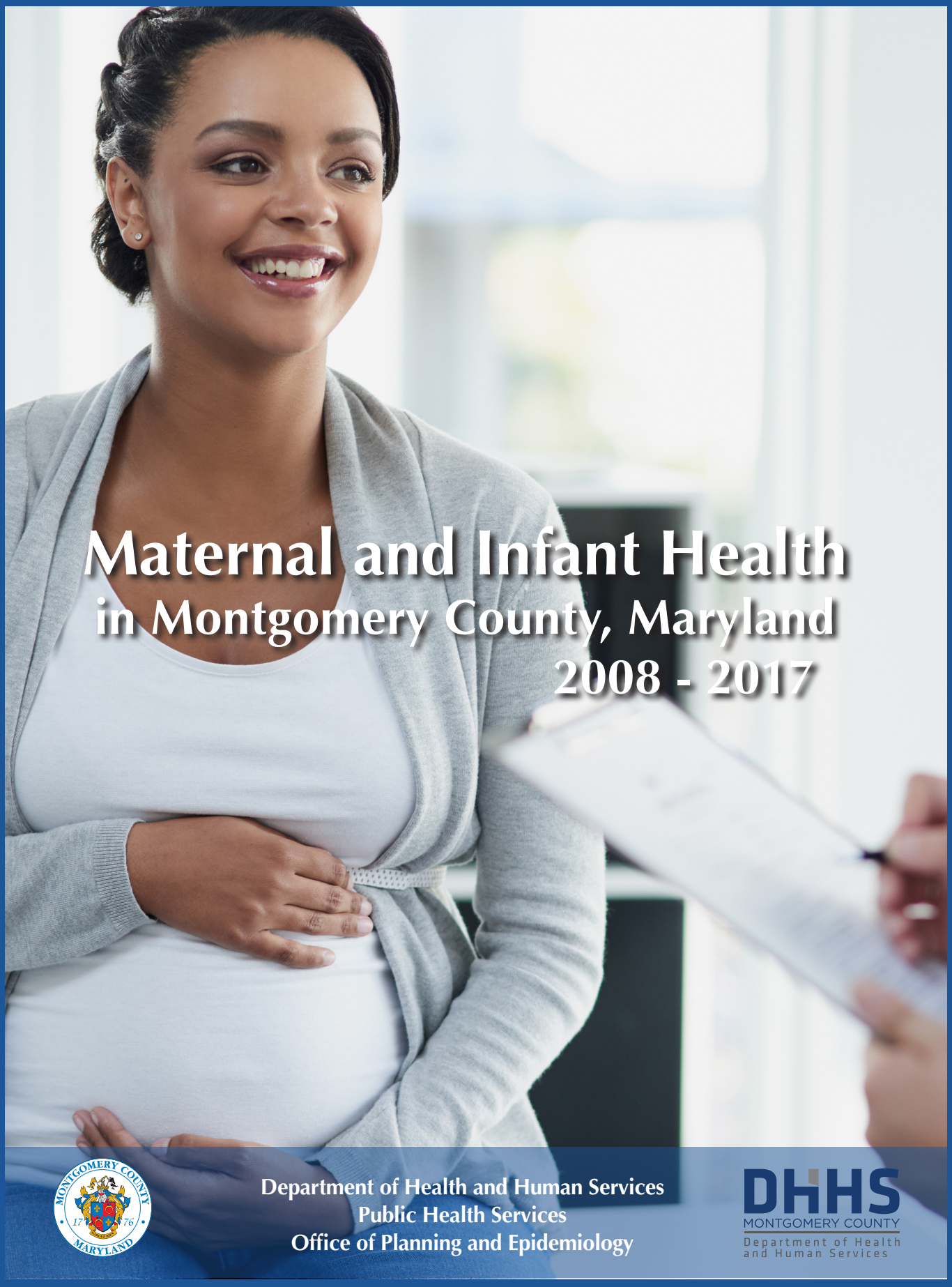

Maternal and Infant Health
in Montgomery County, Maryland
2008 - 2017

Department of Health and Human Services
Public Health Services
Office of Planning and Epidemiology

