their primary care operations. In 2018, approximately 93 percent of health centers provided mental health services and 67 percent provided SUD services. The Health Center Program measures rates of depression screening and follow-up care through the Uniform Data System. Between 2016 and 2018, health centers improved their performance on the Screening for Clinical Depression and Follow-Up Plan clinical quality measure from 60.3 percent to 70.6 percent. The number of patients receiving Screening, Brief Intervention, and Referral to Treatment services increased by 53 percent, from 717,000 to 1.1 million. The number of health center patients receiving MAT for OUD increased by 142 percent, from 39,000 to more than 94,500. To incentivize health centers' care coordination efforts, the HRSA's Accreditation and Patient-Centered Medical Home Recognition Initiative provides recognition to health centers that meet national quality standards.

To support diabetes management and control, HRSA developed the diabetes quality improvement initiative to support patients living with the disease. The initiative requires that all health centers focus on diabetes quality improvement by implementing clinical strategies to improve weight screening, nutritional and physical activity counseling, and HbA1c testing, improve diabetes control in patients living with the disease, and reduce disparities seen in diabetes control across racial and ethnic minority populations.

KEY TAKEAWAYS:

Health centers are community-based and patient-directed organizations that deliver comprehensive, high-quality primary and preventive health care services, including maternal-health related services, to the nation's most vulnerable individuals and families.

**FIND MORE ON
the Health Center Program at**

<https://bphc.hrsa.gov/>

The **STATE MATERNAL HEALTH INNOVATION (STATE MHI) PROGRAM** is assisting nine states in collaborating with maternal health experts and optimizing resources to implement state-specific actions that improve maternal health outcomes, including the prevention and reduction of maternal mortality and SMM. States receiving State MHI awards will establish a state-focused Maternal Health Task Force to implement a strategic maternal health plan that incorporates efforts to improve the collection and analysis of state-level data on maternal mortality and SMM to accelerate change in maternity care service delivery and policies, and improve maternal health in the state. Specifically, states must improve access to state-level maternal health data and surveillance by coordinating with multidisciplinary state-focused MMRC or another state-focused initiative that collects, analyzes, and reports maternal mortality and morbidity data. As part of the Maternal Health Task Force, grantees will partner with MMRCs, state PQC, and other state and local public health professionals to implement evidence-informed interventions to address critical gaps in the state's provision of maternity care services.

KEY TAKEAWAYS:

The State MHI Program is a demonstration that provides additional funding to states focused on improving maternal health outcomes by convening traditional and non-traditional maternal health stakeholders, reviewing annual maternal health outcome data, and implementing innovative programs within communities with poor maternal health outcomes.

FIND MORE ON the State MHI Program at:

<https://www.hrsa.gov/grants/fundingopportunities/default.aspx?id=4a36c363-b829-4608-af5e-9bc1fa884f41> and <https://www.hhs.gov/about/news/2019/09/12/hhs-awards-374-million-programs-supporting-maternal-child-health.html>

The purpose of the **RURAL MATERNITY AND OBSTETRICS MANAGEMENT STRATEGIES (RMOMS) PROGRAM** (distinct from CMS' MOM model discussed elsewhere), is to improve access to, and continuity of, maternal and obstetrics care in rural communities. RMOMS evolved out of the work of the HHS Rural Health Task Force and aims to achieve this goal by funding three rural health networks in Missouri, New Mexico, and Texas inclusive of clinical and community organizations (e.g., faith-based and community-based organizations, tribes, and tribal organizations) to: (1) develop sustainable network approaches to coordinate maternal and obstetrics care within a rural region; (2) increase the delivery and access of pre-pregnancy, pregnancy, labor and delivery, and postpartum services; (3) and develop sustainable financing models for the provision of maternal and obstetrics care with the

ultimate goal of improving maternal and neonatal outcomes. Applicants are required to incorporate the following components in their proposals: (1) rural hospital obstetric service aggregation; (2) a network approach to coordinating a continuum of care; (3) leveraging of telehealth and specialty care; and (4) financial sustainability.

KEY TAKEAWAYS:

Maintaining access to maternal and obstetric services in rural areas has been a long-standing and growing challenge requiring innovative thinking on new approaches to coordinating care delivery. HRSA is providing resources to test alternative systems for delivering maternal care in rural areas.

FIND MORE ON RMOMS at:

<https://www.hrsa.gov/grants/find-funding/hrsa-19-094>

The **RURAL HEALTH RESEARCH CENTER PROGRAM** is the only federal program that is dedicated entirely to producing policy-relevant research on health care in rural areas. The centers study critical issues facing rural communities in their quest to secure adequate, affordable, high-quality health services for rural residents. The centers have focused on maternal and obstetrical service gaps in recent years and their implications for rural communities. HRSA used research from this program to inform the Rural Maternity and Obstetrics Management Strategies (RMOMS) Program.

KEY TAKEAWAYS:

HRSA supports rural health research, frequently focusing on maternal health, in order to inform program development and policy.

FIND MORE ON the Rural Health Research Center Program at:

<https://www.hrsa.gov/rural-health/research/index.html>

The **PRECONCEPTION COLLABORATIVE IMPROVEMENT AND INNOVATION NETWORK**

(CoIIN) is a project led by the University of North Carolina-Chapel Hill and a part of the Infant Mortality CoIIN initiative. In its third and final year, this project facilitates the development of woman-centered, clinician-engaged, and community-involved approaches to the well-woman visit in order to improve the pre-pregnancy health status of women of reproductive age, particularly low-income women and women of color.

In 2020, the Preconception CoIIN will disseminate new models and promising practices of integrating pre-pregnancy health screening and follow-up into primary care and other clinical settings, including screening tools and a provider practice bulletin.

KEY TAKEAWAYS:

Health prior to pregnancy (pre-pregnancy health also referred to as preconception health) can be improved by ensuring all women get pre-pregnancy screening and necessary services (pre-pregnancy care) during the well-woman visit. HRSA's Preconception CoIIN is helping develop innovative approaches to maximizing well-women visits to in order to improve pre-pregnancy health.

FIND MORE ON the Preconception CoIIN, visit:

<https://beforeandbeyond.org/pchimcoiin/>

FIND MORE ON CoIIN at:

<https://mchb.hrsa.gov/maternal-child-health-initiatives/collaborative-improvement-innovation-networks-coiins>

HRSA recently announced a new funding opportunity for three years to implement the **SUPPORTING FETAL ALCOHOL SPECTRUM DISORDERS SCREENING AND INTERVENTION** program. The program is intended to reduce alcohol use among pregnant women, and to improve developmental outcomes for children and adolescents with a suspected or diagnosed Fetal Alcohol Spectrum Disorder (FASD) in parts of the country that have high rates of binge drinking among pregnant women. The specific goals of the program are to improve the ability of primary care providers (1) serving pregnant women to screen their patient population for alcohol use, provide brief intervention, and refer high-risk pregnant women to specialty care and (2) serving children and adolescents to screen their patient population for prenatal alcohol exposure among those suspected of Fetal Alcohol Spectrum Disorder (FASD), and manage and provide referrals to necessary services. The recipient will use telehealth approaches, among others, to increase primary care provider knowledge and provide technical assistance.

The **NATIONAL CENTER FOR HEALTH WORKFORCE ANALYSIS (NCHWA)** is a national resource for health workforce research, information, and data, which assists policymakers in making decisions regarding workforce education, training, and delivery of care. HRSA used data from this resource to expand the maternal health workforce, particularly in rural communities, by supporting several grant programs. The most recent funding opportunity for the **TEACHING HEALTH CENTER GRADUATE MEDICAL EDUCATION (THCGME) PROGRAM** provides priority points to applicants with community-based ambulatory patient care center training sites located in rural communities. The **BEHAVIORAL HEALTH WORKFORCE EDUCATION AND TRAINING (BHWET) PROGRAM** expands funding for master and doctorate level's behavioral health professionals, including social workers, professional counselors, and marriage and family therapists. The program also supports behavioral health paraprofessional certificate programs, including peer support specialists, community health workers, and other behavioral health related paraprofessionals in high need areas. These professionals and paraprofessionals work on interprofessional teams where behavioral health is integrated into primary care settings, such as at Community Health Centers. Their role in addressing behavioral health concerns such as depression, anxiety, substance use, and psychosis, helps to improve health outcomes.

Preliminary analyses conducted by HRSA's NCHWA have found that higher rates of regional maternal mortality may be associated with regional shortages in maternal health providers. Recognizing this, the **HRSA-FUNDED HEALTH WORKFORCE RESEARCH CENTERS (HWRCS)** are currently conducting studies to examine the geographic distribution of women's health providers in more detail, as well as to elucidate how care provided by the allied health workforce can help expand access to maternal care. Findings from these research efforts are expected to be available in late 2020, and may help to inform planning and policy at local, state, and federal levels.

KEY TAKEAWAYS:

HRSA supports the maternal health workforce, particularly in rural areas, through several grant programs including the THCGME program and the BHWET program.

FIND MORE ON NCHWA at:

<https://bhw.hrsa.gov/health-workforce-analysis/about>

FIND MORE ON THCGME at:

<https://bhw.hrsa.gov/grants/medicine/thcgme>

FIND MORE ON BHWET at:

<https://bhw.hrsa.gov/grants/behavioral-health>

The **IMPROVING ACCESS TO MATERNITY CARE ACT OF 2018**, signed into law by President Trump on December 17, 2018, requires HRSA to identify maternity care health professional target areas within existing primary care Health Professional Shortage Areas (HPSAs), using input from relevant stakeholder groups and provider organizations. These target areas will then be used to distribute maternal health providers participating in the National Health Service Corps (NHSC). HRSA is in the process of developing criteria for the new maternity care health professional target areas and published a Request for Information in May 2020 to solicit input from stakeholders.

The **SCHOLARSHIPS FOR DISADVANTAGED STUDENTS PROGRAM** aims to enroll and retain full-time students from disadvantaged backgrounds, including students who are members of racial and ethnic minority groups, to expose them to primary care, including maternity care, and place them in medically underserved communities. The program increases diversity in the health professions and nursing workforce and provides scholarships to students who have demonstrated financial need. This program targets funding to nurses and non-nursing midwives to address the national shortage of maternity care providers, and specifically, to address the lack of diversity in the maternity care workforce.

KEY TAKEAWAYS:

HRSA is working towards distributing maternity care providers in its scholarship and student loan repayment programs based specifically on maternity care health professional target areas.

FIND MORE ON

Scholarships for Disadvantaged Students at:

<https://bhwhrsa.gov/loans-scholarships/school-based-loans/sds>

The **ADVANCED NURSING EDUCATION NURSE PRACTITIONER RESIDENCY (ANE-NPR) PROGRAM** prepares new nurse practitioners and Nurse Midwives in primary care practice in community-based settings such as health centers and rural health clinics through clinical and academic focused 12-month Nurse Practitioner Residency programs with a preference for those projects that benefit rural or underserved populations. In June 2019, HRSA awarded 36 grants to entities in 24 states to expand access to high quality care where it is most needed. The ANE-NPR incorporates evidence-based strategies to address maternal mortality, SUD, and behavioral health.

FIND MORE ON

the Advanced Nursing Education Nurse Practitioner Residency (ANE-NPR) Program at

<https://www.hrsa.gov/grants/find-funding/hrsa-19-001>

The **NURSE EDUCATION, PRACTICE, QUALITY AND RETENTION INTERPROFESSIONAL COLLABORATIVE PRACTICE PROGRAM: BEHAVIORAL HEALTH INTEGRATION** aims to increase access to quality behavioral health services through team-based care models in interprofessional nurse-led primary care teams in rural and underserved areas. The program will increase training of both the current and future nursing workforce and strengthen its ability to provide integrated behavioral health care services in primary care settings, including for maternity care. The program is currently seeking applications and estimates funding approximately 17 cooperative agreement awards beginning in July 2020.

