CHAPTER 2
Maternal, Infant, and Child Health

Maternal, Infant, and Child Health

This chapter presents information about trends, disparities and resources related to maternal, infant, and child health in Massachusetts.

This chapter addresses the following topics:

- Infant Health
- Child Health
- Children and Youth with Special Health Care Needs
- Women's Health
- Selected Resources, Services, and Programs

Chapter Data Highlights

- Preterm births are declining, but disparities remain
- The infant mortality rate is the lowest in the nation, but disparities remain
- Among pregnant women enrolled in addiction treatment, opioids are the most common substance used in the past year
- Childhood overweight and obesity are declining, but disparities remain
- Receipt of adequate prenatal care is down for all racial and ethnic groups
- Massachusetts has the lowest teen birth rate in the US, but disparities remain

Overview

Health outcomes for women, infants, and children in Massachusetts are some of the best in the nation; however, some racial, ethnic, and socioeconomic disparities persist.

Massachusetts devotes substantial resources to protecting and improving the health of these populations, offering nearly 50 programs and services targeted at pregnant women, infants, and children.

Infant Health

Infant mortality is the best indicator of the health and well-being of a community or state, because the same biological, social, economic, and environmental risk factors that contribute to infant health also affect the health of the broader population.

MDPH tracks and responds to trends and disparities in infant health with a multi-faceted approach that includes preventive services, screening programs, and intervention strategies.

Preterm Birth

Preterm birth refers to the birth of an infant that occurs before the 37th week of gestation. Preterm birth is a major contributor to infant mortality; two-thirds of all infant deaths occur among infants born preterm.[56] Preterm birth is also a major cause of infant morbidity and long-term neuro-developmental and behavioral disabilities, particularly if the birth occurs before 34 weeks of gestation.[57] Additionally, infants who are born preterm are more likely to be re-hospitalized in the first year of life.[58]

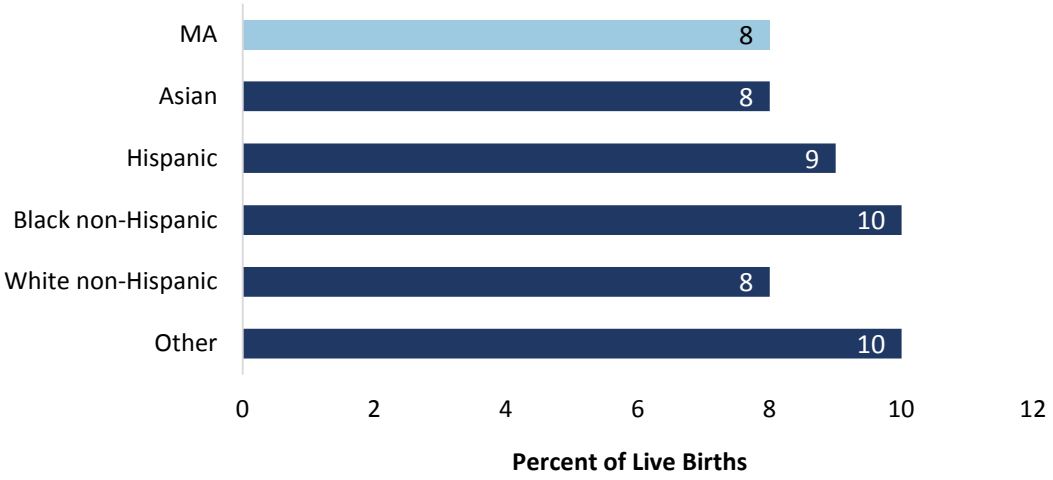
Women of lower socioeconomic status, those who receive poor care during pregnancy, and those of younger or older ages are at increased risk of preterm birth. Other risk factors for preterm birth include elevated stress in the second trimester; behavioral risk factors such as smoking, drug use, or alcohol consumption; heavy physical labor; malnutrition; obstetric history including a previous preterm birth and multiple births; and pregnancy complications in the current pregnancy.[59, 60, 61, 62]

Trends/Disparities

From 2006 to 2015, the proportion of preterm births in Massachusetts before 34 weeks declined by 0.6%. Late preterm births (between 34-36 weeks of gestation) comprised 72% of all preterm births. In 2015, preterm birth was highest among Black non-Hispanics, followed by Hispanics, Asian non-Hispanics, and White non-Hispanics **(Figure 2.1)**.

Figure 2.1

Percent of Live Births That Were Preterm Births, By Race/Ethnicity, 2015



NOTE: *OTHER* INCLUDES AMERICAN INDIAN AND OTHER NOT SPECIFIED

Breastfeeding

Breastfeeding has proven benefits for both mothers and infants. Breastfeeding lowers the incidence of sudden infant death syndrome (SIDS); infant respiratory infections; and necrotizing enterocolitis, a serious intestinal disease among infants.[63] Exclusive and extended breastfeeding is also associated with reduced risk of obesity, certain cancers, and diabetes.[64]

Many low-income mothers, including many who receive support from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), need to return to work earlier than higher income women. This makes it difficult for them to continue breastfeeding.

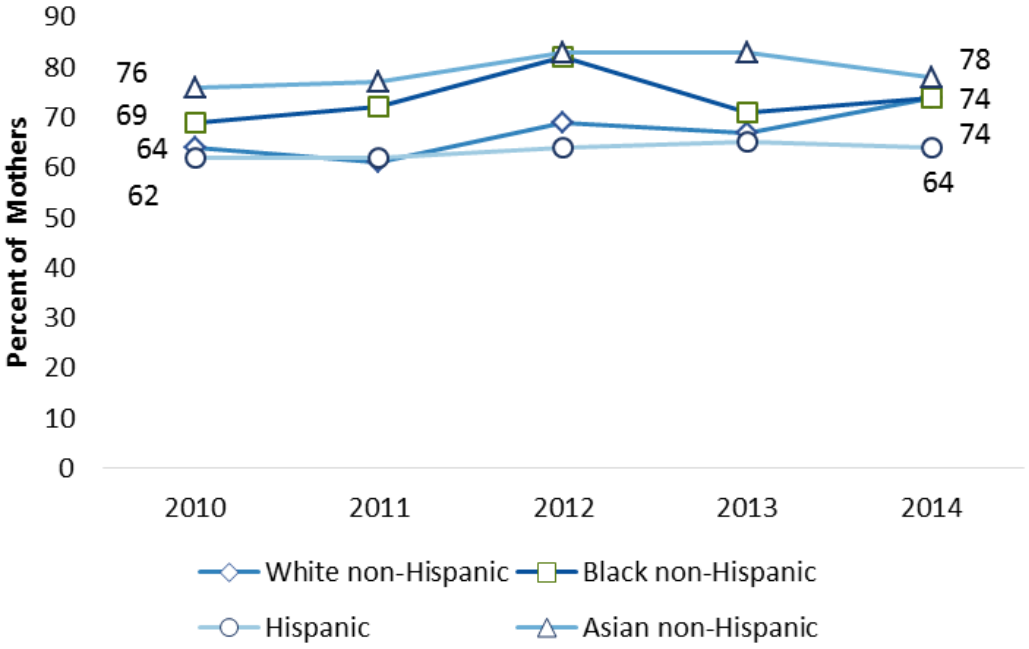
Trends/Disparities

According to Massachusetts birth certificate records, breastfeeding at the time of hospital discharge increased from 83% in 2011 to 87% in 2015. In 2015, Asian non-Hispanic women (92%) had the highest prevalence of breastfeeding initiation, followed by Black non-Hispanic (88%), Hispanic (87%), and White non-Hispanic women (86%).

Breastfeeding at eight weeks postpartum, as measured on the Massachusetts Pregnancy Risk Assessment Monitoring System (PRAMS) survey, increased from 65% in 2010 to 73% in 2014. Over this period, Asian non-Hispanic women maintained the highest prevalence of any breastfeeding at eight weeks postpartum **(Figure 2.2)**.

Figure 2.2

Any Breastfeeding at Eight Weeks Postpartum, By Race/Ethnicity, 2010-2014



There also are important socioeconomic disparities in breastfeeding. According to Massachusetts PRAMS survey estimates, in 2014 only 59% of mothers with MassHealth were breastfeeding at eight weeks postpartum, compared with 81% of mothers with private health insurance.

Additionally, data from the 2016 National Immunization Survey indicate that only 28% of WIC participants in Massachusetts were breastfeeding at six months postpartum, compared to 68% of Massachusetts mothers overall, falling short of the Healthy People 2020 goal of 60.6%.

Infant Mortality

Infant mortality refers to the death of an infant prior to one year of age. The infant mortality rate (IMR) is calculated as the number of infant deaths per 1,000 live births.