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HEALTH OFFICER'S MESSAGE

Dear Residents:

The importance of Maternal and Infant Health cannot be overemphasized as it determines the health of the next generation and can help predict future public health challenges for families, communities, and the health care system. Improving maternal and infant health and preventing mortality requires on-going consideration of the evolving continuum of reproductive health across the life span, from prior to conception through the first year of life and throughout the childbearing years. Surveillance is a fundamental component of public health practice. Our task is to disseminate this information in a clear, digestible manner, so that the data can be used to drive practice innovation, policy analysis, preventative methods, health promotion messages, and planning activities related to public health.

This report highlights the maternal and infant health in Montgomery County. Overall, Montgomery County performs better than state and national averages related to maternal and infant health indicators. However, great disparities of pregnancy-related outcomes among population subgroups on race/ethnicity are of particular concern. Though a decreasing trend is observed for severe maternal morbidity (e.g. severely complicated pregnancies and deliveries), population subgroups such as non-Hispanic Blacks and Hispanics experienced 60% and 46% greater risks respectively than their non-Hispanic White counterpart. Additionally, this report highlights Department of Health and Human Services programs and efforts that play a significant role in providing education and services to County residents to reduce adverse pregnancy-related outcomes and improve maternal and infant health in the County.

Sincerely,

Travis Gayles, MD, PhD
County Health Officer

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EXECUTIVE SUMMARY

Overall, Montgomery County performs better than state and national averages related to maternal and infant health indicators. A closer examination of the overall averages, however, reveals great disparities of pregnancy-related outcomes among population subgroups based on race/ethnicity and geographic areas. It is critical to highlight these areas, to better target efforts and resources to meet the evolving needs of a changing population in the County. The major findings of maternal and infant health topics examined in this report are summarized below.

Demographic and Social Determinants

1) The County's population is becoming more diverse over time; the percentages of NH-Black, Asian/Pacific Islander, and Hispanic residents have increased while the NH-White population is decreasing.

2) In 2016 an increasing percentage of families are living in poverty in the County; however, the County's overall level (4.7%) is lower than Maryland's (6.8%) and much lower than that of the U.S. (11.0%); the Hispanic and NH-Black groups had the highest poverty levels.

Births

1) Adolescent birth rates in Montgomery County are decreasing over the years, the County has consistently lower rates than Maryland and the U.S.

2) Hispanics have the highest adolescent birth rates than other groups.

Maternal Characteristics and Behaviors

1) County has consistently higher percentages of births among women age 35-44 and percentages of births to unmarried women than Maryland.

2) County has consistently lower percentages of births with delayed/no prenatal care than Maryland; NH-Blacks have the highest percentages among all the groups.

Birth Outcomes

1) County has consistently lower percentages of preterm births than Maryland; NH-Blacks have the highest percentages among all the groups.

2) County has consistently lower percentages of low weight births than Maryland; NH-Blacks have the highest percentages among all the groups.

3) Infant and fetal death rates in the County are consistently lower than that from Maryland; NH-Blacks have the highest rates, while Hispanic rates are much closer to those of whites.

Maternal Mortality and Morbidity

1) There is a decreasing trend of severe maternal morbidity in the County over time.
2) NH-Blacks are 60% more likely and Hispanics are 46% more likely to have severe maternal morbidity than NH-Whites.

DHHS Programs

DHHS programs work closely with partners, providers, and communities to provide education and services to County residents to reduce adverse pregnancy-related outcomes and improve maternal and infant health in the County.