The **SCREENING AND TREATMENT FOR MATERNAL DEPRESSION AND RELATED BEHAVIORAL DISORDERS (MDRBD)**

program, funded by the 21st Century Cures Act, supports states in integrating behavioral health into maternal health care via telehealth. In fiscal year (FY) 2018, HRSA awarded cooperative agreements to seven state health departments in Florida, Kansas, Louisiana, Montana, North Carolina, Rhode Island, and Vermont from FY 2018 to FY 2023. Programs focus on expanding health care providers' capacity to screen, assess, treat, and refer pregnant and postpartum women for maternal depression and related behavioral disorders, such as anxiety and SUD. The authorizing legislation for the MDRBD program was modeled on the Massachusetts Child Psychiatry Access Program (MCPAP) for Moms program. Specifically, these new or expanded telehealth access programs offer real-time psychiatric consultation, care coordination support, and training to front-line health care providers in a state's specified regions, including in rural and underserved areas.

KEY TAKEAWAYS:

The goal of HRSA's Screening and Treatment for Maternal Depression and Related Behavioral Disorders program is to improve the mental health and well-being of pregnant women and mothers, particularly those living in rural and medically underserved areas through increased access to affordable, culturally and linguistically appropriate treatment and recovery support services within a reasonable distance or through telehealth services.

FIND MORE ON
the Screening and Treatment for Maternal Depression and Related Behavioral Disorders program at:

<https://www.hrsa.gov/about/news/press-releases/hrsa-awards-12-million-maternal-child-mental-health-programs>

The **NATIONAL ACTION TO PROMOTE SAFE SLEEP IMPROVEMENT AND INNOVATION NETWORK** aims to make safe infant sleep and breastfeeding a national norm. Specifically, the project aims to increase infant caregiver adoption of safe infant sleep practices, as recommended by the American Academy of Pediatrics, as well as breastfeeding, by empowering champions for these protective behaviors within systems that serve families at increased risk of sudden unexpected infant deaths.

FIND MORE ON
the Screening and Treatment for Maternal Depression and Related Behavioral Disorders program at:

<https://www.hrsa.gov/grants/find-funding/hrsa-18-101>

The **NATIONAL ADVISORY COMMITTEE ON RURAL HEALTH AND HUMAN SERVICES (NACRHHS)** convened its eighty-seventh meeting in Atlanta, Georgia on March 2-4, 2020. One of the topics the committee will address is the lack of access to maternal and obstetric care in rural America. NACRHHS gathered feedback from national and state policy makers as well as local rural providers and other stakeholders to learn more about this issue. NACRHHS will submit a report to the Secretary including recommendations to address the identified challenges.

KEY TAKEAWAYS:

NACRHHS advises the Secretary of HHS on health care delivery and financing challenges in rural America.

FIND MORE ON
the NACRHHS at:

<https://www.hrsa.gov/advisory-committees/rural-health/index.html>

The **BRIDGING THE WORD GAP CHALLENGE** supported the development of innovative technology solutions to help parents and caregivers talk and engage more with young children, with a prize awarded in May 2017 to *Háblame Bebé*, an app that promotes both English and Spanish language development.

HRSA is working on a pilot initiative related to **MAPPING OF MATERNAL HEALTH DATA AND RESOURCES**. Focusing pilot activities on HHS Region VIII, the cross-HRSA team is first mapping maternal health outcome and risk factor data in the region. The team is also cataloguing relevant HRSA resources (community health centers, home visiting local implementing agencies, National Health Service Corps and Nurse Corps providers, etc.), and will overlay these resources against various outcome and risk factor maps. The ultimate goal is to optimize placement of current and future HRSA programs in areas with the highest maternal health needs.

KEY TAKEAWAYS:

HRSA is working to further optimize program resources by better identifying, and targeting resources in, areas with the highest need.

The **PREGNANCY-RELATED CARE RESEARCH NETWORK (PRCRN)** works to improve health care for women and children in the U.S. through health services, biologic, and social science research. PRCRN is a multi-site national research network. The network's data are used to evaluate and improve women's health clinical guidelines, practices, and policies throughout the U.S. PRCRN's main objectives focus on obstetrical/gynecological issues. With the high U.S. maternal mortality rate, and a projected deficit of 8,800 OB/GYNs by 2020, there is urgent need for evidence-informed innovative approaches for obstetric care delivery.

KEY TAKEAWAYS:

HRSA's Pregnancy-Related Care Research Network contributes to the evidence base to improve access to quality obstetrical and gynecological care.

The **MATERNAL AND CHILD HEALTH FIELD-INITIATED INNOVATIVE RESEARCH STUDIES (MCH FIRST) PROGRAM** supports investigator-initiated applied MCH research that has the potential to improve health care services and delivery, and promote the health and wellbeing of maternal and child populations. Past studies include the epidemiology of abruptio placentae, a rare and serious pregnancy complication; the testing of a potential mid-trimester screening algorithm for early-onset preeclampsia, which is a leading cause of maternal death; and examining state-specific disparities in maternal and perinatal morbidity and mortality.

KEY TAKEAWAYS:

HRSA's MCH FIRST program contributes to the evidence base to improve knowledge and prevention of serious obstetric complications.

INDIAN HEALTH SERVICE (IHS)

The **SPECIAL DIABETES PROGRAM FOR INDIANS** has earned national recognition for diabetes quality improvement and focuses on prevention, screening, and early treatment of diabetes, and represents an important part of a broader approach to providing team-based care and care management. The program has helped to produce long-term stabilization of childhood obesity rates, reduce the incidence of diabetes-related kidney failure, decrease the prevalence of diabetic retinopathy, and decrease hospitalizations for uncontrolled diabetes AI/AN populations.^{104,105,106,107} The program has developed monitoring and surveillance systems for diabetes clinical care and tracking diabetes prevalence and complications.

IHS provides **DIABETES STANDARDS OF CARE AND CLINICAL PRACTICE RESOURCES** for clinicians that include screening and counseling for women with diabetes during the reproductive years during and after pregnancy. Because the risk of diabetes for the AI/AN population is relatively high, screening for this at-risk population begins at the first prenatal visit, which may identify previously undiagnosed diabetes.

KEY TAKEAWAYS:

Diabetes is one of a number of chronic conditions that can lead to poor health outcomes for pregnant women and their babies. IHS focuses on applying scientifically proven methods in a broad approach to prevent the onset of diabetes and costly diabetes-related complications. At-risk populations, such as the AI/AN population, may benefit from earlier screening in pregnancy.

FIND MORE ON the Special Diabetes Program for Indians at:

<https://www.ihs.gov/diabetes/clinician-resources/soc/preconception-pregnancy-postpartum-diabetes1/> and <https://www.ihs.gov/sdpi/>

The Johns Hopkins Center for American Indian Health, the Navajo Nation, and the White Mountain Apache Tribe conducted a **MATERNAL IMMUNIZATION PROJECT** involving community surveys, education materials, and an Electronic Medical Record reminder to improve immunization rates for influenza and tetanus, diphtheria, and acellular pertussis (Tdap) immunizations during pregnancy. These immunizations protect mothers during and after pregnancy and decrease the risk of illness in infants. A curriculum for health care providers was also developed via a cooperative agreement from the Association of State and Territorial Health Officers and CDC. Additional communication materials included a “Protect Two From the Flu” poster, which addressed the most common questions or misconceptions about influenza vaccine, and a ‘general information’ poster, which informs women of the immunization recommendations and encourages them to talk to their health care provider. These posters were shared within the Navajo Nation and White Mountain Apache communities, as well as the Arizona and New Mexico Departments of Health. Maternal Tdap coverage among study sites was tracked from 2015-2019 as well as missed opportunities for vaccination. Results indicated that although 41 percent of women in the study sites had initial concerns regarding vaccine safety, after receiving education materials on the safety of vaccination, 85 percent of all women at these sites were vaccinated with Tdap, compared to 54 percent in the U.S. Women who also received influenza vaccination during their pregnancy were six times more likely to receive Tdap during their pregnancy.

KEY TAKEAWAYS:

American Indian and Alaska Native populations are at higher risk for hospitalization and deaths from lower respiratory tract infections. Research shows that provider recommendation is the top predictor of patients getting vaccinated. Education for both provider and patient, that is culturally-tailored, as well as reminder systems, can improve rates. Being up-to-date on recommended immunizations, including during pregnancy, is important for the health of mothers and their babies.

For over four decades, IHS has collaborated with **ACOG’S COMMITTEE ON AMERICAN INDIAN AND ALASKA NATIVE WOMEN’S HEALTH** for professional consultation, continuing medical education, and ongoing technical assistance. ACOG supported activities include: site visits, conferences, assistance with providing the Advanced Life Support in Obstetrics^{al} course, and collaboration on the recent “Recommendations to the Indian Health Service on American Indian/Alaska Native Pregnant Women and Women of Childbearing Age with Opioid Use Disorder.” Since 2017, IHS sites providing obstetric care have been phasing in implementation of AIM patient safety bundles, discussed above, and all IHS

^{al} The Advanced Life Support in Obstetrics course, developed by the American Academy of Family Physicians, encourages a standardized team-based approach for physicians, residents, nurse midwives, registered nurses and other members of the maternity care team to prepare for obstetric emergencies, improve patient safety and positivity impact maternal outcomes.

federal sites that provide inpatient obstetric services have implemented at least one safety bundle. IHS also has a strong history of partnership with the American Academy of Pediatrics Committee on Native American Child Health and they recently collaborated on “Recommendations to the Indian Health Service on Neonatal Opioid Withdrawal Syndrome.”

KEY TAKEAWAYS:

As part of IHS’ efforts to improve the quality of maternal health care provided by its facilities, IHS collaborates with professional organizations on various maternal health initiatives.

IHS provides breastfeeding support in a variety of ways. IHS participates in the **BABY-FRIENDLY HOSPITAL INITIATIVE** to support breastfeeding. All IHS federal facilities that provide obstetric delivery services have been designated Baby-Friendly, with re-designation occurring every 5 years. Designation includes provision of staff education on risk factors that could interfere with breastfeeding and education and support to AI/AN mothers to prevent or address delayed initiation of milk production following birth, and to help mothers understand the benefits of long-term breastfeeding.

IHS has also encouraged public health nurses to obtain **INTERNATIONAL BOARD OF LACTATION CONSULTANT CERTIFICATIONS** and to provide lactation education and support during prenatal and postpartum public health nursing visits. This postpartum support can assist in improving breastfeeding rates, including when women return to work. The first public health nurses program to be 100 percent certified is expected in October 2020.

Since 2017, the **IHS LACTATION SUPPORT PROGRAM** has supported AI/AN women, infants, children, and families by allowing women who choose to breastfeed to express or pump breast milk at work for a period of one year after returning to work. In 2020, IHS will begin development of a **CULTURALLY APPROPRIATE EDUCATIONAL HANDBOOK/APPLICATION** for AI/AN women to promote healthy pregnancies, which will include breastfeeding advice, tips, support, and education.

KEY TAKEAWAYS:

IHS is providing breastfeeding support both in and out of hospital settings. IHS efforts have helped to improve breastfeeding rates for infants seen by IHS at 2 months of age from 35 percent in 2016 to above 40 percent in 2018.

To educate and assist staff in supporting breastfeeding, IHS offers a Breastfeeding Toolkit. Find the toolkit at:

www.ihs.gov/healthed/resources/breastfeedingtoolkit

FIND MORE ON the IHS Lactation Support Program at:

<https://www.ihs.gov/ihm/pc/part-4/p4c7>

IHS continues to address the OUD and SUD crisis affecting people across the U.S., especially those in vulnerable and rural communities. The **INDIAN HEALTH SERVICE (IHS) NATIONAL COMMITTEE ON HEROIN OPIOIDS AND PAIN EFFORTS (HOPE)** works with tribal stakeholders to promote appropriate and effective pain management, reduce overdose deaths from heroin and prescription opioid misuse, and improve access to culturally appropriate treatment.

The committee consists of 7 workgroups that aim to foster tribal relationships to:

- Identify local resources that are available to treat pain and SUDs
- Ensure adequate administrative support to effectively coordinate patient care
- Encourage IHS facilities to increase clinical capacity and identify viable training and educational resources to support IHS prescribers, practitioners, tribal leadership, and community members
- Facilitate meaningful discussions surrounding development of comprehensive medication-assisted treatment (MAT) strategies

In addition, the committee strives to expand availability of co-prescribed and first responder access to naloxone for patients at risk for opioid overdose; expand Neonatal Opioid Withdrawal Syndrome/Neonatal Abstinence Syndrome guidelines to increase screening and referral to treatment for pregnant and parenting mothers; and improve data collection, analysis, and evaluation to target strategies to impact pain management and addiction in tribal populations.