The decline in the US infant mortality rate during the 20th century is one of the country's greatest public health victories. However, currently 25 other developed nations have a lower IMR than the US.[65,66]

Trends/Disparities

While Massachusetts has achieved a 2.6% annual decline in the IMR from 2005 to 2014 and currently has the lowest IMR in the nation, racial/ethnic disparities persist. In 2014, the IMRs for Black non-Hispanics and Hispanics were 2.1 and 1.5 times that of White non-Hispanic infants, respectively **(Figure 2.3)**.

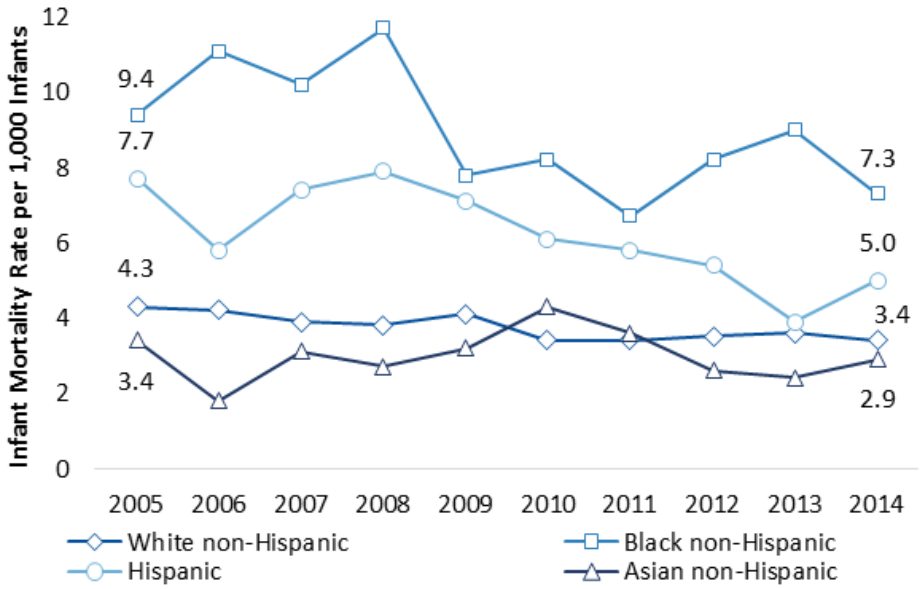
IMRs also vary by city or town. In 2014, the communities of Fitchburg (9.9 per 1,000 live births), Chelsea (8.5 per 1,000), and Worcester (7.4 per 1,000) had some of the highest IMRs in the state.

Disparities in infant mortality result from differential developmental pathways shaped by early life experiences and cumulative wear and tear on the body as an individual is exposed to repeated or chronic stress over time.

To reduce disparities in birth outcomes and infant mortality, MDPH is addressing differential exposures to risk factors not only during pregnancy but over the life course.

Figure 2.3

Infant Mortality Rate by Race/Ethnicity, Massachusetts, 2005-2014



Perinatal Substance Exposure

Substance use disorder can negatively affect maternal and child health and place substantial burden on federal and state health and human service systems. Risks to children prenatally exposed to substances and/or exposed to parental addiction in the home can include adverse developmental, behavioral, and psychosocial outcomes.[67]

Women who use substances may experience health risks from these substances and accompanying behaviors. They may also experience stress while interacting with health care providers, child welfare agencies and the criminal justice system.[68]

Trends/Disparities

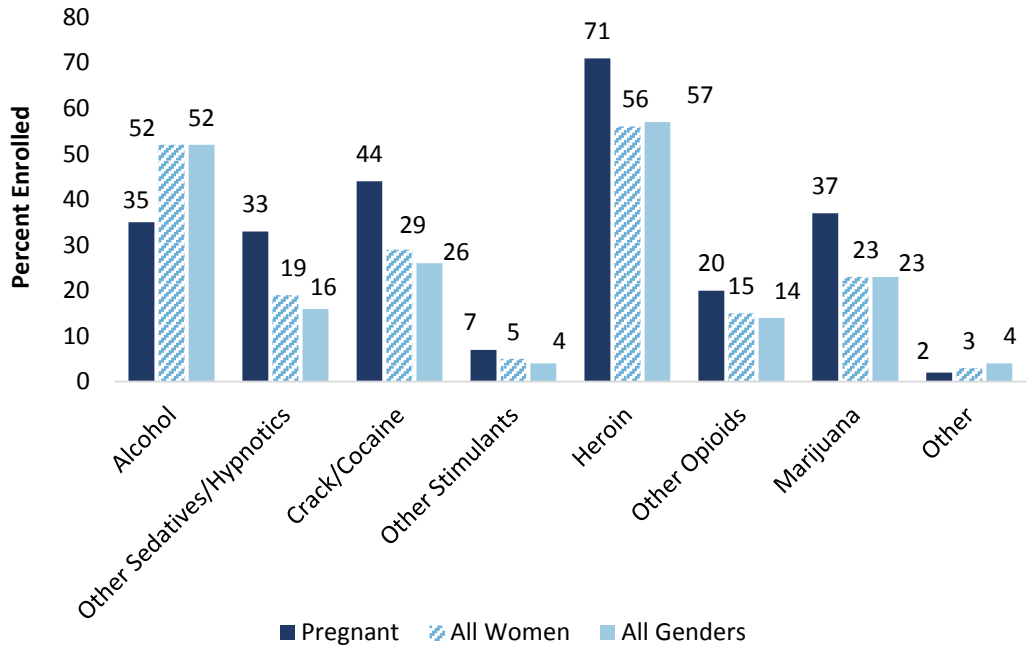
Substance use disorders affect pregnant women across Massachusetts, but the burden varies by region. For example, Charlton Memorial Hospital in Fall River, St. Luke's Hospital in New Bedford, Cape Cod Hospital in Hyannis, Melrose-Wakefield Hospital in Melrose, and Berkshire Medical Center in Pittsfield have the highest rates of infants diagnosed with neonatal abstinence syndrome, a collection of symptoms related to substance exposure in the womb that can include low birth weight, respiratory distress, feeding difficulty, tremors, increased irritability, diarrhea, and seizures.[69]

Across the Commonwealth, mothers with opioid use disorder are more likely to be younger than 30 years of age, White non-Hispanic, US-born, unmarried, unemployed, of low educational attainment, receiving prenatal care at a hospital clinic, and covered by MassHealth.[70]

In 2016, among pregnant women enrolled in the Bureau of Substance Addiction Services (BSAS) treatment system, opioids, including pain relieving medications and heroin, were the most common substance used in the past year. Seventy-one percent of pregnant women reported use of heroin and 20% reported use of other opioids **(Figure 2.4)**. Crack/cocaine use was reported by 44%, marijuana use by 37% and alcohol use by 35% of pregnant women.

Figure 2.4

Bureau of Substance Addiction Services Enrollees Reporting Past Year Use, by Substance, 2016



NOTE: BSAS TREATMENT DATA DO NOT INCLUDE WOMEN WHO BECOME PREGNANT WHILE IN TREATMENT AND DO NOT REFLECT ALL TREATMENT PROGRAMS IN THE STATE.

Sudden Unexpected Infant Death

MDPH classifies sudden unexpected infant death (SUID) as the death of an infant less than one year of age due to sudden infant death syndrome (SIDS), accidental suffocation and strangulation in bed, or from an undetermined cause and manner.

Unsafe infant sleep practices, including placing infants to sleep on their stomachs or sides or in places other than cribs/bassinets/play yards -- such as adult beds, baby slings, car seats, couches or armchairs -- are known modifiable risk factors for SUID.[71] Preterm birth is also a risk factor[72] along with prenatal and secondhand smoke exposure,[73] low access to prenatal care,[74] prenatal substance use,[75] soft bedding,[76] parental alcohol use,[77] and overheating.[78] In addition to supine sleep position, firm sleep surface, and separate sleep space, known protective factors for SUID include breastfeeding,[79] pacifier use,[80] and parental exposure to educational interventions.[81]

Trends/Disparities

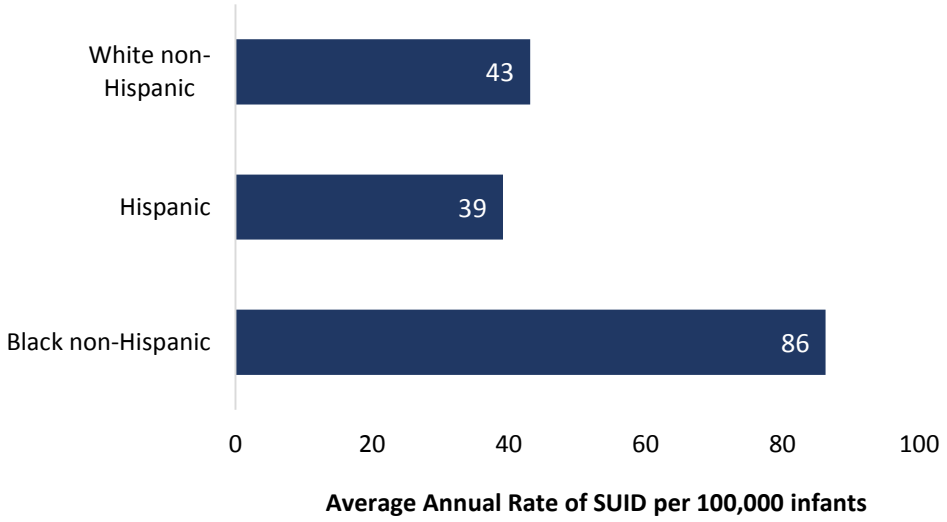
SUID rates decreased in Massachusetts during the 10-year period from 2005 to 2014. The three-year average annual SUID rate in Massachusetts declined 24.2%, from 54.2 per 100,000 infants in 2005-2007 to 41.1 per 100,000 infants in 2012-2014.