INTRODUCTION

Montgomery County is the most populous county in Maryland with a population estimate of over 1.06 million in 2017 from the U.S. Census; it also has the highest percentage (29.2%) of residents over 25 years of age who hold post-graduate degrees. In 2016, it was ranked by the American Community Survey as the 17th richest in the country, with a median household income of $99,763[1]. Montgomery County has a very diverse population and there is an increasing trend toward becoming more diverse over time. In 2017, there were 43.8% Non-Hispanic White, 18.3% Non-Hispanic Black, 15.4% Asian/ Pacific Islander, and 19.6% Hispanic or Latino based on the estimate from the U.S. Census. Of the County's population, 32.6% were born outside the U.S.

Montgomery County has had the highest overall health outcomes ranking in Maryland since 2014, based on the County Health Rankings by the Robert Wood Johnson Foundation[2]. However, ongoing efforts are needed to make improvements in the areas of access to health care, health inequities, and unhealthy behaviors. Though doing better than the state average and other jurisdictions in most pregnancy-related outcomes, there are great disparities of pregnancy-related outcomes among population subgroups on race/ethnicity and geographic areas. This report provides an overview of maternal and infant health in Montgomery County, compared to Maryland and the U.S. for the period 2008-2017. It also includes information describing programs within DHHS that provide maternal and infant health services to County residents, types of services provided and data on clients served. Most of these programs are in Public Health Services.

This report is organized into three major sections: (1) the maternal and infant health by year, race/ ethnicity, and maternal age where appropriate in the County; (2) DHHS program services and clients, and (3) the appendices. Here are the features of this report:

- A section on prevention is included to illustrate the importance of prevention at different levels to improve pregnancy-related outcomes.
- Comparison of risky behaviors and outcomes by race/ethnicity, maternal age (where appropriate), and geographic areas are included to illustrate the disparities of risks.
- Trends in risky behaviors and outcomes are examined over time, to illustrate the effectiveness of prevention and intervention.
- Comparisons of pregnancy-related outcomes between sub-county areas (i.e. Census Tract and Zip Code) and the County overall through Geographic Information System (GIS) mapping are available to identify potential risks for outcomes associated with different life styles and possible environmental/occupational exposures.
- Comparison of risk behaviors and outcomes between the County, Maryland and U.S. are made where appropriate.

- Information from the 2012-15 Maryland Pregnancy Risk Assessment Monitoring System (PRAMS) is included to provide information on risk behaviors and prevalence pertinent to pregnancy-related outcomes.
- Information from the Healthy People 2020 is included to provide a benchmark for the progress made and areas for ongoing efforts.
- List of definitions for pregnancy-related terms in is provided in the appendices.
- Technical notes are included in the appendices to provide information on methodological issues.
- Sources of additional information are included in the appendices.

Department of Health and Human Services

The Department of Health and Human Services is responsible for public health and human services that help address the needs of our community's most vulnerable children, adults and seniors. DHHS has more than 130 programs and delivers services to more than 20 locations, where the majority of these sites are located in schools. DHHS's core services protect the community's health, protect the health and safety of at-risk children and vulnerable adults, and address basic human needs including food, shelter and clothing. The five main service areas of DHHS include Aging and Disability Services, Behavioral Health and Crisis Services, Children, Youth and Family Services, Public Health Services, and Special Needs Housing. Additionally, the Office of Community Affairs provides direct services through several programs. DHHS has more than 1,700 employees and provides services to more than 120,000 clients annually (1 in every 8 residents).

Office of Planning and Epidemiology

DHHS Public Health Services entail Cancer Screening Programs, Communicable Diseases and Emergency Preparedness, Community Health Services, Health Care for the Uninsured, Planning and Epidemiology, Licensure and Regulatory Services, and School Health Services.

The Office of Planning and Epidemiology serves as the expert in planning and analytic epidemiology within DHHS and is responsible for the community health needs assessment, program evaluations, disease surveillance and outbreak investigations, health statistics and data management, epidemiology and biostatistics, ongoing development and maintenance of a population data warehouse, and special research projects in collaboration with internal and external partners and academic institutions.