**FIND MORE ON
HOPE and IHS maternal health opioid resources at:**

<https://www.ihs.gov/opioids/hope/> and <https://www.ihs.gov/opioids/maternalchild/>

Rural IHS sites that include an Emergency Department, but do not have on-site Labor and Delivery services will develop a program of Rural Obstetric Readiness in 2020. This **“OB READY”** program will include staff development with ongoing training and drills, resource development with assurance of access to necessary equipment and medications, and integration with regional maternity care and transportation networks.

NATIONAL INSTITUTES OF HEALTH (NIH)

The President's FY 2021 Budget proposes \$316 million in maternal health research at NIH. NIH funds a wide variety of research project grants and research networks focused on the cardiovascular health of women of reproductive age. NIH-funded researchers have found evidence that in the first trimester, blood pressure readings lower than those traditionally used to identify women as having high blood pressure may indicate a higher risk for later developing a hypertensive disorder of pregnancy, such as preeclampsia. In addition, an increase in blood pressure between the first and second trimester increased the risk of a hypertensive disorder of pregnancy. An NIH-funded study found that, after giving birth, a woman is at the highest risk for postpartum stroke in the first 10 days that she is home from the hospital. Separate research funded by NIH has also found that infections diagnosed during a delivery admission are associated with a higher risk of postpartum readmission for ischemic stroke. The risk was seen particularly in women without hypertensive disorders of pregnancy, which suggests that infection may play a triggering role in postpartum ischemic stroke, even if there are no other risk factors in a patient. Another NIH study determined that postpartum hemorrhage may be underdiagnosed in electronic medical records, comparing medical diagnosis codes to the actual volume of blood lost during delivery.

The Chronic Hypertension and Pregnancy (CHAP) study is a large, multi-center trial evaluating the efficacy and safety of treating pregnant women for mild chronic hypertension. CHAP seeks to resolve concerns that lowering blood pressure could

KEY TAKEAWAYS:

NIH-funded research highlights the need to recognize and act on unusual blood pressure readings early in a pregnancy or in the immediate days following a delivery, even when a delivery is uncomplicated. In addition, NIH research reinforces the need to study safe and effective therapies for women with cardiovascular conditions or cardiovascular conditions of pregnancy.

FIND MORE ON

the study on blood pressure during pregnancy at:

<https://www.nichd.nih.gov/newsroom/news/062719-blood-pressure-first-trimester> and with a subscription at: <https://www.ncbi.nlm.nih.gov/pubmed/31255629>

FIND MORE ON

the timing and risk factors of postpartum stroke with a subscription at:

<https://www.ncbi.nlm.nih.gov/pubmed/29215510>

FIND MORE ON

the underdiagnosis of postpartum hemorrhage with a subscription at:

<https://www.ncbi.nlm.nih.gov/pubmed/29377131>

FIND MORE ON

the Chronic Hypertension and Pregnancy Study at:

<https://clinicaltrials.gov/ct2/show/NCT02299414> and with a subscription at: <https://www.nhlbi.nih.gov/news/2019/chronic-hypertension-pregnancy-treat-or-not-treat>

FIND MORE ON

the pravastatin study with a subscription at:

<https://www.ncbi.nlm.nih.gov/pubmed/26723196>

FIND MORE ON

the Maternal Fetal Medicine Units with a subscription at:

<https://www.nichd.nih.gov/research/supported/mfmu>

harm the baby. In addition, NIH-supported researchers are conducting a randomized controlled clinical trial to determine if the medication pravastatin, used for hypertension, is safe and effective for prevention of preeclampsia and improving maternal and fetal outcomes in women at high risk. Many of these studies leverage large clinical trial networks focused on maternal and infant health, which allow for systematic studies of conditions and treatments during pregnancy and the postpartum period.

NIH has enhanced its outreach efforts to inform researchers, providers, communities, and policymakers of the agency's efforts to address maternal mortality and morbidity, with an emphasis on mitigating maternal health disparities. NIH is engaging the scientific community through meetings and workshops to inform the research agenda and to address the research and evidence gaps for prevention and treatment strategies, including workshops such as **"PREDICTING, PREVENTING AND TREATING PREECLAMPSIA", "RESEARCH CONFERENCE ON SLEEP AND THE HEALTH OF WOMEN", "IMPROVING MATERNAL HEALTH: BEHIND THE NUMBERS", AND "THE CONVENING ON NATIVE AMERICAN WOMEN'S HEART HEALTH"**.

As a result of these engagements, NIH is developing a research agenda to address maternal health conditions, recognizing that the disparities in maternal mortality and morbidity in the U.S. stem from a complex interplay of biological, genetic, environmental, structural, and psychosocial factors that warrant new approaches in patient and provider education, research, and community engagement initiatives. Public health messages and information for women on key pregnancy risk factors are disseminated by several NIH institutes, centers, and offices using websites, informational booklets, fact sheets, and other resources on pre-pregnancy, pregnancy-related, and postpartum conditions.

KEY TAKEAWAYS:

NIH is continuing to enhance its efforts to get important research findings into the hands of a variety of stakeholders who can translate these findings into action.

FIND MORE ON

"Predicting, Preventing and Treating Preeclampsia", "Research Conference on Sleep and the Health of Women" at:

<https://pubmed.ncbi.nlm.nih.gov/30686084/>

FIND MORE ON

"Research Conference on Sleep and the Health of Women" at:

<https://www.liebertpub.com/doi/10.1089/jwh.2020.8341>

FIND MORE ON

"The Convening on Native American Women's Heart Health" at:

<https://www.nhlbi.nih.gov/news/2019/native-american-women-and-heart-health-new-vision-research-and-outreach>

Through the **HEART TRUTH® PROGRAM**, NIH raises awareness about heart disease in women, including risks, causes, and prevention. To accomplish this, the program relies on partnerships fostered through The Heart Truth Healthy Hearts Network to amplify critical public health messages to local communities, including high-risk minority communities across the country. Additionally, the National Heart, Lung, and Blood Institute organizes national activities each year during American Heart Month, which helps create awareness about heart disease among women of all ages.

FIND MORE ON

The Heart Truth® at:

<https://www.nhlbi.nih.gov/health-topics/education-and-awareness/heart-truth>

NIH is advancing the science related to gestational diabetes mellitus (GDM), including studies of risk factors, mechanisms, interventions, and long-term effects. This includes studies of gestational weight gain and adverse events for mothers and children, comparison of screening methods for GDM. NIH-funded research supports the use of pre-pregnancy vitamin D to help lower the risk of GDM. Further, NIH research provides evidence that women with GDM are at risk for chronic kidney disease and the development of type 2 diabetes, but that these risks can be mitigated by the adoption of healthy lifestyle practices including healthy weight maintenance, moderate exercise, and smoking cessation.

KEY TAKEAWAYS:

NIH has sponsored research generating a growing body of evidence on GDM prevention. More research is needed on optimal screening techniques, effective interventions, and monitoring long-term health risks as a result of GDM.

NIH held a [Community Engagement Forum](#) on Improving Maternal Health to work with community-based and healthcare provider groups to discuss underlying causes of maternal mortality and morbidity, how patient communities can inform future research, and engagement strategies that can enhance local efforts to improve maternal health. NIH recently published an editorial to highlight the importance of research in tackling maternal mortality and SMM: [Importance of research in reducing maternal mortality and morbidity rates](#).

KEY TAKEAWAYS:

NIH is continuing to enhance its efforts to get important research findings into the hands of a variety of stakeholders who can translate these findings into action.

FIND MORE ON

NIH's maternal mortality activities at:

<https://www.nichd.nih.gov/health/topics/maternal-mortality>, <https://www.nichd.nih.gov/newsroom/digital-media/videos/perspectives-mortality-full> and <https://orwh.od.nih.gov/research/maternal-morbidity-and-mortality>

NIH's **CONSORTIUM ON SAFE LABOR (CSL)** collected detailed information from electronic medical records on 228,562 deliveries from 19 hospitals across the U.S. from 2002 to 2008. The study explored the underlying causes of the high cesarean delivery rate in the U.S. population. The primary goals of the CSL were to explore the underlying causes of the high cesarean delivery rate in the U.S. population, describe contemporary labor progression at the national level, and determine the appropriate time to perform a cesarean delivery in women with labor protraction and arrest. Among other important research findings, this study found that one out of three first-time mothers have a cesarean delivery. A high percentage of intrapartum cesarean deliveries were performed too soon before women achieved active labor, indicating that preventing cesarean delivery in the first pregnancy would go a long way to decreasing the national cesarean delivery rate. In addition, the results of a randomized controlled trial, sponsored by NIH noted no differences between elective induction of labor at 39 weeks gestation and expectant management among low-risk women experiencing their first pregnancy for perinatal mortality or severe perinatal morbidity and there was a lower risk of cesarean delivery in the elective induction group

KEY TAKEAWAYS:

The CSL explored the underlying causes of the high cesarean delivery rate (approximately 30 percent) in the U.S. population and found a significant number of first-time mothers deliver by cesarean delivery too soon before achieving active labor.

FIND MORE ON the CSL study at:

<https://www.nichd.nih.gov/about/org/diphr/officebranch/eb/safe-labor>

The **HHS TASK FORCE ON RESEARCH SPECIFIC TO PREGNANT WOMEN AND LACTATING WOMEN (PRGLAC)** was established by the 21st Century Cures Act to advise the Secretary of HHS on how to overcome gaps in knowledge and research on safe and effective therapies for pregnant women and lactating women. Many medications used during pregnancy are not studied in women who are pregnant, and key adverse reactions or changes in treatment outcomes are not well understood. PRGLAC includes representatives from several NIH Institutes, Centers and Offices, HHS operating divisions, other federal agencies such as the U.S. Department of Veteran's Affairs and the Department of Defense, research experts from leading universities, advocates, and industry representatives. PRGLAC recommendations were published in September 2018, and an implementation plan for these recommendations is in development.

Working groups, comprised of representatives across government, academia, industry, and nonprofit organizations, are currently drafting an implementation plan that focuses on research and training, regulatory processes, communications, and discovery.

KEY TAKEAWAYS:

Multiple federal agencies are participating in an HHS Task Force to address challenges in determining effective therapies for pregnant women and lactating women.

**FIND MORE ON
the PRGLAC at:**

<https://www.nichd.nih.gov/about/advisory/PRGLAC>

The goal of the **OBSTETRIC-FETAL PHARMACOLOGY RESEARCH CENTERS (OPRC) PROGRAM** is to ensure that there is evidence supporting the use of specific medications and treatments in pregnancy. The network conducts cooperative multidisciplinary research to enhance the understanding of obstetric pharmacokinetics and pharmacodynamics and to provide the expert infrastructure needed to test therapeutic drugs during pregnancy. The centers allow researchers to conduct safe, technically sophisticated, and complex studies that help clinicians protect women's health, improve birth outcomes, and reduce infant mortality. OPRC researchers are currently studying medicated-assisted treatment for substance misuse, medications used for depression in pregnant women, and treatment for pregnancy-associated hypertension. Under this initiative, NIH supports research on how substance use affects pregnancy, including the consequences of prenatal exposure to drugs of abuse, including cocaine and marijuana, on brain development, behavior, and cognition.

KEY TAKEAWAYS:

About 9 in 10 women report taking at least one medicine during pregnancy. The effectiveness and side effects of taking medications can differ for pregnant women. Still, more research in this area could inform the safety and effectiveness of therapies for pregnant and lactating women. NIH is also funding research to better inform the implications of pregnancy for pharmaceutical therapies with a special focus on medication-assisted treatment as part of the Department's broader efforts to address the opioid epidemic.

**FIND MORE ON
the OPRC at:**

https://www.nichd.nih.gov/research/supported/opru_network

PREGSOURCE®, a crowdsourcing research project, aims to improve understanding of pregnancy by gathering information directly from pregnant women via confidential online questionnaires.

NIH is asking pregnant women to answer questions about their experiences, their health, and (eventually) their babies' health and provide information back to these women on how they compare to others in the study. The project not only provides insights to improve pregnancy care, but also uses research data to inform women about specific risks or care needs they may have and links them to partner organizations where they can seek help.