Yet despite this overall reduction in SUID, racial and ethnic disparities persist. The five-year average annual SUID rate (2010-2014) among Black non-Hispanic infants was two times the rate of White non-Hispanic infants **(see Figure 2.5)**.

According to data from MA PRAMS, while the prevalence of supine (back) sleep positioning has increased from 77% in 2010 to 85% in 2014, disparities persist as well. For example, in 2014, fewer WIC participants (76%) placed their infant on his/her back to sleep compared with non-WIC participants (90%). Further, Black non-Hispanic (70%) and Hispanic (74%) infants had a lower prevalence of supine sleep position than White non-Hispanic infants (91%).

Figure 2.5

Average Annual Rate of Sudden Unexpected Infant Death (SUID), by Race/Ethnicity, 2010-2014



Child Health

A child's physical, social, and emotional health has important implications for health later in life.[82] As children develop, they have unique health care needs and may require specialized services and interventions. Protecting and promoting the health of children and adolescents is a key mission of MDPH as the Commonwealth's Title V Maternal and Child Health Block Grant Agency.

Nutrition

Healthy eating in childhood and adolescence is important for proper growth and development and the prevention of various health conditions including cancers and heart disease.[83,84] Additionally, poor diet can increase the risk of obesity.[85] Childhood obesity has important implications for the physical and emotional well-being of children and youth. Children who are obese are more likely to develop risk factors for chronic disease early in life, such as high blood sugar, high triglycerides, and high blood pressure. Children who are obese are also more likely to develop chronic diseases,

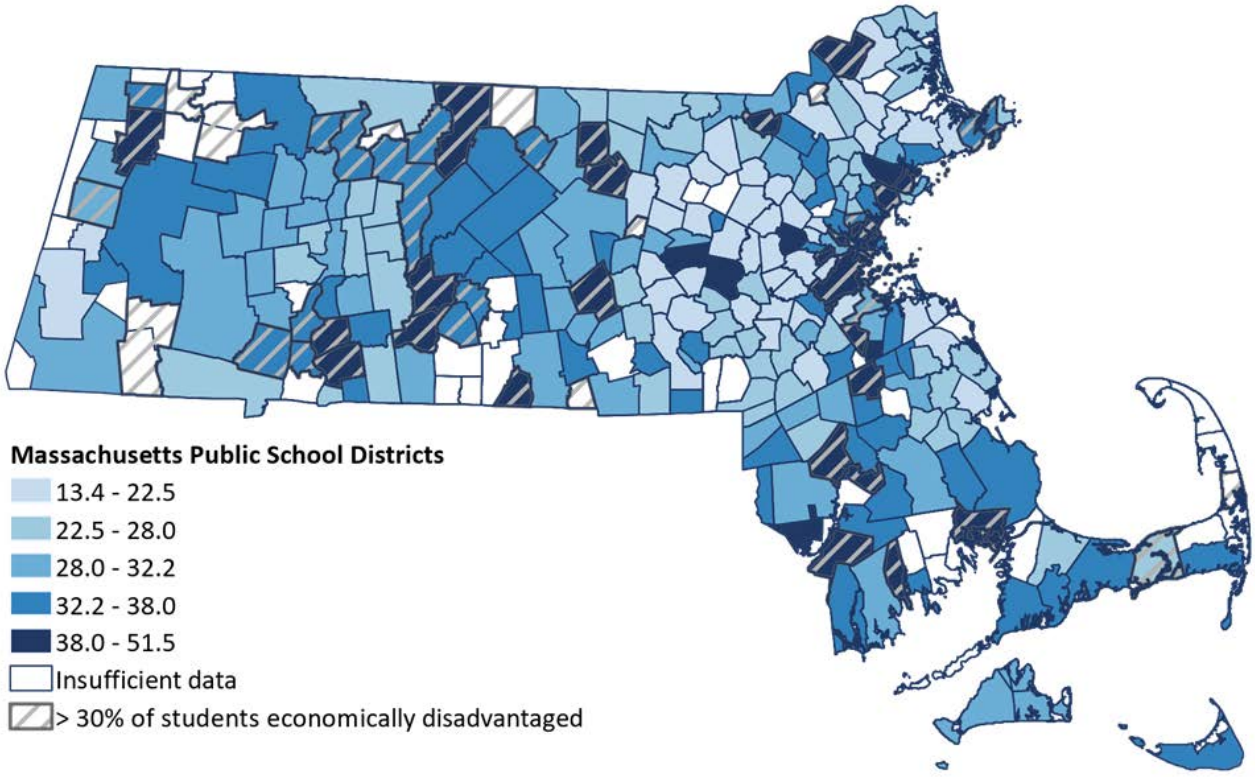
such as type 2 diabetes, before becoming adults. In addition, children who are obese are more likely to experience bullying and weight-based discrimination.[86]

Trends/Disparities

Body mass index (BMI) screening data in Massachusetts indicate that the prevalence of overweight and obesity declined across the Commonwealth, from 34% in 2009 to 32% in 2015. While school districts with higher median household incomes (>$37,000) experienced significant reductions in the prevalence of overweight and obesity during this period, data from 2014-2015 show that districts with lower median household incomes have disproportionally higher prevalence of overweight and obesity **(see Figure 2.6)**.

Figure 2.6

Prevalence of Overweight and Obesity among Public School Children, Massachusetts Public School Districts, School Year 2014-2015



Social/Emotional Health

Emotional well-being is shaped by a variety of factors, including biological factors, life experiences, family and community supports, education, and environmental factors. Social connections are an important source of support for children and adolescents that can buffer the effects of stress, connect children with resources, and shape health behaviors.[87] Early detection and intervention to address social and emotional risk factors can greatly improve outcomes

for children and adolescents. Promoting emotional wellness and social connectedness across the life course is a Title V priority for MDPH, including during early childhood and adolescence.

Trends/Disparities

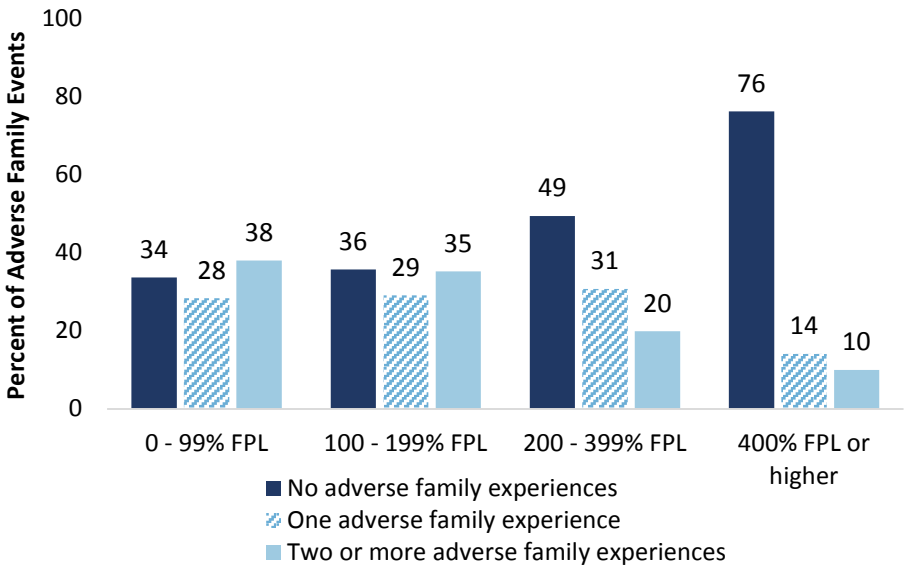
Massachusetts data show an increase in the proportion of high school students who reported feeling sad or hopeless, from 22% in 2013 to 27% in 2015.[88]

Among Massachusetts high school students, in 2015 racial, ethnic, and sexual minority students were less likely to report supportive relationships with adults in their family or at school. During the same time period, 65% of high school students who identified as gay, lesbian, or bisexual reported having a parent or adult with whom they could talk about important matters compared with 84% of students who identified as heterosexual.[89]

Children from households with incomes below the federal poverty level were 1.9 and 3.8 times as likely to experience two or more adverse family experiences as children in households with incomes 200-399% of the federal poverty level and those with household incomes ≥400% of the federal poverty level, respectively **(Figure 2.7)**.