PREVENTION

Improving maternal and infant health and preventing mortality requires on-going consideration of the evolving continuum of reproductive health across the life span, from prior to conception through the first year of life and throughout the childbearing years. Below is the framework provided by the Association of Maternal and Child Health programs that examines various factors that impact infant health across the reproductive health continuum[3].

Table 1. Various Factors Impacting Infant Health Across the Reproductive Health Continuum

Many types of pregnancy-related conditions may be prevented, and considerable progress continues to be made to improve the quality of life and survival for mothers and infants with these conditions. Prevention strategies are based on the natural history of the disease development and categorized into three levels of intervention.

Table 1. Various Factors Impacting Infant Health Across the Reproductive Health Continuum

Preconception		Pregnancy	Labor & Delivery	Birth Outcomes	
Maternal Risk Indicators	Environment & Health Care System	Risk Indicators	Risk Indicators	Morbidity	Mortality
Pregnancy-related • High parity • History of poor birth outcome • Intendedness of pregnancy • Short inter-pregnancy interval • Poor health status **Demographic** • Race/Ethnicity • Nativity • Uninsured/Under-insured • Lack of employ-ment • Low educational attainment **Behavioral Risks** • Poor nutrition • Physical inactivity • Substance use • Stress • Poor mental health **Genetic Risks** • Maternal low birth weight/small for gestational age	**Physical Environment** • Lack of housing • Urbanicity **Social Environment** • Poverty • High crime rates • Health inequity **Health Care System** • Infertility treatment • Lack of access to family planning services • Lack of access to family practice providers	**Maternal** • Insufficient or excess gestational weight gain • Substance use (Smoking, alcohol, drugs) • Multiple gestation • Lack of social support • Extremes of maternal age • Medical risk factors **Environment** • Lack of social support • Adverse living conditions **Health Care System** • Variations in the quality of the in-hospital care provided • Inadequate prenatal care • Limited access to obstetrical and high-risk perinatal services	**Maternal** • Uninsured/ Underinsured **Health Care System** • No plan for delivery at risk-appropriate hospital • Mode of delivery • Delivery complications • Lack of breastfeeding	• Low and very low birth weight • Preterm and very preterm • Small for gestational age • Post-term • Congenital Malformations and anomalies • Macrosomia	• Fetal • Neonatal • Postneonatal • Cause specific

Primary prevention – is to limit the occurrence of health conditions by controlling exposure to risk factors or increasing an individual's resistance to them (e.g., through healthy diet). The first step is to identify the relevant exposures and to assess their impact on the risk of developing disease in the population. For example, consuming recommended fruits and vegetables and exercising may help reduce cholesterol and prevent cardiovascular diseases. Smoking during pregnancy may increase risks for preterm birth, low birth weights, and certain birth defects. In this report, examples of adverse pregnancy-related outcomes that can be prevented using these strategies are described.

This report includes County-specific information from the 2012-15 Maryland Pregnancy Risk Assessment Monitoring System (PRAMS) and 2016 Maryland Behavioral Risk Factor Surveillance System (BRFSS) whenever possible and appropriate.

This icon indicates data from the 2012-15 Maryland Pregnancy Risk Assessment Monitoring System (PRAMS), a CDC surveillance system to assess maternal attitudes and experiences before, during, and shortly after pregnancy.

Secondary prevention – refers to detection of diseases at an early stage, when intervention is more effective than at the time of usual diagnosis and treatment. Early detection and intervention can reduce or eliminate the complications related to the condition, including death. Screening represents an important component of secondary prevention. Prenatal visits provide strategic opportunities to identify adverse birth outcomes early and employ appropriate interventions to reduce the consequences of health conditions.

Tertiary Prevention – aims at improving the prognosis and quality of life of affected individuals by offering them the best available treatment and rehabilitation programs.