**FIND MORE ON
PregSource at**

<https://pregsource.nih.gov/about/about-pregsource.html>

NIH supports the **HUMAN PLACENTA PROJECT**, a collaborative research effort to understand the role of the placenta in health and disease. HPP aims to develop new tools to study the organ in real time to learn how it develops and functions throughout pregnancy and how the placenta impacts the health of the woman and her child. NIH also supports clinical trial infrastructure designed to conduct rigorous clinical trials in maternal-fetal medicine and to provide the scientific foundation for evidence-based clinical best practices in obstetrics. Current projects include randomized controlled trials of interventions designed to:

- prevent obstetrical hemorrhage after cesarean delivery;
- prevent the negative effects from cytomegalovirus infection; and
- treat sleep apnea in pregnancy.

**FIND MORE ON
the Human Placenta Project at:**

<https://www.nichd.nih.gov/research/supported/HPP/default>

The **SAFE TO SLEEP CAMPAIGN**, a public health campaign led by NIH in collaboration with other organizations, has helped to educate millions of caregivers about ways to reduce the risk of SIDS and other sleep-related causes of infant death. Since the start of the campaign in 1994, SIDS rates in the U.S. have decreased by almost 50 percent, both overall and within various racial/ethnic groups. NIH also funds ongoing research to inform best practices in safe sleeping. For instance, the American Academy of Pediatrics recommends that infants sleep in the parent's room, but in a separate sleep space. However, some infant care and public health experts have feared that instructing mothers to avoid bed sharing could discourage them from breastfeeding. NIH-funded researchers surveyed more than 3,000 U.S. mothers to gather information about breastfeeding and infant sleep locations, and found that receiving advice to share a room and not share a bed did not discourage breastfeeding. The campaign includes educational messaging and outreach resources that support the initiation and continuation of breastfeeding while maintaining safe sleep practices. NIH also collaborates with breastfeeding-focused organizations, such as the U.S. Breastfeeding Committee (USBC), to enhance the capacity of health care systems, clinicians, and allied care providers to provide evidence-based and supportive services to parents who wish to practice safe sleep and breastfeeding. In October 2019, a CDC-USBC webinar titled "Safe Infant Sleep Practices: Integrating Breastfeeding & Safe Sleep" included an NIH representative as a lead presenter.

KEY TAKEAWAYS:

NIH has played a critical role in reducing SIDS and other sleep-related causes of infant death over the past few decades by both continuing to generate information on evidence-based safe sleeping practices for infants and leading the charge through a nationwide campaign. NIH also promotes breastfeeding as a SIDS risk-reduction and overall beneficial practice for mothers and babies.

FIND MORE ON the Safe to Sleep Campaign at:

<https://safetosleep.nichd.nih.gov/>

The published findings of the NIH-funded study are available with a subscription at:

<https://www.ncbi.nlm.nih.gov/pubmed/26851615>

The primary objective of the **MEDICATION TREATMENT FOR OPIOID-DEPENDENT EXPECTING MOTHERS: A PRAGMATIC RANDOMIZED TRIAL COMPARING TWO BUPRENORPHINE FORMULATIONS** study is to evaluate the impact of treating OUD in pregnant women with extended release buprenorphine, compared to sublingual buprenorphine, on maternal-infant outcomes. Testing a conceptual model of the mechanisms by which extended release buprenorphine may improve maternal-infant outcomes, relative to sublingual buprenorphine, is a secondary trial objective.

KEY TAKEAWAYS:

Prior research on medication-assisted treatment for OUD has focused on the general adult population. NIH is pursuing research to understand the implication of these therapies for pregnant women and their babies.

FIND MORE ON

Medication Treatment for Opioid-dependent Expecting Mothers: A Pragmatic Randomized Trial Comparing Two Buprenorphine Formulations at:

<https://www.drugabuse.gov/about-nida/organization/cctn/ctn/research-studies/medication-treatment-opioid-dependent-expecting-mothers-moms-pragmatic-randomized-trial-comparing>

Find a commentary on addressing the impact of opioids on women and children at:

[https://www.ajog.org/article/S0002-9378\(19\)30429-6/fulltext](https://www.ajog.org/article/S0002-9378(19)30429-6/fulltext)

The **ADVANCING CLINICAL TRIALS IN NEONATAL OPIOID WITHDRAWAL SYNDROME (ACT NOW)** study aims to inform clinical care for newborns with opioid withdrawal syndrome (NOWS), a form of NAS, which is a group of complications that affect newborns exposed to addictive drugs while in the mother's womb. The ACT NOW study is evaluating the burden of NOWS/NAS, describing current approaches (pharmacological and non-pharmacological) to managing NOWS, and analyzing developmental outcomes for children prenatally exposed to opioids. Existing research suggests that children with NAS are at risk for lower developmental scores (language, cognitive, motor) than children not exposed when measured at two years of age. With the rising frequency and costs of treating drug withdrawal in newborns, there is a need to ensure access to and delivery of quality treatment and services to infants, young children, and families impacted by NAS. In addition, ACL's **NEONATAL ABSTINENCE SYNDROME NATIONAL TRAINING INITIATIVE (NTI)** seeks to address the

opioid epidemic by supporting training for interdisciplinary medical teams on emerging knowledge and evidence-based practices in screening, monitoring, and care for children with NAS that are trauma-informed and culturally competent. Initial training will target up to ten states with the highest needs as identified by the applicant using current data sources. The list of states receiving training will grow over time and the intent is to develop a sustainability plan for continuing a NAS interdisciplinary training models beyond initial program funding. The initiative will also employ formative and summative evaluation techniques to supportive continuous program improvements.

KEY TAKEAWAYS:

HHS and the entire federal government are committed to ending the crisis of opioid addiction in America. HHS has a five-point strategy to stop the epidemic, which includes better addiction prevention, treatment, and recovery services. Such services need to be inclusive of the needs of families with infants and young children impacted by NAS. NIH's ACT NOW program is designed to study the optimal treatment of withdrawal for affected infants and the long-term impact of prenatal opioid exposure on child development. ACL's NTI is designed to help train interdisciplinary medical teams on optimal treatment strategies for children with NAS.

FIND MORE ON the NTI at:

<https://acl.gov/grants/neonatal-abstinence-syndrome-national-training-initiative>

NIH supports two major projects that provide prospective longitudinal, population-representative data on children, adolescents, and their families in the U.S. that allow researchers to examine the long-term factors affecting maternal health. Both studies include measures ranging from the genome to the external environment and both can be used to examine social determinants of maternal health. **THE NATIONAL SURVEY OF ADOLESCENT TO ADULT HEALTH (ADD HEALTH)** is a longitudinal study of a nationally representative sample of adolescents in grades 7-12 in the U.S. during the 1994-95 school year. The Add Health cohort has been followed into young adulthood with several in-home interviews. Data collection has taken place during the prime reproductive years: data collection for the sample at ages 24-32 has been completed and data collection on the sample at ages 31-42 is currently taking place. Social, environmental, behavioral, and biological data are collected. Add Health combines longitudinal survey data on respondents' social, economic, psychological, and physical well-being with contextual data on the family, neighborhood, community, school, friendships, peer groups, and romantic relationships, providing unique opportunities to study how social environments and behaviors in adolescence are linked to health and achievement outcomes in young adulthood. Direct measures of medical problems affecting maternal health—for

instance, hypertension, and overweight and obesity—are available. **THE FRAGILE FAMILIES AND CHILD WELLBEING STUDY** follows a cohort of nearly 5,000 children born in large U.S. cities between 1998 and 2000, roughly three-quarters of whom were born to unmarried parents. Interviews are conducted with mothers, fathers, and/or primary caregivers at birth and again when children are ages one, three, five, nine, and fifteen. The study is currently collecting data on the cohort as they enter young adulthood (average age 22) and will capture child-bearing experience during young adulthood.

KEY TAKEAWAYS:

Two population-representative, longitudinal data sets—the National Survey of Adolescent to Adult Health and Fragile Families and Child Wellbeing Study—are available to be used to identify long-term risk factors associated with maternal health, including social determinants of maternal health.

FIND MORE ON

Add Health at:

<https://www.cpc.unc.edu/projects/addhealth>

FIND MORE ON

The Fragile Families and Child Wellbeing Study at:

<https://fragilefamilies.princeton.edu>

The **PREGNANCY FOR EVERY BODY** initiative educates plus-size women and their health care providers about the importance of open and nonjudgmental conversations about weight when making plans for a healthy pregnancy. This campaign is intended to guide women and providers to work together to ensure the best outcomes. It includes information for moms-to-be, a pregnancy action plan, and information for health care providers.

FIND MORE ON

the “Pregnancy for Every Body” initiative at:

<https://www.nichd.nih.gov/ncmhep/initiatives/pregnancy-for-every-body/moms-to-be>

The **CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) FOR SLEEP AND APNEA IN PREGNANCY STUDY** is a phase III clinical trial to determine whether sleep apnea intervention with CPAP can reduce adverse cardiovascular outcomes in pregnancy, including preeclampsia.

NIH-supported researchers are working to determine specific cellular interactions that lead to the production of immune factors, which cause symptoms of preeclampsia, and to identify ways to block these interactions to improve maternal and fetal outcomes.

FIND MORE AT:

<http://grantome.com/grant/NIH/UG3-HL140131-01>

The **“MENTAL HEALTH MATTERS”** initiative provides content for the public on postpartum depression. These public education materials include links to resources, clinical trials, and information on potential referrals for treatment and avenues to seek help.

**FIND MORE ON
“mental health Matters” at:**

<https://mental-health-matters.com/postpartum-depression-101>

The **PREGNANCY EATING ATTRIBUTES STUDY (PEAS)** analyzes eating behavior in pregnancy and postpartum, including the effects of home food environment on maternal diet and infant feeding behavior and growth. The rising prevalence of maternal overweight/obesity and excessive gestational weight gain pose serious public health concerns as these factors contribute to increased risk of adverse maternal and child health outcomes.

**FIND MORE ON
the NIH PEAS study here:**

https://www.nichd.nih.gov/about/org/diphr/officebranch/sbsb/pregnancy_eating

NIH provides major co-funding for data projects managed by other agencies, including the **NATIONAL SURVEY OF FAMILY GROWTH (NSFG)**, managed by CDC. The NSFG gathers information on pregnancy, men's and women's health, and other topics. It can be used to perform statistical studies of families, fertility, and health.

**FIND MORE ON
the NSFG at**

<https://www.cdc.gov/nchs/nsfg/index.htm>

NIH bolsters research on maternal health by supporting a data archive, **DATA SHARING FOR DEMOGRAPHIC RESEARCH (DSDR)**, housed at the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan. The data sets available through DSDR are available at low- or no-cost. Data users and depositors have access to expert assistance from DSDR and ICPSR staff, extensive documentation of and metadata for data sets, expert data curation, and excellent protection of human subjects, including human subject privacy, and extensive online training.

KEY TAKEAWAYS:

A major component of bolstering research is providing low-cost, easy-to-access data. NIH remains committed to supporting data sharing, including through the DSDR.

**FIND MORE ON
the DSDR at:**

<https://www.icpsr.umich.edu/icpsrweb/content/DSDR/index.html>

**FIND MORE ON
the ICPSR at**

<https://www.icpsr.umich.edu/icpsrweb>

NIH sponsors substantial research that utilizes the resources, data systems, and data repositories mentioned in this section and relies on investigators to obtain state-level or facility-level data to help interpret national trends. NIH also encourages pregnant women to participate in research, including an interface through [ClinicalTrials.gov](https://clinicaltrials.gov), which allows interested participants to find clinical studies for which they are eligible. Examples of recent work sponsored by NIH include a study that examined the relationship between sociodemographic characteristics of women and causes of death in pregnant women and examined more closely the trends in maternal mortality in Texas. NIH-

supported research also noted significant measurement and reporting factors that may require correction to achieve better estimates of maternal mortality rates and factors to be considered in the gathering of the data on maternal mortality. NIH grantees have examined contributing factors such as time of day of delivery, site of care for delivery, and health disparities on the rates of maternal mortality and morbidity.

KEY TAKEAWAYS:

NIH is funding investigators throughout the U.S. to examine existing data in order to provide new insights into causes of and contributors to maternal mortality and morbidity. In addition, external scientists working with federal data can provide key insights into methods to improve the collection and quality of surveillance programs.