Figure 2.7

Prevalence of Adverse Family Experiences among Children 17 Years and Younger, by Federal Poverty Level, 2011-2012



SOURCE: NATIONAL SURVEY OF CHILDREN'S HEALTH

Immunizations

Immunizations are the cornerstone of communicable disease prevention and have led to the elimination of many diseases in the US. Immunizing children against diseases such as whooping cough, measles, mumps, and chickenpox before they enter kindergarten remains critical. Human papillomavirus (HPV) vaccination for all pre-teens (11-12 years old) is alsoan important primary prevention strategy against a variety of cancers, particularly cervical cancer. Increasing skepticism about vaccines in certain communities in the US has led to a resurgence of domestic outbreaks of diseases like measles. Social norms surrounding vaccination are important for encouraging parents to vaccinate their children.

Trends/Disparities

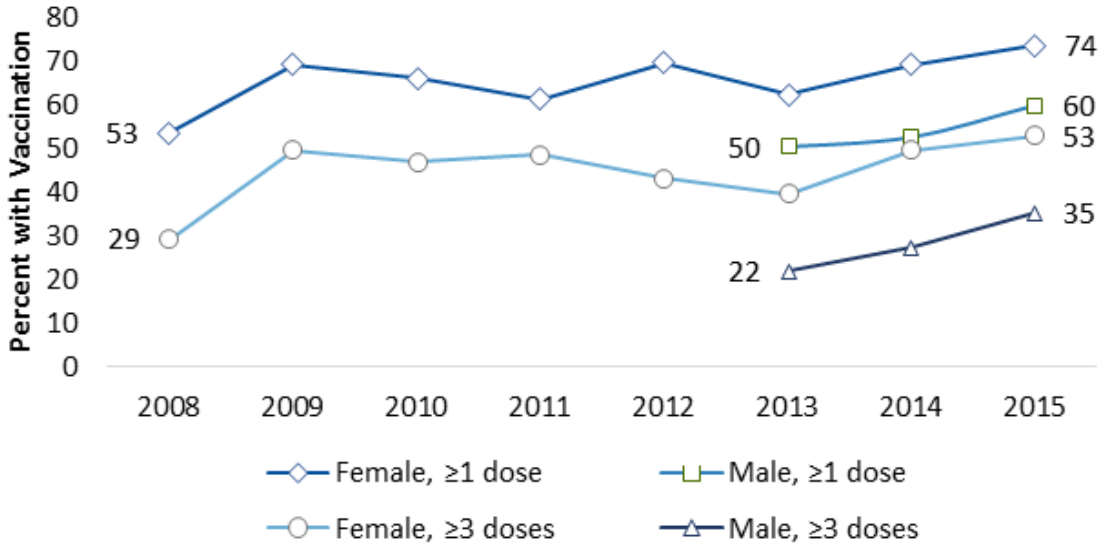
Since 2011, the proportion of children in Massachusetts meeting vaccination requirements before entering kindergarten has increased. In 2015-2016, Massachusetts met or surpassed the Healthy People 2020 goal of 95% coverage for MMR, DTP/DTaP/DT, varicella, hepatitis B, and polio vaccines.

From 2008 to 2015, HPV vaccination coverage increased among female Massachusetts teenagers 13-17 years old from 53% to 74% receiving at least one dose and from 29% to 53% for those receiving three doses **(Figure 2.8)**. As of December 2016, Centers for Disease Control and Prevention (CDC) recommends two doses of HPV vaccine for 11-12 year-olds who initiate the series between 9 and 14 years of age – rather than the previously recommended three doses.[90]

Male teens have lower HPV vaccination rates compared to female teens. Between 2013 and 2015, HPV vaccination coverage increased among male Massachusetts teenagers 13-17 years old from 50% to 60% receiving at least one dose **(Figure 2.8)**.

Figure 2.8

Human Papillomavirus Vaccination Coverage among Massachusetts Teenagers Aged 13 to 17 Years, by Gender, 2008-2015



SOURCE: NATIONAL IMMUNIZATION SURVEY – TEEN

NOTE: THE HPV VACCINE WAS NOT RECOMMENDED FOR MALES UNTIL 2011 AND COVERAGE ESTIMATES PRIOR TO 2013 ARE NOT AVAILABLE FOR MALES. USE OF A 2-DOSE SCHEDULE FOR 11-12 YEAR-OLDS WHO INITIATE THE SERIES BETWEEN 9-14 YEARS OF AGE WAS RECOMMENDED IN DECEMBER 2016, REPLACING THE PREVIOUS 3-DOSE RECOMMENDATION.

Immunizing teenagers against meningococcal disease helps prevent outbreaks in schools, dormitories, and other densely populated settings. Meningococcal vaccine coverage among Massachusetts teenagers (13-17 years old) has increased from 56% in 2008 to 90% in 2015.[91]

Children and Youth with Special Health Care Needs

Children and youth with special health care needs (CYSHCN) include those who have or are at increased risk for a chronic physical, developmental, behavioral or emotional condition and who also require health-related and other services beyond that required by children generally.[92]

In 2009-2010, the National Survey of Children with Special Health Care Needs (NS-CSHCN) indicated that approximately 18% of Massachusetts children from birth to 17 years have a special health care need. Among them, 48% had two or more of 18 listed chronic health conditions and 3% had complex conditions that led to 11 or more missed school days and required at least two medications daily.[93]

In the NS-CSHCN, 28% of parents reported reducing work hours or stopping work altogether to care for their children and youth with special health care needs. Further, one in three (34%) families with health insurance had coverage that was not sufficient to meet their children's needs and one in four (25%) families had incomes below 200% of the federal poverty level.

Family engagement -- the intentional practice of working with families toward positive outcomes across the life course -- is increasingly recognized as a key strategy to improve systems of care, health care quality, and safety for CYSHCN. Strategic family engagement is at the core of the vision, mission, and activities of the MDPH Division for Children and Youth with Special Health Care Needs.

Care within a Medical Home

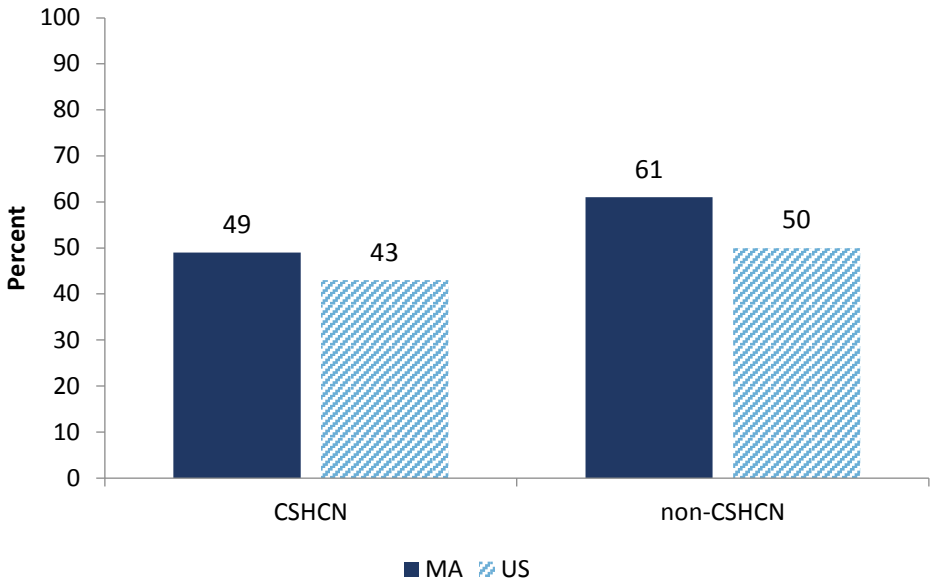
The medical home is a model of delivering primary care that is accessible, continuous, comprehensive, family-centered, coordinated, compassionate, and culturally sensitive to every child and adolescent.[94] To meet medical home criteria, CYSHCN from birth to age 17 should have a personal doctor or nurse, a usual source of care, and family-centered care, referrals, and care coordination if needed. Access to a pediatric medical home is associated with increased quality of care, improved health outcomes, and decreased unmet medical needs.[95] Medical homes for CYSHCN have a positive impact on reducing health care costs through decreased utilization of unnecessary services, such as visits to the emergency department and inpatient hospitalizations.

Trends/Disparities

The National Survey of Children's Health (NSCH) has provided population-based estimates of the proportion of children connected to a medical home since 2003 from three administrations: 2003, 2007, and 2011/12. The newly-revised 2016 NSCH results are similar to medical home estimates from previous years, indicating that only about half (49%) of Massachusetts CYSHCN receive care in a medical home, lower than their counterparts without special health needs (61%) **(Figure 2.9)**.