The goal of prevention is to reduce the associated morbidity and mortality. It is important to set up long-term objectives for achieving these goals through various prevention and health promotion activities. Through comparing results with Healthy People 2020, a program of a nationwide health-promotion and disease-prevention goals set by the United States Department of Health and Human Services, it provides information on progress made and areas for ongoing efforts. Objectives from the Healthy People 2020 are included in this report whenever possible and appropriate.

This icon indicates goals of Healthy People 2020 from the CDC National Center for Health Statistics.

Other Information on Prevention

Family Planning

Nearly half of all pregnancies in the United States are unintended[4]. Approximately one in eight pregnancies in the United States results in a preterm birth. The United States continues to have one of the highest adolescent pregnancy rates in the developed world, while infant mortality rates remain high compared with other developed countries. Many of these outcomes affect racial and ethnic minority populations disproportionately. Family planning services can help address these public health challenges by providing education, counseling and medical services.

The 2014 recommendations from the Centers for Disease Control and Prevention and the U.S. Office of Population Affairs defines family planning to include[4]:

- providing contraception to help women and men plan and space births, prevent unintended pregnancies, and reduce the number of abortions;
- offering pregnancy testing and counseling;
- helping clients who want to conceive;
- providing basic infertility services;
- providing preconception health services to improve infant and maternal outcomes and improve women's and men's health; and
- providing sexually transmitted disease (STD) screening and treatment services to prevent tubal infertility and improve the health of women, men, and infants."

Improving the quality of family planning services will lead to improved reproductive health outcomes. The Institute of Medicine describes quality health care to encompass safety, effectiveness, a client-centered approach, timeliness, efficiency, accessibility, equity and value[4].

In developing Healthy People 2030, the US Department of Health and Human Services has proposed the following objectives on family planning:

- Reduce the proportion of pregnancies that are unintended;
- Reduce the proportion of pregnancies conceived within 18 months of a previous birth;
- Reduce pregnancies among adolescent females aged 15 to 19 years;
- Increase the proportion of adolescents aged 15-17 years who have never had sexual intercourse;
- Increase the proportion of sexually active females aged 15 to 19 years who use a condom and hormonal or intrauterine contraception at last intercourse;
- Increase the proportion of sexually active males aged 15 to 19 years who used a condom at last intercourse;
- Increase the proportion of sexually active adolescents aged 15 to 19 years who use any method of contraception at first intercourse;
- Increase the proportion of female adolescents who received formal instruction on delayed sex, birth control methods, HIV/AIDS prevention, and sexually transmitted diseases before there were 18 years old;

- Increase the proportion of females in need of publicly supported contraceptive services and supplies who receive those services and supplies;
- Increase the proportion of females aged 20 to 44 years at risk of unintended pregnancy who use most effective or moderately effective methods of contraception;
- Increase the proportion of adolescent females aged 15 to 19 at risk of unintended pregnancy who use most effective or moderately effective methods of contraception; and
- Increase the proportion of publicly funded family planning clinics that offer the full range of reversible contraceptive methods onsite.

For more information on family planning in the United States, please visit:
https://www.healthypeople.gov/2020/topics-objectives/topic/family-planning

For more information on family planning services offered within Montgomery County, Maryland, please visit: www.infomontgomery.org

Birth Spacing

Birth spacing, also known as interpregnancy interval, is the time from one child's birth until the next pregnancy[5]. Pregnancies that begin less than 18 months after birth are associated with delayed prenatal care and other adverse birth outcomes such as preterm birth, low birthweight, and neonatal morbidity and other health conditions including developmental delay, asthma, and vision and hearing loss. Nationally, interpregnancy intervals of less than 6 months were most common among non-Hispanic black mothers (7.1%), followed by Hispanic (5.0%) and non-Hispanic white (4.1%) mothers[6].

Healthy People 2020 currently has a goal of reducing the proportion of pregnancies conceived within 18 months of a previous birth by 10 percent (from 33.1% to 29.8%)[7].