The **INTERNATIONAL MATERNAL, PEDIATRIC, ADOLESCENT AIDS CLINICAL TRIALS NETWORK** and **DOMESTIC & INTERNATIONAL PEDIATRIC & MATERNAL HIV CLINICAL STUDIES NETWORK**

(referred to jointly as the IMPAACT Network) conducts high-quality clinical trials to advance the prevention and treatment of HIV and its complications for infants, children, adolescents, and pregnant/postpartum women globally. Specific aims of the IMPAACT Network include evaluating the pharmacokinetics, safety, and drug interactions of new and existing antiretroviral agents and formulations leading to optimal dosing and licensing for HIV-infected infants, children, adolescents, and pregnant/postpartum women. While more than 30 antiretroviral medications are licensed for use in adults, many newer antiretroviral medications have not been evaluated for pharmacokinetics, safety, and dosing in pregnant women. The domestic agenda of the IMPAACT network prioritizes evaluation of pharmacokinetics of antiretroviral and related medications during pregnancy and postpartum.

KEY TAKEAWAYS:

NIH-supported research produces needed data to guide safe and effective use of antiretroviral and related medications in pregnant and postpartum women. Since the mid-1990s, NIH research has informed the implementation of HIV testing and preventive measures that have led to a decrease of more than 90 percent in the number of children perinatally infected with HIV in the U.S., nearly eliminating the mother-to-child transmission of HIV.

FIND MORE ON the IMPAACT Network at:

<https://www.nichd.nih.gov/research/supported/impaaact>

Stemming from recommendations in the **NATIONAL ACADEMY OF SCIENCES, ENGINEERING, AND MEDICINE (NASEM) WORKSHOP ON BIRTH SETTINGS**, NIH requested that NASEM convene an ad hoc committee to provide an evidence-based analysis of the complex findings in the research on birth settings, focusing particularly on health outcomes experienced by sub-populations of women. With input from key stakeholders in the health care provider, women's health, and research communities, the ad hoc committee gathered information on the following questions:

- Risk factors affecting maternal mortality and morbidity overall
- Access to and choice in birth setting
- Social determinants that influence risk and outcomes in varying birth settings
- Financing models for childbirth across settings
- Licensing, training, and accreditation issues pertaining to professionals providing maternity care across all settings

The report, published in 2020, found that no hospital, birth center, or home birth is risk-free; however, better access to care, quality of care, and care system integration can improve safety for women and infants during birth.

FIND MORE ON

NASEM Birth Settings in America at:

<https://www.nationalacademies.org/our-work/assessing-health-outcomes-by-birth-settings>, <https://www.nap.edu/catalog/25636/birth-settings-in-america-outcomes-quality-access-and-choice>, and <https://www.nationalacademies.org/news/2020/02/no-hospital-birth-center-or-home-birth-is-risk-free-but-better-access-to-care-quality-of-care-and-care-system-integration-can-improve-safety-for-women-and-infants-during-birth-says-report>

NIH conducted a workshop on **“PREGNANCY AND MATERNAL CONDITIONS THAT INCREASE RISK OF MORBIDITY AND MORTALITY”** in May of 2020. The purpose of this workshop was to develop a research agenda targeted at the clinical causes of maternal mortality and morbidity. An interdisciplinary team of experts addressed the question of why women die from these conditions (e.g. postpartum hemorrhage, hypertension, cardiovascular disease, infection, etc.) and what can be done to identify patients at risk, and the interventions required to reduce maternal mortality and morbidity.

FIND MORE ON

the “Pregnancy and Maternal Conditions that Increase Risk of Morbidity and Mortality” workshop at:

<https://www.nhlbi.nih.gov/events/2020/maternal-mortality-workshop>

OFFICE OF THE ASSISTANT SECRETARY FOR HEALTH (OASH)

HHS OMH supports grants to agencies and organizations in the public and non-profit sectors to eliminate health disparities among racial and ethnic minority populations. These entities include state offices of public health, minority health and/or health equity; community and faith-based organizations, health care organizations, institutions of higher education; tribes and tribal organizations; and other scientific and research organizations dedicated to improving the health of these targeted populations. In FY 2020, applicants seeking funding under OMH's **STATE/TRIBAL/TERRITORIAL PARTNERSHIP INITIATIVE TO DOCUMENT AND SUSTAIN DISPARITY-REDUCING INTERVENTIONS** will have the opportunity to select maternal mortality as a focus area.

THINK CULTURAL HEALTH is a program of HHS OMH that provides health and health care professionals with information, continuing education opportunities, and resources to learn about culturally and linguistically appropriate services, or CLAS. OMH is developing a Think Cultural Health e-learning program targeted to providers of pregnancy-related services. Culturally and linguistically appropriate services are respectful of and responsive to the health beliefs, practices, and needs of diverse patients. Health care providers are looking to meet the challenges of serving diverse communities and provide high quality services and care.

KEY TAKEAWAYS:

By improving cultural competence and tailoring services to an individual's culture and language preferences, health professionals can help bring about positive health outcomes for diverse populations.

FIND MORE ON

Think Cultural Health at:

<https://thinkculturalhealth.hhs.gov>

The **IT'S ONLY NATURAL** campaign is a partnership between the Office of Women's Health and HHS OMH promoting breastfeeding and its benefits to mothers. Breastfeeding is associated with a reduced risk of type 2 diabetes and hypertension. This campaign focuses on decreasing disparities and increasing breastfeeding as a part of a larger strategy to improve blood pressure control among women of reproductive age. This is especially relevant for African American women, who have lower rates of breastfeeding and are at increased risk of hypertension. Increased breastfeeding may help to address this health disparity and improve maternal health outcomes. The goal of this national campaign is to encourage African American mothers to breastfeed for at least the first six months after birth with support from their families. The campaign will focus on African American mothers and families using the **IT'S ONLY NATURAL, MOTHER'S LOVE. MOTHER'S MILK**, and other HHS and OWH breastfeeding support materials available through [womenshealth.gov](https://www.womenshealth.gov). The campaign will be national in scope and include partnerships with outreach organizations, community stakeholders, and the HHS Regional Offices and their partners.

FIND MORE ON

It's Only Natural at:

<https://www.womenshealth.gov/its-only-natural>

MOVE YOUR WAY MATERNAL HEALTH is a partnership between the Office of Disease Prevention and Health Promotion and OWH aimed at improving the health and wellness of families through increased physical activity during pregnancy and postpartum. It is part of Move Your Way, which is the promotional campaign for the second edition of the Physical Activity Guidelines for Americans. The goal is to help people live healthier lives through increased physical activity. Move Your Way Maternal Health will complete formative research with women who are pregnant and postpartum and their health care providers, develop targeted tools and resources for these audiences, and evaluate the effectiveness of efforts to encourage physical activity behavior and improve knowledge of the benefits of physical activity during pregnancy and beyond. Physical activity during pregnancy can impact maternal co-morbidities including diabetes that can affect maternal mortality and morbidity.

FIND MORE ON

Move Your Way at:

<https://health.gov/moveyourway> and <https://www.womenshealth.gov/blog/improving-maternal-health-outcomes-focus-physical-activity>

The OWH **POSTPARTUM DEPRESSION CAMPAIGN'S** goal is to encourage moms across the nation to report postpartum depression symptoms to a health care provider. This new campaign will feature video stories from real moms who have been treated for postpartum depression. The campaign builds upon the National Institute of Child Health and Human Development [Moms Mental Health Matters](#) initiative. OWH's campaign activities will focus specifically on reducing the stigma of postpartum depression and anxiety so that more women talk to their doctor, nurse, or midwife about depression or anxiety symptoms and treatment in the 12-month period after childbirth. The campaign will use digital storytelling to focus on women's experiences with postpartum depression.

KEY TAKEAWAYS:

The OWH Breastfeeding Guide is an easy-to-read publication that has how-to information and support to help women breastfeed.

FIND MORE ON the Breastfeeding Guide at:

<https://www.womenshealth.gov/patient-materials/resource/guides>

TARGETED ENHANCEMENT OF IMMUNIZATION CULTURE IN OBSTETRIC & GYNECOLOGICAL (OBGYN) CARE TO INCREASE VACCINATIONS ACROSS THE LIFECOURSE is a partnership between the Office of Infectious Disease and HIV/AIDS Policy (OIDP) and OWH with the goal of increasing maternal, childhood and adolescent immunizations throughout the life course. The project involves partnering with healthcare providers and medical professional organizations focused on prenatal and maternal care. Data consistently shows that the majority of mothers-to-be make their decisions to vaccinate before their child is born and this decision remains relatively stable over time. This partnership is designed to encourage the promotion of immunization in OB-GYN and family practices providing prenatal healthcare by incorporating routine conversations about the importance and safety of immunizations.

SUBSTANCE ABUSE AND MENTAL HEALTH SERVICES ADMINISTRATION (SAMHSA)

President's FY 2021 Budget proposes \$31.9 million for the **PROGRAM FOR TREATMENT FOR PREGNANT AND POSTPARTUM WOMEN**, which applies a system approach to: (1) support family-based services for pregnant and postpartum women with a primary diagnosis of a SUD; (2) help state substance abuse agencies address the continuum of care, including services provided to women in nonresidential-based settings; and (3) promote a coordinated, effective and efficient state system managed by state substance abuse agencies by encouraging new approaches and models of service delivery. Similarly, the purpose of the **SERVICES GRANT PROGRAM FOR RESIDENTIAL TREATMENT FOR PREGNANT AND POSTPARTUM WOMEN** is to expand comprehensive treatment, prevention, and recovery services for women and their children in residential substance-use treatment facilities, including services for non-residential family members of both the women and children. The program focuses on low-income women, age 18 and over, who are pregnant or postpartum, and their children (age 17 and under) who have limited access to quality health services, including traditionally underserved populations such as ethnic and minority groups. Funding supports programs that utilize evidence-based parenting and treatment models including trauma-specific services in a trauma-informed context. With regards to maternal health, together, these programs aim to decrease use of harmful substances, increase engagement in treatment services, improve mental and physical health, and reduce involvement in and exposure to crime, violence, and neglect. This program approaches service delivery from a family-centered perspective, meets the multiple individual needs of the population of focus, and considers the health and well-being of the family members within the context of their families and other important relationships. SAMHSA recognizes the importance of early childhood as the foundation for healthy social and emotional development, so needs of young children must be met while serving mothers in the program. When minor children cannot reside in the treatment facility with their mother, and there are no other living arrangements available, alternative safe and appropriate accommodations for the children must be arranged in consultation with the mother.

KEY TAKEAWAYS:

SAMHSA is assisting vulnerable pregnant and postpartum women with SUDs in finding their way towards living healthier lifestyles in safer environments.

FIND MORE ON

State Pilot Grant Program for Treatment for Pregnant and Postpartum Women at:

<https://www.samhsa.gov/grants/grant-announcements/ti-17-016>

FIND MORE ON

the Services Grant Program for Residential Treatment for Pregnant and Postpartum Women at:

<https://www.samhsa.gov/grants/grant-announcements/ti-17-007>

The **CENTER OF EXCELLENCE FOR INFANT AND EARLY CHILDHOOD MENTAL HEALTH CONSULTATION** is a prevention-based service funded by SAMHSA that pairs a mental health consultant with families and adults who work with infants and young children. While the focus of the service is on childhood development, the service also provides multiple resources and support for parents, including for postpartum/maternal depression and SUDs.

SAMHSA'S PROJECT LAUNCH (Linking Actions for Unmet Needs in Children's Health) and Infant and Early Childhood Mental Health grant programs engage in a range of activities that promote strong parent-child relationships. Grantees increase knowledge about healthy infant and young child development through public education campaigns, parent training, and professional development for early childhood providers (such as child care workers, pediatricians, and home visitors). Grantees offer evidence-based parenting supports (in groups and individually); for example, Circles of Security, Incredible Years, and Triple P. These supports are offered in childcare, school, and primary care settings to be accessible and convenient for families. Grantees screen widely for maternal mental health and substance use issues and developmental problems among infants and children, and provide assessments and linkages to treatment when needed. Grantees provide dyadic (parent and child together) mental health interventions such as Child-Parent Psychotherapy and Attachment and Biobehavioral Catch-up, which are treatments designed to help parents provide nurturing care that supports and strengthens the relationship with the infant or child.