Figure 2.9

Percentage of Massachusetts Children Receiving Care in a Medical Home, By Special Health Care Need Status, 2016



SOURCE: NATIONAL SURVEY OF CHILDREN'S HEALTH

Future NSCH data for Massachusetts CYSHCN will enable monitoring of statewide estimates of medical home connection according to insurance coverage, income level, and race/ethnicity, using 2016 data as the new baseline.

Support for Effective Care Transition

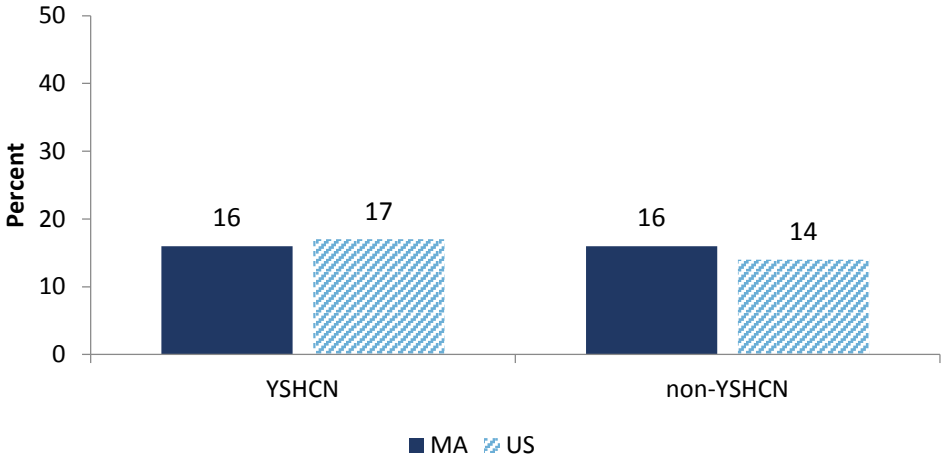
The transition of youth between 12 to 17 years of age with special health care needs (YSHCN) to adulthood has become a priority nationwide.[96] More than 90% of YSHCN now live to adulthood but are less likely than non-YSHCN to complete high school, attend college, or be employed. Health and health care are cited as two of the major barriers to successful transitions.

Trends/Disparities

The NSCH defines the components of a successful transition as whether the health care provider actively worked with the youth to think about and plan for the future, make positive choices about the future, gain skills to manage health and health care, and understand the changes in health care that happen at age 18. According to 2016 NSCH data, only 16% of Massachusetts YSHCN received the services necessary to transition to adult health care compared to only 17% of US YSHCN **(Figure 2.10)**.

Figure 2.10

Percentage of Massachusetts Children who Received Services Necessary to Make Transitions to Adult Health Care, By Special Health Care Need Status, 2016



SOURCE: NATIONAL SURVEY OF CHILDREN'S HEALTH

As mentioned above for the medical home estimate, future administrations of the NSCH will enable monitoring of statewide estimates of health care transition with 2016 data serving as the new baseline.

Women's Health

Poor maternal health is associated with adverse child health outcomes with implications for neonatal survival, birth weight, cognitive development, child behavior, school performance, and adult health and productivity.[97,98,99,100,101,102] It is important to provide opportunities for deliberate family planning and to promote the health of mothers before, during, and after childbirth. Reducing preventable maternal morbidity and mortality can improve health outcomes for mothers and infants and is critical to the promotion of health across the lifespan.[103]

Access to Routine Preventive Care and Personal Health Care Provider

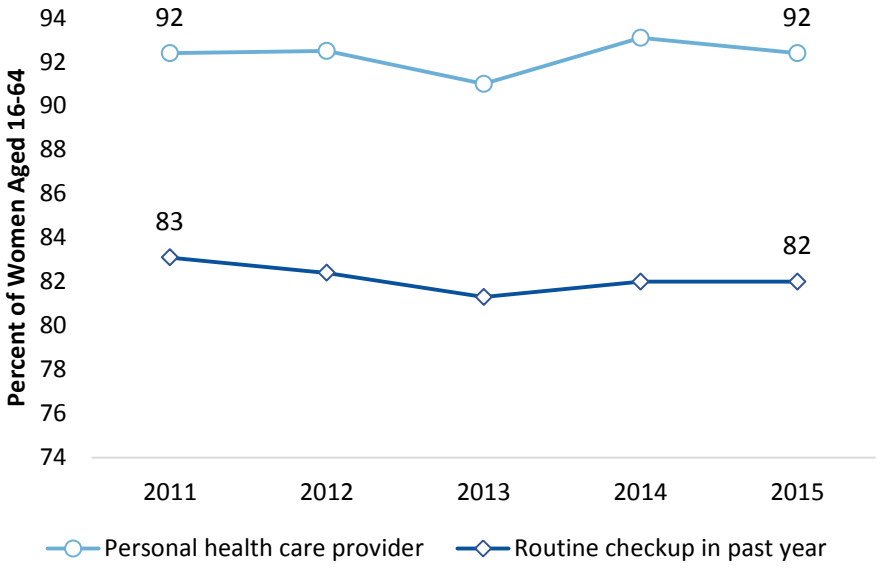
Increasing access to preventive health care remains a longstanding public health goal.[104,105] Women's preventive health care services provide an opportunity to screen for high blood pressure; high cholesterol; breast, cervical, and colorectal cancers; depression; gonorrhea and chlamydia; diabetes; HIV and human papilloma virus; substance use and misuse; obesity; and intimate partner violence.[106]

Trends/Disparities

From 2011 to 2015, the proportion of women reporting a personal health care provider and a routine check-up in the past year remained stable **(Figure 2.11)**. In 2015, 82% of women had a routine check-up in the past year and 92% had a personal health care provider. Hispanic women were significantly less likely than White non-Hispanic women to have a personal health care provider, even after adjusting for age (87% vs. 93%). Black non-Hispanic women were the most likely to receive a routine check-up in the past year, significantly more likely than White non-Hispanic women when adjusting for age (87% vs. 80%).

Figure 2.11

Women's Access to a Personal Health Care Provider and Routine Check-Up Visit by Year, Massachusetts, 2011-2015



Prenatal Care

Prenatal care is one of the most frequently used preventive health care services in the US.[107] Prenatal care is important for preventing maternal mortality and morbidity as well as infant mortality by allowing for detection and management of potential complications. Prenatal care also provides a setting for health education and behavioral interventions.

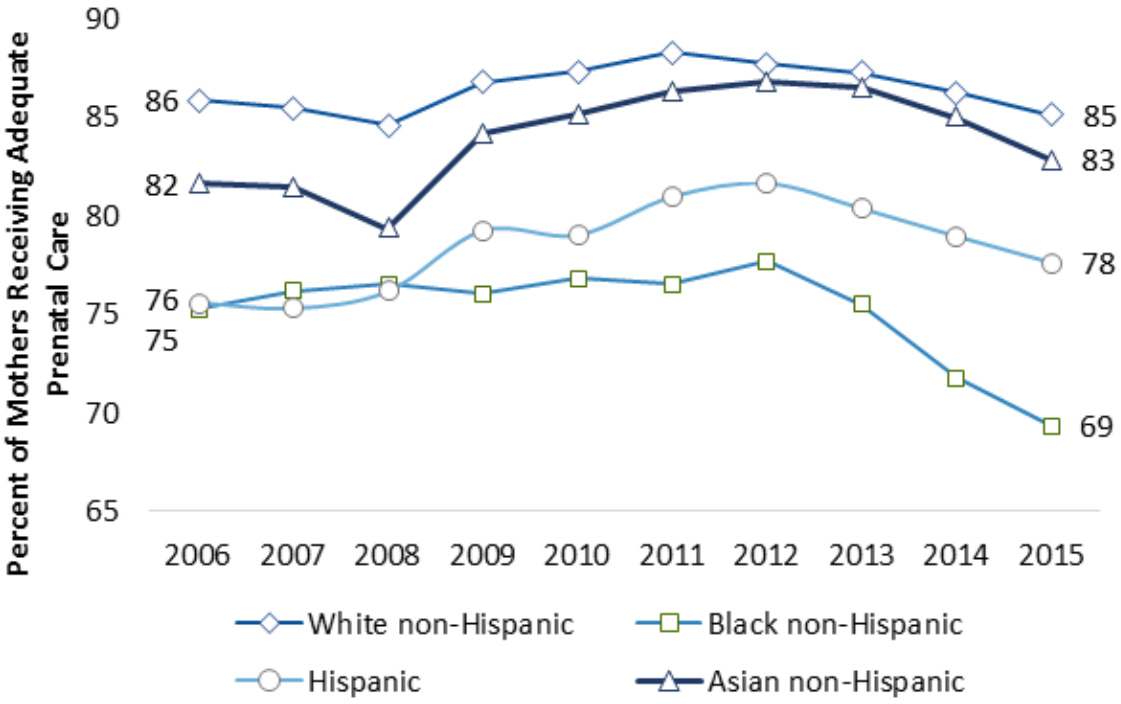
Trends/Disparities

MDPH measures the adequacy of prenatal care utilization by considering gestational age, number of prenatal health care visits completed, and timing of entry into prenatal care.