The American College of Obstetricians and Gynecologists have recommended shifting postpartum care from a single 6 week visit to a postpartum process that include up to 12 weeks of ongoing follow-up as needed with a care team made up of family and friends, the primary maternal care provider, the infant's health care provider, the family's primary care provider, lactation support, care coordinator or case manager, home visitor and specialty consultants such as a behavioral health care provider[8].

Safe Sleep

Approximately 3,500 sleep-related deaths among infants are reported each year in the United States, including those from sudden infant death syndrome (SIDS), accidental suffocation and strangulation in bed, and unknown causes. The American Academy of Pediatrics recommends infant sleep practices that include placing infants to sleep on their backs, room sharing but not bed sharing, and keeping soft objects and loose bedding out of the infant's sleep environment. Data from PRAMS show that unsafe sleep practices were most commonly reported by younger, less educated, and racial/ethnic minority mothers, suggesting priority groups that might need to be reached with clear, culturally appropriate messages[9].

Folic Acid Intake

The Centers for Disease Control and Prevention recommends that all women of reproductive age get 400 micrograms (µg) of folic acid daily, in addition to consuming food with folate from a varied diet to help prevent neural tube defects. Neural tube defects are major birth defects of the baby's brain (anencephaly) and spine (spina bifida)[10].

Breastfeeding

Breastfeeding, the provision of human milk, is one of the most effective ways for a mother to protect the health of her infant and prevent disease. Current clinical and public health guidelines recommend exclusive breastfeeding for the first six months of life and continued breastfeeding for at least one year (up to two years of age or longer), with age-appropriate additional feeding.

Despite continued improvement in percentage of breastfeeding initiation, duration and exclusivity in the United States in the past decade, the latest National Immunization Survey data from infants born in 2014 show that Black infants born in 2014 have not met any of the national breastfeeding goals, while White infants met or exceeded all of them. On average, there is a 17-percentage point gap in breastfeeding initiation between black and white infants born between 2009 and 2014, with the black-white gap in breastfeeding widening at six and 12 months[11]. African American women have the lowest breastfeeding initiation and duration rates compared with all other racial and ethnic groups.

Health risks associated with not breastfeeding include ear infections, gastrointestinal infections/ diarrhea, respiratory infections, necrotizing enterocolitis, SIDS, allergies, asthma, celiac disease, obesity, diabetes, childhood leukemia, and lymphoma. Breastfeeding has been shown to decrease direct and indirect insurance claim costs and missed days from work due to caring for a sick infant. Infants who are breastfed have a reduced risk of obesity later in life.

The Centers for Disease Control and Prevention along with other national public health partners have developed nine strategies to support providers, pregnant and lactating women, communities, and businesses to increase breastfeeding. These include: maternity care practices; professional education; access to professional support; peer support programs; support for breastfeeding in the workplace; support for breastfeeding in early care and education; access to breastfeeding education and information; social marketing; and addressing the marketing of infant formula[12].

SUMMARY OF MATERNAL AND INFANT HEALTH

Births

Fig. 1. Adolescent Birth Rate by Race/Ethnicity, Montgomery County and Maryland, 2013-2017