KEY TAKEAWAYS:

SAMHSA's early childhood grant programs strengthen parent-child relationships through parenting supports, screening and assessments, and evidence-based parent-child interventions.

FIND MORE ON Project LAUNCH at:

<https://healthysafechildren.org/grantee/project-launch>

In 2019, SAMHSA published an evidence-based practice guidebook focused on preventing marijuana use among women of child-bearing age. This guide supports health care providers, systems, and communities seeking to prevent marijuana use by pregnant women. It describes relevant research findings, examines emerging and best practices, identifies knowledge gaps and implementation challenges, and offers useful resources.

FIND MORE ON SAMHSA's evidence-based practice guidebook at:

<https://store.samhsa.gov/product/preventing-use-marijuana-focus-women-and-pregnancy>

SAMHSA's Technology Transfer Centers provide multiple resources for women with substance use and mental health concerns. Key documents include:

- Marijuana Use and Pregnancy – Dr. Laura Borgelt, Professor at the University of Colorado Skaggs School of Pharmacy, discusses the effects marijuana use can have on women who are pregnant, breastfeeding, the unborn child, and newborns.
- The Stigma is Real: Pregnant and Parenting Women with Substance Use Disorders – This webinar will provide an in-depth examination of the stigma women with SUDs who are pregnant and/or parenting encounter when seeking healthcare services. Strategies to reduce barriers related to stigmatizing attitudes and practices will be addressed.
- Healing Two Generations: Care for Pregnant/Parenting Women with OUD/SUD (Webinar) – This webinar, sponsored by the Northwest Addition Technology Transfer Center and the Western States Node of the National Institute on Drug Abuse Clinical Trials Network, summarized what makes women's treatment for OUD or other SUDs unique from men's treatment, and highlighted key issues when providing treatment to pregnant and parenting women with OUD and other SUDs.

FIND MORE ON
Marijuana Use and Pregnancy

<https://attcnetwork.org/centers/network-coordinating-office/product/marijuana-use-and-pregnancy>

FIND MORE ON
The Stigma is Real: Pregnant and Parenting Women with Substance Use Disorders at:

<https://attcnetwork.org/centers/mountain-plains-attc/product/stigma-real-pregnant-and-parenting-women-substance-use>

FIND MORE ON
the Healing Two Generations: Care for Pregnant/Parenting Women with OUD/SUD at:

<https://attcnetwork.org/centers/northwest-attc/product/healing-two-generations-care-pregnantparenting-women-oudsud-webinar>

SAMHSA has many publications that are specific to addressing treatment for women with OUD:

- **Healthy Pregnancy Healthy Baby Fact Sheet:** This series of four fact sheets emphasizes the importance of continuing a mother's treatment for OUD throughout pregnancy. The series includes information on OUD and pregnancy, OUD treatment, neonatal abstinence syndrome, and considerations to address before hospital discharge.
- **Opioid Use Disorder and Pregnancy:** This fact sheet gives pregnant women with OUD helpful steps to ensure they have a healthy pregnancy and a healthy baby. This resource includes information about OUD and pregnancy, and provides do's and don'ts to keep mothers and babies healthy during pregnancy.
- **Treating Babies Who Were Exposed to Opioids Before Birth:** This fact sheet talks about what pregnant women with OUD should know about and expect after the birth of their baby. This resource includes information about neonatal abstinence syndrome, babies' needs after birth, and do's and don'ts for understanding and responding to babies' needs.
- **Good Care for You and Your Baby While Receiving Opioid Use Disorder Treatment:** This fact sheet addresses the care of women with OUD and care of their babies after pregnancy. This resource includes information on managing OUD, caring for a baby, and do's and don'ts for creating a healthy environment at home.

**FIND MORE ON
the Healthy Pregnancy Healthy Baby Fact
Sheet at:**

<https://store.samhsa.gov/product/Healthy-Pregnancy-Healthy-Baby-Fact-Sheets/SMA18-5071>

**FIND MORE ON
Opioid Use Disorder and Pregnancy at:**

<https://store.samhsa.gov/product/Opioid-Use-Disorder-and-Pregnancy/SMA18-5071FS1>

**FIND MORE ON
Treating Babies Who Were Exposed to
Opioids Before Birth at:**

<https://store.samhsa.gov/product/Treating-Babies-Who-Were-Exposed-to-Opioids-Before-Birth/SMA18-5071FS3>

**FIND MORE ON
Good Care for You and Your Baby While
Receiving Opioid Use Disorder Treatment at:**

<https://store.samhsa.gov/product/Good-Care-for-You-and-Your-Baby-While-Receiving-Opioid-Use-Disorder-Treatment/SMA18-5071FS4>

- Clinical Guidance for Treating Pregnant and Parenting Women With Opioid Use Disorder and Their Infants: This Clinical Guide provides comprehensive, national guidance for optimal management of pregnant and parenting women with OUD and their infants. The Clinical Guide helps healthcare professionals and patients determine the most clinically appropriate action for a particular situation and informs individualized treatment decisions.
- A Collaborative Approach to the Treatment of Pregnant Women with Opioid Use Disorders: This manual offers best practices to states, tribes, and local communities on collaborative treatment approaches for pregnant women living with OUD, and the risks and benefits associated with medication-assisted treatment.

FIND MORE ON

Clinical Guidance for Treating Pregnant and Parenting Women With Opioid Use Disorder and Their Infants:

<https://store.samhsa.gov/product/Clinical-Guidance-for-Treating-Pregnant-and-Parenting-Women-With-Opioid-Use-Disorder-and-Their-Infants/SMA18-5054>

FIND MORE ON

A Collaborative Approach to the Treatment of Pregnant Women with Opioid Use Disorders at:

<https://store.samhsa.gov/product/A-Collaborative-Approach-to-the-Treatment-of-Pregnant-Women-with-Opioid-Use-Disorders/SMA16-4978>

ABBREVIATION LIST

ACF:	Administration for Children and Families
ACL:	Administration for Community Living
ACOG:	American College of Obstetricians and Gynecologists
ACT NOW:	Advancing Clinical Trials in Neonatal Opioid Withdrawal Syndrome
AHRQ:	Agency for Healthcare Research and Quality
AIM:	Alliance for Innovation on Maternal Health
AI/AN:	American Indian/Alaska Native
ANE-NPR:	Advanced Nursing Education Nurse Practitioner Residency Program
ASD:	Autism Spectrum Disorder
ASPE:	Office of the Assistant Secretary for Planning and Evaluation
BD-STEPS:	Birth Defects Study to Evaluate Pregnancy Exposures
BEST:	Biologics Effectiveness and Safety
BHWET:	Behavioral Health Workforce Education and Training
CADDRE:	Centers for Autism and Developmental Disabilities Research and Epidemiology
CBDRP:	Centers for Birth Defects Research and Prevention
CDC:	Centers for Disease Control and Prevention
CHAP:	Chronic Hypertension and Pregnancy
CHIP:	Children's Health Insurance Program
CLAS:	Culturally and Linguistically Appropriate Services
CMCS:	Center for Medicaid and CHIP Services
CMQCC:	California Maternal Quality Care Collaborative
CMS:	Centers for Medicare & Medicaid Services
CoIIN:	Collaborative Improvement and Innovation Network
CPAP:	Continuous Positive Airway Pressure
CQMC:	Core Quality Measures Collaborative
CSL:	Consortium on Safe Labor
CSTE:	Council of State and Territorial Epidemiologists
DPP:	National Diabetes Prevention Program
DRH:	Division of Reproductive Health
DSDR:	Data Sharing for Demographic Research
EPC:	Evidence-based Practice Centers

ERASE MM:	Enhancing Reviews and Surveillance to Eliminate Maternal Mortality Program
FASD:	Fetal Alcohol Spectrum Disorder
FDA:	Food and Drug Administration
FPL:	Federal Poverty Level
GDM:	Gestational Diabetes Mellitus
HCP LAN:	Health Care Payment Learning & Action Network
HCUP:	Healthcare Cost and Utilization Project
HHS:	U.S. Department of Health and Human Services
HIV:	Human Immunodeficiency Virus
HOPE:	Heroin Opioids and Pain Efforts
HRSA:	Health Resources and Services Administration
IAP:	Medicaid Innovation Accelerator Program
ICD:	International Classification of Diseases
ICD-9-CM:	ICD, 9th Revision, Clinical Modification
ICD-10-CM/PCS:	ICD, 10th Revision Clinical Modification/Procedure Coding System
ICPSR:	Inter-university Consortium for Political and Social Research
I/DD:	Intellectual and Developmental Disabilities
IHS:	Indian Health Service
IMD:	Institution for Mental Diseases
IMPAACT:	International Maternal, Pediatric, Adolescent AIDS Clinical Trials Network and Domestic & International Pediatric & Maternal HIV Clinical Studies Network
IQR:	Inpatient Quality Reporting
LOCATE:	Levels of Care Assessment Tool
MAT:	Medication Assisted Treatment
MAT-LINK:	Maternal and Infant Network to Understand Outcomes Associated with Treatment for Opioid Use Disorder during Pregnancy
MCH:	Maternal and Child Health
MCH FIRST:	Maternal and Child Health Field-Initiated Innovative Research Studies
MDC:	CMQCC's Maternal Data Center
MDE:	Medical Diagnostic Equipment
MDRBD:	Screening and Treatment for Maternal Depression and Related Behavioral Disorders Program
MGH:	Maternity Group Homes
State MHI:	State Maternal Health Innovation Program
MIECHV:	Maternal, Infant and Early Childhood Home Visiting
MIH:	Maternal and Infant Health

MIHOPE:	Mother and Infant Home Visiting Program Evaluation
MIPS:	Merit-based Incentive Payment System
MMRC:	Maternal Mortality Review Committees
MMRIA:	Maternal Mortality Review Information Application
MOM:	Maternal Opioid Misuse
MCH:	Maternal and Child Health
NACRHHS:	National Advisory Committee on Rural Health and Human Services
NAMCS:	National Ambulatory Medical Care Survey
NAS:	Neonatal Abstinence Syndrome
NASEM:	National Academy of Sciences, Engineering, and Medicine
NBDPS:	National Birth Defects Prevention Study
NCHS:	National Center for Health Statistics
NCHWA:	National Center for Health Workforce Analysis
NHANES:	National Health and Nutrition Examination Survey
NHCS:	National Hospital Care Survey
NHIS:	National Health Interview Survey
NIH:	National Institutes of Health
NORA:	National Occupational Research Agenda
NOW:	Newborn with Opioid Withdrawal Syndrome
NSFG:	National Survey of Family Growth
NTI:	Neonatal Abstinence Syndrome National Training Initiative
NTSV:	Nulliparous, Term, Singleton, Vertex
NVSS:	National Vital Statistics System
OASH:	Office of the Assistant Secretary for Health
OB-GYN:	Obstetrics and Gynecology
OECD:	Organisation for Economic Co-operation and Development
OMH:	HHS Office of Minority Health
OPRC:	Obstetric-Fetal Pharmacology Research Centers
OS-PCORTEF:	Office of the Secretary's Patient-Centered Outcomes Research Trust Fund
OD:	Opioid Use Disorder
PATH:	Population Assessment of Tobacco and Health
PC:	Provision of Care, Treatment and Services
PEAS:	Pregnancy Eating Attributes Study
PMSS:	Pregnancy-Related Mortality Surveillance System

PQC:	Perinatal Quality Collaborative
PRAMS:	Pregnancy Risk Assessment Monitoring System
PRCRN:	Pregnancy-Related Care Research Network
PRGLAC:	Task Force on Research Specific to Pregnant Women and Lactating Women
PRMR:	Pregnancy-Related Mortality Ratio
LAUNCH:	Linking Actions for Unmet Needs in Children's Health
QDR:	National Healthcare Quality and Disparities Report
REMS:	Risk Evaluation and Mitigation Strategy
RFI:	Request for Information
RMOMS:	Rural Maternity and Obstetrics Management Strategies Program
RPRC:	Residential Pediatric Recovery Center
SAMHSA:	Substance Abuse and Mental Health Services Administration
SBI:	Screening and Brief Intervention
SDD:	Sentinel Distributed Database
SDOH:	Social Determinants of Health
SEED:	Study to Explore Early Development
SID:	State Inpatient Databases
SIDS:	Sudden Infant Death Syndrome
SMM:	Severe Maternal Morbidity
SPPC:	Safety Program in Perinatal Care
SDY:	Sudden Death in the Young
STI:	Sexually Transmitted Infection
SUD:	Substance Use Disorder
SUID:	Sudden Unexpected Infant Death
TAF:	T-MSIS Analytic Files
TLG:	Through the Looking Glass
THCGME:	Teaching Health Center Graduate Medical Education
T-MSIS:	Transformed Medicaid Statistical Information System
UCEDD:	University Centers for Excellence in Developmental Disabilities
U.S.:	United States of America
USBC:	U.S. Breastfeeding Committee
USPSTF:	United States Preventative Services Task Force
WHO:	World Health Organization