The proportion of Massachusetts mothers receiving adequate prenatal care has long exceeded the national Healthy People 2020 goal of 78% **(Figure 2.12)**. While the prevalence of adequate prenatal care improved from 2006 to 2012, it has declined from 2012 to 2014.

Figure 2.12

Trends in Adequacy of Prenatal Care, by Race/Ethnicity, Massachusetts, 2006-2015



Persistent disparities remain in the percentage of mothers receiving adequate prenatal care by race/ethnicity. While the percentage declined during 2012-2014 in all racial and ethnic groups, the largest decline occurred among Black non-Hispanic mothers. The underlying causes are complex and multifactorial.

Initiation of prenatal care services during the first trimester has declined over the last decade in Massachusetts. Findings from the 2011 PRAMS survey indicate that about 10% of mothers reported not receiving prenatal care as early as they had wanted. Among those who did not receive prenatal care as early as wanted and entered prenatal care after the first trimester of pregnancy, the top four reasons included: not knowing about the pregnancy (24%); not having a MassHealth card (14%); lack of money or insurance (14%); and lack of transportation, childcare, or inability to take time off from work or school (13%).

Pregnancy Intention

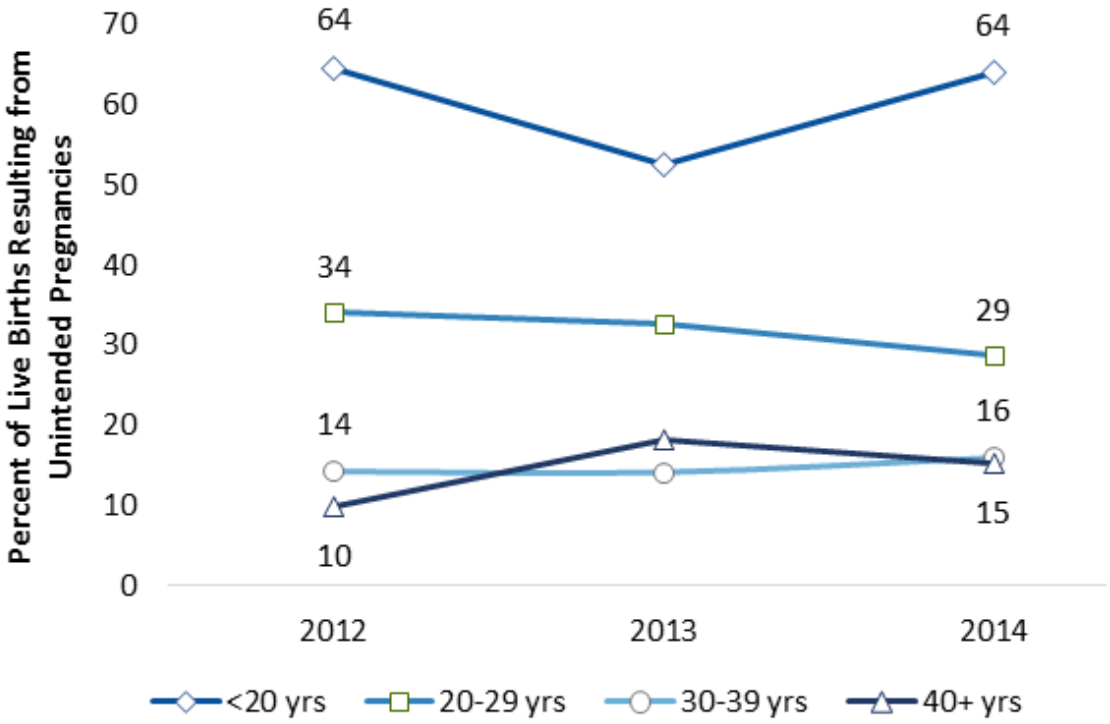
Women's control over their own fertility, through access to contraception and family planning, is crucial for advancing their opportunities for higher education and employment.[108] Unintended pregnancy is associated with inadequate prenatal care, substance use during pregnancy, and low birth weight.[109,110,111,112]

Trends/Disparities

Massachusetts Behavioral Risk Factor Surveillance System (BRFSS) data indicate that during 2012-2014, 21% of women 18 to 44 years of age had an unintended pregnancy. Trends in unintended pregnancy have remained relatively stable over this period. Among women who had a live birth from 2012 to 2014, women less than 20 years of age had a higher prevalence of unintended pregnancy than older women **(Figure 2.13)**.

Figure 2.13

Trends in Unintended Pregnancies Resulting in a Live Birth by Maternal Age, Massachusetts, 2012-2014



Additionally, in 2014 women with MassHealth coverage (32%) were twice as likely as women with private health insurance (16%) to have an unintended pregnancy that resulted in a live birth. In 2014, Black non-Hispanic and Hispanic women were 2.3 and 1.7 times as likely as White non-Hispanic women to have an unintended pregnancy resulting in a live birth, respectively.

Teen Pregnancy

Adolescent childbearing is associated with lower educational attainment for teen mothers and fathers.[113,114] Children of teen parents are also more likely to experience a range of adverse health outcomes, including low birth weight, infant mortality, and barriers to educational attainment and employment.[115] With appropriate support and access to services, teen parents can complete their education, successfully achieve employment, and provide for their children.[116]

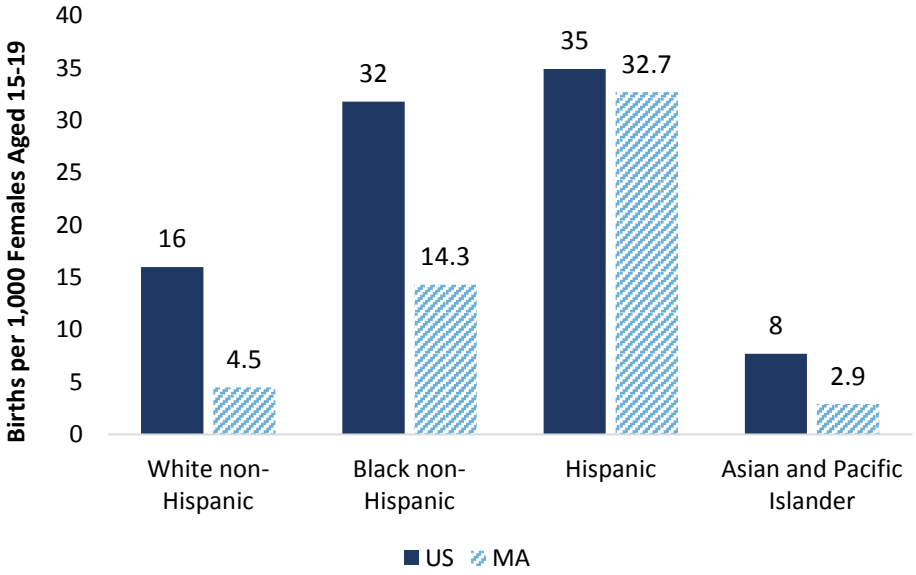
Trends/Disparities

Teen birth rates have been declining across the US and in Massachusetts. While teen birth rates have been declining in all racial/ethnic groups, in 2015 Hispanic teens 15-19 years of age were still seven times as likely to give birth as White non-Hispanic teens **(Figure 2.14)**.

In 2015, lesbian, gay, and bisexual high school students were three times as likely to report ever having been pregnant or gotten someone pregnant, compared to heterosexual students.[117] In 2015, the communities of Holyoke, Southbridge, Chelsea, Lawrence, Lynn, New Bedford, Springfield, Fall River, Fitchburg, West Springfield, and Brockton had teen birth rates that exceeded the state average.