ENDNOTES

- 1 Jacob, C., Baird, J., Barker, M., Cooper, C., & Hanson, M. (2015). The importance of a life course approach to health: chronic disease risk from preconception through adolescence and adulthood. Southampton: University of Southampton.
- 2 Alhusen, J. L., Bower, K. M., Epstein, E., & Sharps, P. (2016). Racial discrimination and adverse birth outcomes: an integrative review. *Journal of midwifery & women's health*, 61(6), 707-720.
- 3 Hoyert, D. L., & Miniño, A. M. (2020). Maternal mortality in the United States: changes in coding, publication, and data release, 2018.
- 4 Centers for disease Control and Prevention. (ND). *Pregnancy-related deaths*. Retrieved from <https://www.cdc.gov/vitalsigns/maternal-deaths/index.html>
- 5 CDC. Severe Maternal Morbidity in the United States. Available online at: <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html>.
- 6 Main, E. K., Abreo, A., McNulty, J., Gilbert, W., McNally, C., Poeltler, D., ... & Greene, N. (2016). Measuring severe maternal morbidity: validation of potential measures. *American journal of obstetrics and gynecology*, 214(5), 643-e1.
- 7 Himes, K. P., & Bodnar, L. M. (2020). Validation of criteria to identify severe maternal morbidity. *Paediatric and Perinatal Epidemiology*.
- 8 Srinivas, S. K., Fager, C., & Lorch, S. A. (2010). Evaluating risk-adjusted cesarean delivery rate as a measure of obstetric quality. *Obstetrics and gynecology*, 115(5), 1007.
- 9 Bailit, J. L. (2007). Measuring the quality of inpatient obstetrical care. *Obstetrical & gynecological survey*, 62(3), 207-213.
- 10 Barfield, W. (2019). MMRIA User Meeting IV, Atlanta Georgia.
- 11 Hoyert, D. L., & Miniño, A. M. (2020). Maternal mortality in the United States: changes in coding, publication, and data release, 2018.
- 12 Centers for disease Control and Prevention. (ND). *Pregnancy-related deaths*. Retrieved from <https://www.cdc.gov/vitalsigns/maternal-deaths/index.html>
- 13 CDC Pregnancy Mortality Surveillance System. Available online at: <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm>
- 14 Creanga, A. A., Syverson, C., Seed, K., & Callaghan, W. M. (2017). Pregnancy-related mortality in the U.S., 2011-2013. *Obstetrics and gynecology*, 130(2), 366.
- 15 CDC. Pregnancy-Related Deaths: Data from 14 U.S. Maternal Mortality Review Committees, 2008-2017. Available online at: <https://www.cdc.gov/reproductivehealth/maternal-mortality/erase-mm/mmr-data-brief.html>
- 16 Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2008-2015 with ICD-10-CM/PCS coding. www.hcup-us.ahrq.gov/sidoverview.jsp
- 17 Martin, J., Hamilton, B., Osterman, M., & Driscoll, A. (2018). Births: Final Data for 2018. *National Vital Statistics Reports*, 68(13).
- 18 World Health Organization. Caesarean sections should only be performed when medically necessary. Available online at: https://www.who.int/reproductivehealth/topics/maternal_perinatal/cs-statement/en/
- 19 Caughey, A. B., Cahill, A. G., Guise, J. M., Rouse, D. J., & American College of Obstetricians and Gynecologists. (2014). Safe prevention of the primary cesarean delivery. *American journal of obstetrics and gynecology*, 210(3), 179-193.

- 20 Kozhimannil, K. B., Law, M. R., & Virnig, B. A. (2013). Cesarean delivery rates vary tenfold among U.S. hospitals; reducing variation may address quality and cost issues. *Health affairs (Project Hope)*, 32(3), 527-535. <https://doi.org/10.1377/hlthaff.2012.1030>
- 21 Azeez, O., Kulkarni, A., Kuklina, E.V., Kim, S.Y., Cox, S. (2019). Hypertension and Diabetes in Non- Pregnant Women of Reproductive Age in the United States. *Preventing Chronic Disease*, 16(190105). DOI: <http://dx.doi.org/10.5888/pcd16.190105>.
- 22 Yücesoy, G., Özkan, S., Bodur, H., Tan, T., Çalışkan, E., Vural, B., & Çorakçı, A. (2005). Maternal and perinatal outcome in pregnancies complicated with hypertensive disorder of pregnancy: a seven year experience of a tertiary care center. *Archives of gynecology and obstetrics*, 273(1), 43-49.
- 23 Ying, W., Catov, J. M., & Ouyang, P. (2018). Hypertensive disorders of pregnancy and future maternal cardiovascular risk. *Journal of the American Heart Association*, 7(17), e009382.
- 24 Ghosh, G., Grewal, J., Mannisto, T., Mendola, P., Chen, Z., Xie, Y., & Laughon, S.K. (2014). Racial/ethnic differences in pregnancy-related hypertensive disease in nulliparous women. *Ethnicity & Disease*, 24,(3 (2014):), 283-9289.
- 25 Thiel de Bocanegra, H., Braughton, M., Bradsberry, M., Howell, M., Logan, J., & Schwarz, E.B. (2017). Racial and ethnic disparities in postpartum care and contraception in California's Medicaid program. *American Journal of Obstetrics and Gynecology*, 217(1), 47.e1-47.e7.
- 26 Kozhimannil, K. B., Trinacty, C.M., Busch, A.B., Huskamp, H.A., & Adams, A.S. (2011). Racial and ethnic disparities in postpartum depression care among low-income women. *Psychiatric Services*, 62(6), 619-625.
- 27 Petersen, E. E., Davis, N. L., Goodman, D., Cox, S., Syverson, C., Seed, K., ... & Barfield, W. (2019). Racial/ethnic disparities in pregnancy-related deaths—United States, 2007–2016. *Morbidity and Mortality Weekly Report*, 68(35), 762.
- 28 Premier (2019). Bundle of Joy: Maternal & Infant Health Trends, Trend Analysis Key Findings: <https://explore.premierinc.com/MaternalHealthTrends>
- 29 National Center for Health Statistics, National Vital Statistics System, National Vital Statistics Reports 2019, vol. 68, number 13: Births, Final Data for 2018. Available online at: https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_13-508.pdf
- 30 Indian Health Service, Maternal Mortality and Morbidity in Indian Country. Available online at: https://www.ihs.gov/sites/dccs/themes/responsive2017/display_objects/documents/IHSmaternalmortalityfsfinal.pdf
- 31 Howell, E. A., Egorova, N., Balbierz, A., Zeitlin, J., & Hebert, P. L. (2016). Black-white differences in severe maternal morbidity and site of care. *American journal of obstetrics and gynecology*, 214(1), 122-e1.
- 32 Howell, E. A., Egorova, N. N., Balbierz, A., Zeitlin, J., & Hebert, P. L. (2016). Site of delivery contribution to black-white severe maternal morbidity disparity. *American journal of obstetrics and gynecology*, 215(2), 143-152.
- 33 Howell, E. A., & Zeitlin, J. (2017). Improving hospital quality to reduce disparities in severe maternal morbidity and mortality. *Seminars in perinatology*, 41(5), 266-272. <https://doi.org/10.1053/j.semperi.2017.04.002>
- 34 Beauregard JL, Hamner HC, Chen J, Avila-Rodriguez W, Elam-Evans LD, Perrine CG. Racial Disparities in Breastfeeding Initiation and Duration Among U.S. Infants Born in 2015. *MMWR Morb Mortal Wkly Rep* 2019;68:745-748. DOI: <http://dx.doi.org/10.15585/mmwr.mm6834a3>
- 35 Hasnain-Wynia, R., Baker, D. W., Nerenz, D., Feinglass, J., Beal, A. C., Landrum, M. B., ... & Weissman, J. S. (2007). Disparities in health care are driven by where minority patients seek care: examination of the hospital quality alliance measures. *Archives of internal medicine*, 167(12), 1233-1239.
- 36 Main, E. K., Chang, S. C., Dhurjati, R., Cape, V., Profit, J., & Gould, J. B. (2020). Reduction in racial disparities in severe maternal morbidity from hemorrhage in a large-scale quality improvement collaborative. *American Journal of Obstetrics and Gynecology*.

- 37 Healthy People 2030. *Social determinants of health*. Office of Disease Prevention and Health Promotion. <https://health.gov/healthypeople/objectives-and-data/browse-objectives#social-determinants-of-health>
- 38 Braveman, P. A., Cubbin, C., Egerter, S., Williams, D. R., & Pamuk, E. (2010). Socioeconomic disparities in health in the United States: what the patterns tell us. *American journal of public health, 100 Suppl 1*(Suppl 1), S186–S196. <https://doi.org/10.2105/AJPH.2009.166082>
- 39 CDC. National Vital Statistics Reports. Births: Final Data. 2018. Available online at: https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_13-508.pdf
- 40 Sohn, H. (2017). Racial and ethnic disparities in health insurance coverage: Dynamics of gaining and losing coverage over the life-course. *Population research and policy review, 36*(2), 181-201.
- 41 Howell, E. A. (2018). Reducing disparities in severe maternal morbidity and mortality. *Clinical Obstetrics and Gynecology, 1*. <https://pubmed.ncbi.nlm.nih.gov/29346121/>
- 42 Bartel, A.P., Kim, S., Nam, J., Rossin-Slater, M., Ruhm, C. & Waldfogel, J. “Racial and ethnic disparities in access to and use of paid family and medical leave: evidence from four nationally representative datasets,” *Monthly Labor Review*, U.S. Bureau of Labor Statistics, January 2019, <https://doi.org/10.21916/mlr.2019.2>
- 43 Qobadi, M., Collier, C., & Zhang, L. (2016). The effect of stressful life events on postpartum depression: Findings from the 2009–2011 Mississippi pregnancy risk assessment monitoring system. *Maternal and child health journal, 20*(1), 164-172.
- 44 Witt, W. P., Cheng, E. R., Wisk, L. E., Litzelman, K., Chatterjee, D., Mandell, K., & Wakeel, F. (2014). Maternal stressful life events prior to conception and the impact on infant birth weight in the United States. *American journal of public health, 104*(S1), S81-S89.
- 45 Williams, D.R., Lawrence, J.A., Davis, B.A., & Vu, C. Understanding how discrimination can affect health. *Health Serv Res. 2019*;54:1374-1388. <https://doi.org/10.1111/1475-6773.13222>
- 46 Sparrenberger, F., Cicheler, F. T., Ascoli, A. M., Fonseca, F. P., Weiss, G., Berwanger, O., ... & Fuchs, F. D. (2009). Does psychosocial stress cause hypertension? A systematic review of observational studies. *Journal of human hypertension, 23*(1), 12-19.
- 47 CDC. Health, United States Spotlight: Racial and Ethnic Disparities in Heart Disease, April 2019. Available online at: https://www.cdc.gov/nchs/hsu/spotlight/HeartDiseaseSpotlight_2019_0404.pdf
- 48 CDC. Know Your Risk for Heart Disease. Available online at: https://www.cdc.gov/heartdisease/risk_factors.htm
- 49 Beckie, T. M. (2017). Ethnic and racial disparities in hypertension management among women. *Seminars in Perinatology, 41*(5), 278–286. doi: 10.1053/j.semperi.2017.04.004
- 50 Kozhimannil, K. (2014). Rural-urban differences in childbirth care, 2002–2010, and implications for the future. *Medical care, 52*(1), 4.
- 51 American College of Obstetricians and Gynecologists. (2014). Health disparities in rural women. *Committee Opinion, (586)*.
- 52 Yan, J. (2017). The effects of prenatal care utilization on maternal health and health behaviors. *Health economics, 26*(8), 1001-1018.
- 53 Platner, M., Loucks, T. L., Lindsay, M. K., & Ellis, J. E. (2016). Pregnancy-associated deaths in rural, nonrural, and metropolitan areas of Georgia. *Obstetrics & Gynecology, 128*(1), 113-120.
- 54 Kozhimannil, K. B., Hung, P., Henning-Smith, C., Casey, M. M., & Prasad, S. (2018). Association Between Loss of Hospital-Based Obstetric Services and Birth Outcomes in Rural Counties in the United States. *JAMA, 319*(12), 1239–1247. <https://doi.org/10.1001/jama.2018.1830>
- 55 HRSA Health Workforce. Types of Designations. Available online at: <https://bhw.hrsa.gov/shortage-designation/types>.