Figure 2.14

Teen Birth Rates, by Race/Ethnicity, US and Massachusetts, 2015



Postpartum Depression

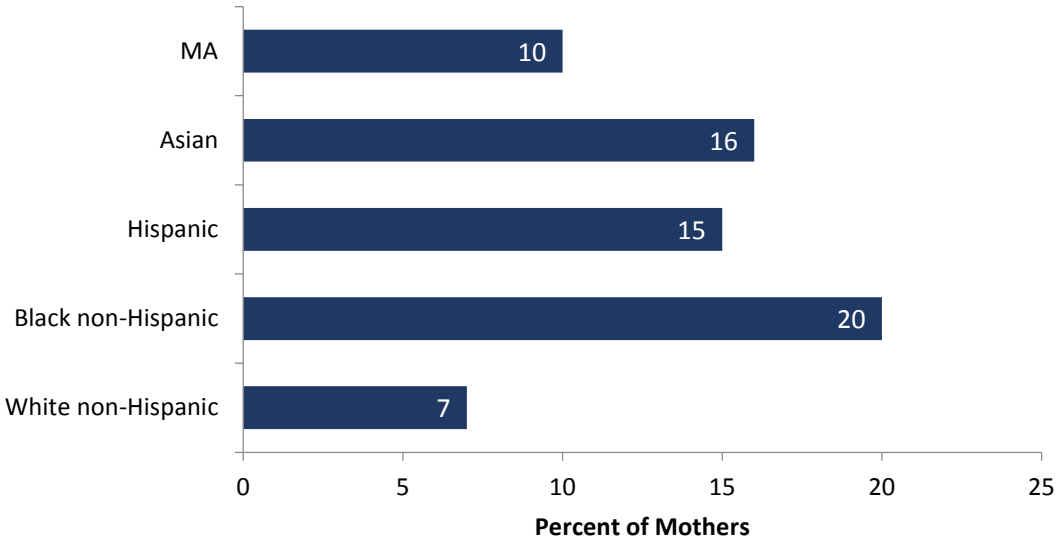
Postpartum depression is a mood disorder that can affect women after childbirth. Mothers with postpartum depression experience feelings of extreme sadness, anxiety, and exhaustion that may make it difficult for them to complete their daily activities.[118] Postpartum depression can be a serious and debilitating condition for new mothers, affecting both maternal and infant health, and potentially interfering with infant development and mother-child bonding.[119,120] Screening for and early detection of depression are important to ensure women receive timely and appropriate treatment.

Trends/Disparities

Data from Massachusetts PRAMS indicate that the percentage of new mothers reporting depressive symptoms in the postpartum period decreased from 12% in 2012 to 10% in 2014. However, racial and ethnic disparities in the prevalence of postpartum depressive symptoms exist. Mothers who are non-Hispanic black (20%), Asian (16%) or Hispanic (15%) had higher prevalence of postpartum depressive symptomology than non-Hispanic white mothers (7%) **(Figure 2.15)**. Women with household incomes at 100% of the federal poverty level or lower were twice as likely to report postpartum depressive symptoms (16%) as women with incomes above 100% of the federal poverty level (8%).

Figure 2.15

Postpartum Depression Symptoms, by Race/Ethnicity, Massachusetts, 2014



Severe Maternal Morbidity

Severe maternal morbidity (SMM) includes unexpected outcomes of labor and delivery that result in significant short or long-term consequences to a woman's health. While maternal deaths are extremely rare in Massachusetts, SMM events are more common and, similar to the national trend, the rate of SMM is on the rise. Studying SMM events is crucial for identifying close calls and improving obstetric care.

Several co-morbidities including obesity, diabetes, and heart disease are associated with increased risk for delivery complications.[121] These chronic conditions are intimately linked with the built environment and social and economic factors.

Trends/Disparities

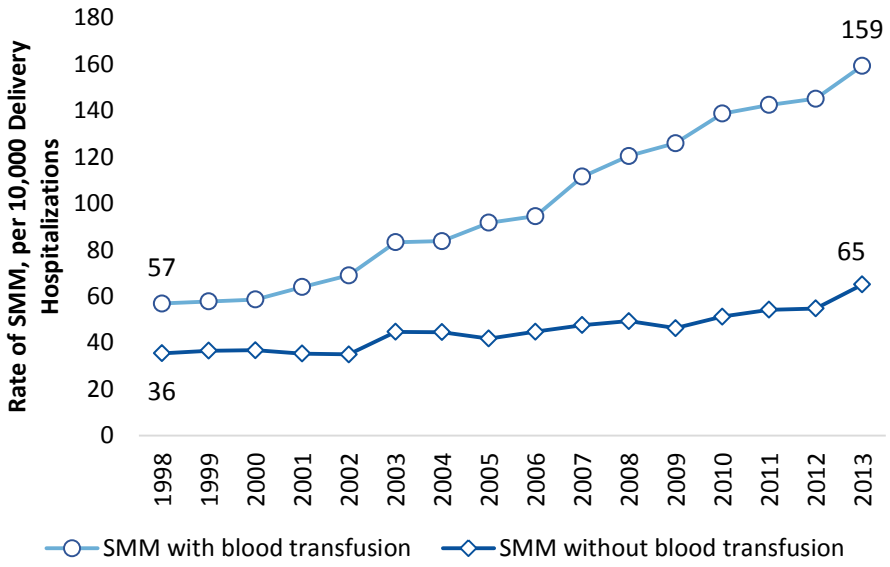
Massachusetts monitors SMM using hospital discharge data to identify 25 indicators associated with life-threatening events or life-saving procedures. Women who received blood transfusions account for the greatest percentage of women with SMM. Because the procedure code for blood transfusion does not include information on the number of units transfused, it is difficult to judge the severity of hospitalizations with only that indication. Therefore rates of SMM are typically examined both with and without transfusion codes to better assess trends over time.

The rate of SMM including blood transfusion increased 179%, from 57 per 10,000 delivery hospitalizations in 1998 to 159 per 10,000 delivery hospitalizations in 2013 **(Figure 2.16)**.

The rate of SMM not including blood transfusion increased 81%, from 36 per 10,000 delivery hospitalizations in 1998 to 65 per 10,000 delivery hospitalizations in 2013.

Figure 2.16

Severe Maternal Morbidity (SMM) Rate, With and Without Blood Transfusion, By Year, 1998-2013



From 1998-2013, Black non-Hispanic women (175 per 10,000 hospitalizations) had twice the rate of SMM including blood transfusion during delivery hospitalization as White non-Hispanic women (83 per 10,000 hospitalizations). Over this same period, SMM rates were higher among older women (40-44 years of age: 163 per 10,000 hospitalizations) than younger women (20-24 years of age: 93 per 10,000 hospitalizations) and for women with MassHealth (122 per 10,000 hospitalizations) compared with women with private health insurance (84 per 10,000 hospitalizations). These patterns were similar when comparing women without blood transfusions.

Pregnancy-Associated Mortality

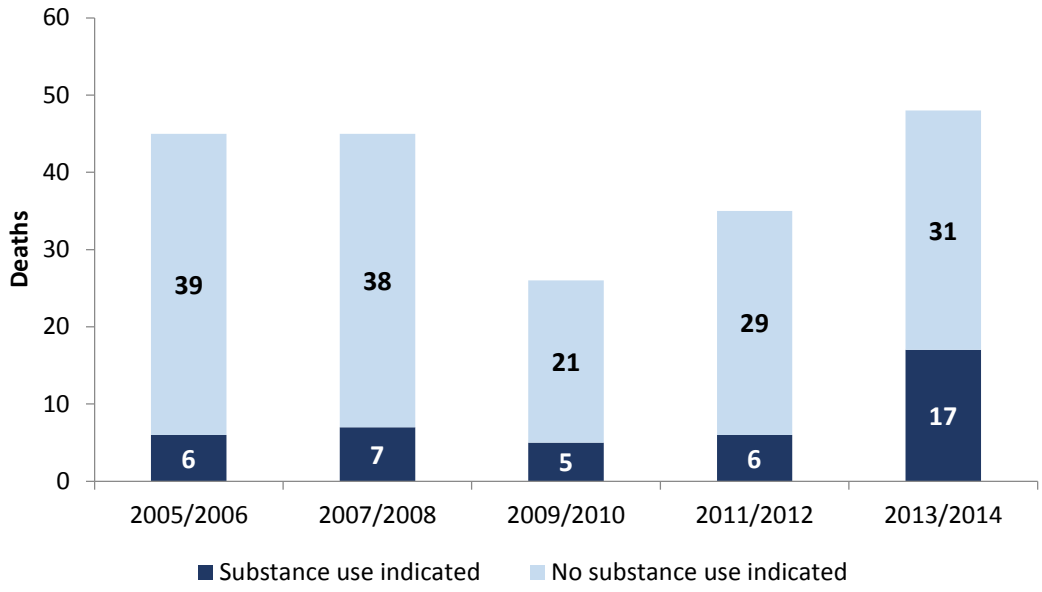
A pregnancy-associated death is the death of a woman while pregnant or within a year of the end of pregnancy from any cause, including obstetric causes (e.g., postpartum hemorrhage), non-traditional obstetric causes (e.g., suicide in the setting of postpartum depression), and accidental or injury-related causes such as opioid overdose months after delivery.

Trends/Disparities

The biennial proportion of pregnancy-associated deaths with any indication of substance use has increased from 13.3% in 2005/2006 to 35.4% in 2013/2014, reflecting the effects of the growing opioid epidemic in Massachusetts and nationwide **(Figure 2.17)**. During 2000-2007, Black non-Hispanic women were twice as likely to experience pregnancy-associated death compared to White non-Hispanic women.[122] Additionally, compared to women who had private health insurance, those with MassHealth were almost three times as likely to experience a pregnancy-associated death.[123]

Figure 2.17

Pregnancy-Associated Deaths with Any Indication of Substance Use in Massachusetts, 2005-2014



NOTE: INDICATION OF SUBSTANCE USE INCLUDES ANY MENTION OF SUBSTANCE USE ON THE DEATH CERTIFICATE AND IS NOT LIMITED TO OVERDOSE DEATHS

Selected Resources, Services, and Programs

Following are selected resources, services, and programs that support the topics discussed in this chapter.

Infant Health

- The Neonatal Quality Improvement Collaborative (NeoQIC) of Massachusetts is an organization of health care providers and institutions to support quality improvement in the health care of newborns through the open sharing of information and practices
- The Infant Mortality Collaborative Improvement and Innovation Network (IM CoIIN) is a national movement of federal, state and local leaders, public and private agencies, professionals, and communities to employ quality improvement, innovation, and collaborative learning to reduce infant mortality and improve birth outcomes
- The Massachusetts WIC Program provides prenatal nutrition counseling, breastfeeding support and education, and advances the professional development of WIC staff to increase availability of expert lactation care for participants
- The Massachusetts Maternal, Infant and Early Childhood Home Visiting (MA MIECHV) Program and the Early Intervention Partnerships Program (EIPP) provide education, intervention, and referrals to improve breastfeeding initiation and duration rates to high risk mothers/infants
- The Welcome Family Program provides a universal, one-time nurse home visit to caregivers with newborns in five Massachusetts communities (Boston, Fall River, Lowell, Holyoke and Springfield), including breastfeeding education and related referrals as needed
- The Massachusetts Breastfeeding Coalition supports hospitals that promote breastfeeding and assists hospitals to become Baby Friendly based on a core set of evidence-based maternity care practices that support positive breastfeeding outcomes
- The NeoQIC Human Milk Quality Improvement Collaborative project brings together Massachusetts Neonatal Intensive Care Units (NICU) to increase the percentage of very low birth weight infants that receive their mother's own milk throughout their hospitalization
- Baby Cafes are a free drop-in resource for pregnant and breastfeeding mothers to get support from International Board Certified Lactation Consultants (IBCLCs) and Certified Lactation Counselors (CLCs) and to share experiences with other mothers
- MDPH and other state agencies are working together to address the current opioid crisis and its impact on perinatal populations. Current activities include:
    - Forming the Massachusetts Interagency Task Force on Newborns with neonatal abstinence syndrome (NAS) and Substance-Exposed Newborns to inventory services, identify, and address gaps
    - Participating in the Policy Academy to Improve Outcomes for Pregnant and Postpartum Women with Opioid Use Disorders, and their Infants, Families and Caregivers sponsored by SAMHSA and led by the National Center on Substance Abuse and Child Welfare[124]
    - Committing $3.5 million for eligible birthing hospitals to develop and/or enhance programs designed to improve care for infants with NAS and for women in treatment for opioid use disorder during and after pregnancy
    - Selecting substance use as a priority for Title V, the major federal block grant that funds maternal and child health programs, and selecting as the state performance measure the percentage of infants diagnosed with NAS in Massachusetts hospitals who are receiving EI services

    - SAMHSA continues to fund grant programs to expand medication-assisted treatment and peer support for pregnant women with opioid use disorder, and to provide peer and clinical parenting support through recovery centers in the Commonwealth
- MDPH collaborated with numerous stakeholders to develop an Infant Safe Sleep Policy aligned with the American Academy of Pediatrics (AAP) 2011 safe sleep guidelines
- Massachusetts IM CoIIN team has worked to improve infant safe sleep practices through modeling safe sleep at Massachusetts birthing hospitals; training home visitors to counsel their clients on safe sleep; training local WIC office staff; revising the Department of Early Education and Care's safe sleep training for child care providers; and training NICU staff to implement safe sleep practices in NICUs
- Birthing Hospital Safe Sleep Forums were held with the goal of increasing awareness of SUID and infant safe sleep among labor and delivery staff
- A Sudden Unexplained Infant Death investigation database is used by state and municipal police officers to collect information on the circumstances of sudden unexpected deaths among children less than 3 years of age

Child Health

- The Massachusetts WIC Nutrition Program offers children a healthy food package containing whole grains, low-fat dairy, fruits, and vegetables and provides caregivers with nutrition counseling and education to help them choose and prepare healthy foods. WIC also promotes the Farmers' Market Coupon Program, through which approximately 20,000 WIC participants receive $20 in Farmers' Market coupons to use through the growing season
- Massachusetts school nurses are required to screen students in grades, 2, 4, 7 and 10 for healthy weight
- Massachusetts Project LAUNCH is a program to ensure early childhood mental health prevention practices are integrated into pediatric primary care practices to support families with children identified by primary care providers as showing early signs of social and emotional difficulties or who experience risk factors known to lead to poor social and emotional development outcomes (located in Springfield, Worcester, and Chelsea)
- Massachusetts Early Childhood Comprehensive Systems (MECCS) develops systems-level approaches to promote young children's emotional wellness
- Massachusetts Early Intervention Program provides screening and services from birth to age three years to improve social emotional skills (including social relationships)
- The Vaccines for Children (VFC) Program is a federal program that provides vaccines free of cost for children whose parents cannot afford them

Children and Youth with Special Health Care Needs

- The Massachusetts Title V Division for Children and Youth with Special Health Needs (DCYSHN) Community Support Line at 1-800-882-1435 provides information, technical assistance and resources to families of CYSHN and providers serving them
- The Division of Children and Youth with Special Health Care Needs offers a variety of programs to support CYSHN and their families such as Care Coordination, the Catastrophic Illness in Children's Relief Fund, Family TIES, MassCARE, MASSTART, Pediatric Palliative Care Network, Universal Newborn Hearing Screening, and several others
- Through a federally-funded Systems Integration Project, MDPH has developed an interactive searchable online platform for families of CYSHN and professionals to access reliable resources and services for CYSHN and their families
- Since 2010, MassHealth requires behavioral health screening for children and youth less than 21 years of age as part of the Early and Periodic Screening, Diagnosis, and Treatment Program

- Massachusetts has mandatory private health insurance coverage for the diagnosis and treatment of Autism Spectrum Disorder (ASD)
- The 2016 Massachusetts Healthy People 2020 Autism Roadmap report serves as a blueprint for better data collection and monitoring across the system of care serving children and youth with ASD and other developmental disabilities and their families in Massachusetts[125]

Women's Health

- The Massachusetts Maternal Mortality and Morbidity Review Committee reviews all pregnancy-associated deaths and makes recommendations to improve clinical practice, health care systems, and public health in Massachusetts
- The Massachusetts Perinatal Quality Collaborative is a voluntary organization of Massachusetts birthing hospitals and key perinatal stakeholders that focuses on quality improvement initiatives to reduce pregnancy-related mortality by reducing obstetric complications
- Massachusetts WIC Program conducts screening of all pregnant and postpartum participants by nutrition staff to assess utilization of prenatal care and provides referrals to health care providers
- The Massachusetts Maternal, Infant, and Early Childhood Home Visiting Program and the Early Intervention Partnerships Program contract with local agencies to conduct community outreach to pregnant women to encourage early enrollment into programs for women at risk of late entry to prenatal care
- The Boston Healthy Start Initiative provides services to self-identifying Black non-Hispanic and Hispanic women in three Boston neighborhoods in which disparities in birth outcomes are most pronounced
- The Sexual and Reproductive Health Program provides counseling on reproductive life planning and promotes access to all FDA-approved contraceptive methods while focusing on geographic areas with adverse reproductive health outcomes
- Through in and out of school settings the MDPH Adolescent Sexuality Education (ASE) Program partners with community-based organizations to deliver evidence-based sexuality education, educational programming backed by preliminary research, and youth development programming for youth aged 11-19 build connectedness with a trusted adult
- The Personal Responsibility Education Program (PREP) works with community-based organizations to deliver evidence-based sexuality education in middle school, high school, and out of school settings
- The Massachusetts Pregnant and Parenting Teens Initiative (MPPTI) supports multidisciplinary teams to provide wrap-around services for pregnant and parenting teens
- Postpartum Depression (PPD) regulations require health care providers to report their data to MDPH annually if they conduct a PPD screen using a validated screening tool during a clinical encounter with a postpartum woman
- MDPH home visiting programs screen women prenatally and postpartum for depression utilizing a validated screening tool and provide education, brief intervention, and referral to treatment as needed
- Effective May 16, 2016, MassHealth began paying for the administration of standardized depression screening during pregnancy and the postpartum period

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