- 56 Streeter, R. A., Snyder, J. E., Kepley, H., Stahl, A. L., Li, T., & Washko, M. M. (2020). The geographic alignment of primary care Health Professional Shortage Areas with markers for social determinants of health. *PLOS One*, 15(4), e0231443.
- 57 CDC. About Rural Health. Available online at: <https://www.cdc.gov/ruralhealth/about.html>
- 58 UNC Cecil G. Sheps Center for Health Services Research. 172 Rural Hospital Closures: January 2005 – Present (130 since 2010). Available online at: <https://www.shepscenter.unc.edu/programs-projects/rural-health/rural-hospital-closures/>
- 59 Rayburn, W. F., Richards, M. E., Elwell, E. C. (2012). Drive Times to Hospitals With Perinatal Care in the United States. *Obstetrics & Gynecology*, 119(3).
- 60 CMS (2019). A Conversation on Maternal Healthcare in Rural Communities: Charting a Path to Improved Access, Quality, and Outcomes. Available at: <https://www.cms.gov/files/document/rural-maternal-health-forum-summary.pdf>
- 61 Martin, J., Hamilton, B.E., Osterman, M., Driscoll, A. K., Drake, P. (2016). Births: Final Data for 2016. *National Vital Statistics Reports*, 67(1).
- 62 NVSS. Birth Data. Available online at: <https://www.cdc.gov/nchs/nvss/births.htm>
- 63 CDC Foundation. Report from Maternal Mortality Review Committees: A Look Into Their Critical Role. Available online at: <https://www.cdcfoundation.org/sites/default/files/upload/pdf/MMRIAREport.pdf>.
- 64 Curtin, S. C., Gregory, K. D., Korst, L. M., & Uddin, S. F. (2015). Maternal Morbidity for Vaginal and Cesarean Deliveries, According to Previous Cesarean History: New Data From the Birth Certificate, 2013. *National vital statistics reports: from the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System*, 64(4), 1-13.
- 65 MacDorman, M. F., & Declercq, E. (2019). Trends and state variations in out-of-hospital births in the United States, 2004-2017. *Birth*, 46(2), 279-288.
- 66 Alliman, J., & Phillippi, J. C. (2016). Maternal outcomes in birth centers: an integrative review of the literature. *Journal of midwifery & women's health*, 61(1), 21-51.
- 67 CDC (2014). Births in the United States, 2013. *NCHS Data Brief No. 175*. Available online at: <https://www.cdc.gov/nchs/products/databriefs/db175.htm>.
- 68 CMS (2020). Strong Start for Mothers and Newborns Initiative: General Information. Available online at: <https://innovation.cms.gov/initiatives/strong-start/>
- 69 Astho Issue Brief. Utilizing Community Health Workers to Improve Access to Care for Maternal and Child Populations: Four State Approaches. Available online at: <https://www.astho.org/Maternal-and-Child-Health/AIM-Access-CHW-Issue-Brief/>
- 70 CDC. Births – Method of Delivery. Available online at: https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_13-508.pdf
- 71 Mistry, K., Fingar, K. R., & Elixhauser, A. (2016). Variation in the rate of cesarean section across U.S. hospitals, 2013: statistical brief# 211. *Healthcare cost and utilization project (HCUP) statistical briefs*. Rockville: Agency for Healthcare Research and Quality (US).
- 72 World Health Organization (2019). Maternal Mortality. Available online at: <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>
- 73 Hoyert, D. L., & Miniño, A. M. (2020). Maternal mortality in the United States: changes in coding, publication, and data release, 2018.
- 74 Rossen, L. M., Womack, L. S., Hoyert, D. L., Anderson, R. N., & Uddin, S. F. (2020). The Impact of the pregnancy checkbox and misclassification on maternal mortality trends in the United States, 1999–2017.
- 75 SID Database Documentation. Healthcare Cost and Utilization Project (HCUP). December 2019. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/db/state/sidbdbdocumentation.jsp.

- 76 HCUP NIS Database Documentation. Healthcare Cost and Utilization Project (HCUP). December 2019. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/db/nation/nis/nisdbdocumentation.jsp.
- 77 Publishing with HCUP Data. Healthcare Cost and Utilization Project (HCUP). May 2020. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/db/hcupdatapartners.jsp.
- 78 HRSA Federally Available Data (FAD) Maternal and Child Health Resource Document. Available online at: <https://mchb.tvisdata.hrsa.gov/uploadedfiles/TvisWebReports/Documents/FADResourceDocument.pdf>.
- 79 CDC. How Does CDC Identify Severe Maternal Morbidity? Available online at: <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/smm/severe-morbidity-ICD.htm>
- 80 Pierre, A. S., Zaharatos, J., Goodman, D., & Callaghan, W. M. (2018). Challenges and opportunities in identifying, reviewing, and preventing maternal deaths. *Obstetrics and gynecology*, 131(1), 138.
- 81 Wanda Barfield. MMRIA User Meeting IV, Atlanta Georgia, December 10, 2019.
- 82 Kozhimannil, K. B., Hernandez, E., Mendez, D. D., & Chapple-McGruder, T. (2019). Beyond the Preventing Maternal Deaths Act: implementation and further policy change. *Health Affairs Blog*.
- 83 Preventing Maternal Deaths Act of 2018. Available at: <https://www.congress.gov/bill/115th-congress/house-bill/1318>
- 84 Centers for Disease Control and Prevention. Erase MM Program. Available online at: <https://www.cdc.gov/reproductivehealth/maternal-mortality/erase-mm/index.html>
- 85 Gupta, M., Donovan, E. F., & Henderson, Z. (2017, April). State-based perinatal quality collaboratives: Pursuing improvements in perinatal health outcomes for all mothers and newborns. In *Seminars in perinatology* (Vol. 41, No. 3, pp. 195-203). WB Saunders.
- 86 Centers for Disease Control and Prevention. State Perinatal Quality Collaboratives. Available online at: <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pqc-states.html>
- 87 Main, E. K. (2018). Reducing maternal mortality and severe maternal morbidity through state-based quality improvement initiatives. *Clinical obstetrics and gynecology*, 61(2), 319-331.
- 88 American College of Obstetricians and Gynecologists. Alliance for Innovation on Maternal Health. Available online at: <https://www.acog.org/practice-management/patient-safety-and-quality/partnerships/alliance-for-innovation-on-maternal-health-aim>
- 89 Mahoney, J. (2018). The alliance for innovation in maternal health care: a way forward. *Clinical obstetrics and gynecology*, 61(2), 400-410.
- 90 Council on Patient Safety in Women's Health Care. Patient Safety Bundles. Available online at: <https://safehealthcareforeverywoman.org/patient-safety-bundles/>
- 91 Council on Patient Safety in Women's Health Care. AIM-Supported Patient Safety Bundles. Available online at: <https://safehealthcareforeverywoman.org/aim-supported-patient-safety-bundles/>
- 92 Health Resources and Services Administration. Maternal/Women's Health. Available online at: <https://mchb.hrsa.gov/maternal-child-health-topics/maternal-and-womens-health>
- 93 California Maternal Quality Care Collaborative. Available online at: <https://www.cmqcc.org/who-we-are>
- 94 California Maternal Quality Care Collaborative. CA-PAMR (Maternal Mortality Review). Available online at: <https://www.cmqcc.org/research/ca-pamr-maternal-mortality-review>
- 95 Main, E. K., Markow, C., & Gould, J. (2018). Addressing maternal mortality and morbidity in California through public-private partnerships. *Health Affairs*, 37(9), 1484-1493.
- 96 California Maternal Quality Care Collaborative. Maternal Data Center. Available online at: <https://www.cmqcc.org/maternal-data-center>

- 97 CMQCC: What We Do. Available online at: <https://www.cmqcc.org/about-cmqcc/what-we-do>
- 98 California Maternal Quality Care Collaborative. CA-PAMR (Maternal Mortality Review). Available online at: <https://www.cmqcc.org/research/ca-pamr-maternal-mortality-review>
- 99 Centers for Medicare and Medicaid Services. Strong Start for Mothers and Newborns Initiative: General Information. Available online at: <https://innovation.cms.gov/initiatives/strong-start/>
- 100 Dubay, L., Hill, I., Garrett, B., Blavin, F., Johnston, E., Howell, E., ... & Cross-Barnet, C. (2020). Improving Birth Outcomes And Lowering Costs For Women On Medicaid: Impacts Of ‘Strong Start For Mothers And Newborns’ An evaluation of the federal Strong Start for Mothers and Newborns program’s impact on birth outcomes and costs for Medicaid-covered women. *Health Affairs*, 39(6), 1042-1050.
- 101 Medicaid and CHIP Payment and Access Commission (2019). Medicaid Payment Initiatives to Improve Maternal and Birth Outcomes. Available online at: <https://www.macpac.gov/wp-content/uploads/2019/04/Medicaid-Payment-Initiatives-to-Improve-Maternal-and-Birth-Outcomes.pdf>
- 102 Diabetes Prevention Program Research Group. (2015). Long-term effects of lifestyle intervention or metformin on diabetes development and microvascular complications over 15-year follow-up: the Diabetes Prevention Program Outcomes Study. *The lancet Diabetes & endocrinology*, 3(11), 866-875.
- 103 CMS Maternal & Infant Health Quality Improvement. (2019). Improving Postpartum Care: State Projects Conducted through the Postpartum Care Action Learning Series and Adult Medicaid Quality Grant Program. Available online at: <https://www.medicaid.gov/medicaid/quality-of-care/downloads/postpartum-als-state-projects.pdf>
- 104 HHS Office of the Assistant Secretary for Planning and Evaluation (2019). The Special Diabetes Program for Indians: Estimates of Medicare Savings. Available online at: <https://aspe.hhs.gov/pdf-report/special-diabetes-program-indians-estimates-medicare-savings>
- 105 Bullock, A., Sheff, K., Moore, K., Manson, S. Obesity and overweight in American Indian and Alaska Native children, 2006-2015. *American Journal of Public Health* 2017;107:1502-1507
- 106 Bursell, S.E., Fonda, S.J., Lewis D.G., Horton, M.B. (2018). Prevalence of diabetic retinopathy and diabetic macular edema in a primary care-based teleophthalmology program for American Indians and Alaska Natives. *PLoS ONE* 2018;13(6):e0198551.
- 107 Agency for Healthcare Research and Quality. Data Spotlight: Hospital admissions for uncontrolled diabetes improving among American Indians and Alaska Natives. AHRQ Publication No. 18(19)-0033-7-EF. December 2018. Available online at: <https://www.ahrq.gov/sites/default/files/wysiwyg/research/findings/nhqdr/dataspotlight-aian-diabetes.pdf>

A photograph of a smiling woman with dark curly hair holding a baby. The image is overlaid with a blue tint. The woman is wearing a patterned shirt, and the baby is wearing a striped tank top.

ACKNOWLEDGEMENTS:

This report is dedicated to all the women who have lost their lives giving the gift of life and to all the women who will give the gift of life in the years to come.

Special thanks goes to Dawn Alley Ph.D., Andre Chappel Ph.D. (chief author), Nancy De Lew, Dorothy Fink M.D., Brendan Fulmer, Annie Hollis, Rachel Kellogg BSN, RN, Caryn Marks, Sarada Pyda Ph.D., Sarah Sugar, Janet Wright M.D., and many others from across the Department who worked tirelessly on this report to improve maternal health in the United States.