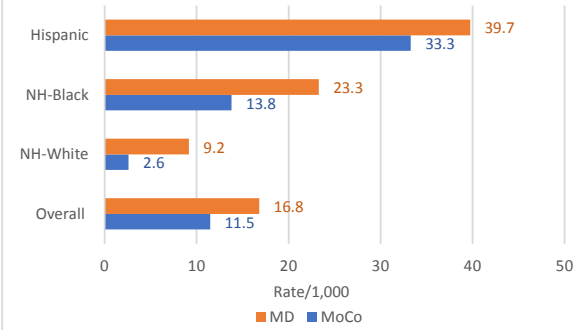


Fig. 2. Adolescent Births by Race/Ethnicity*, Montgomery County, 2013-2017

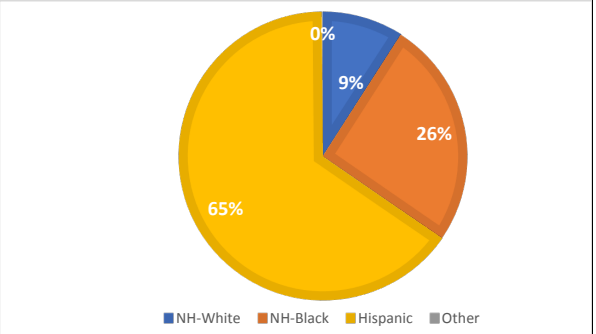


Fig. 3. Percent Births with Late or No Prenatal Care by Race/Ethnicity, Montgomery County and Maryland, 2013-2017

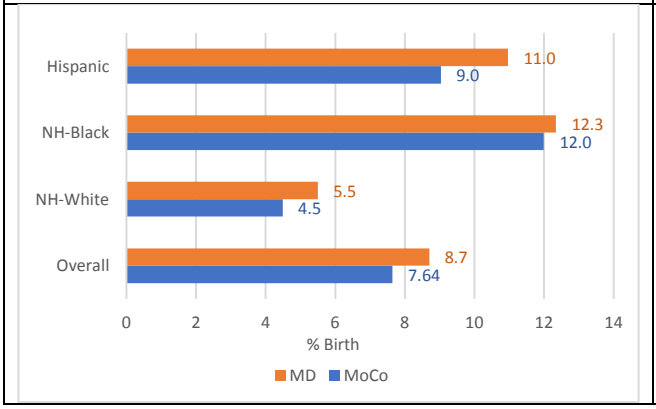
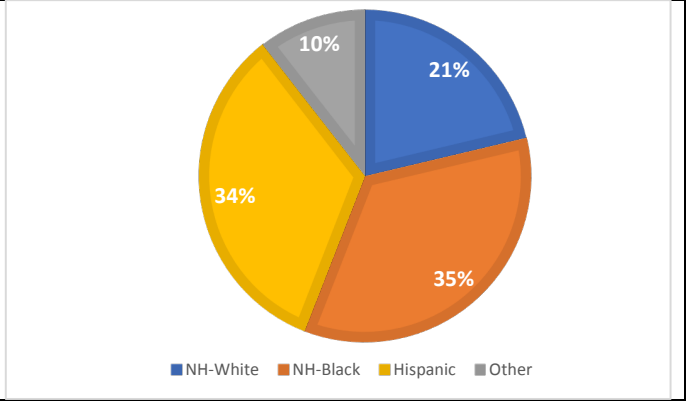


Fig. 4. Percent Late or No Prenatal Care by Race/Ethnicity*, Montgomery County, 2013-2017



*Based on total no of events

Birth Outcomes

Fig. 5. Percent Preterm Birth by Race/Ethnicity, Montgomery County and Maryland, 2013-2017

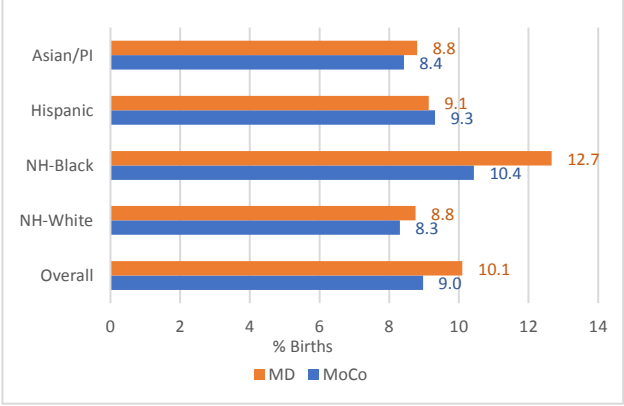
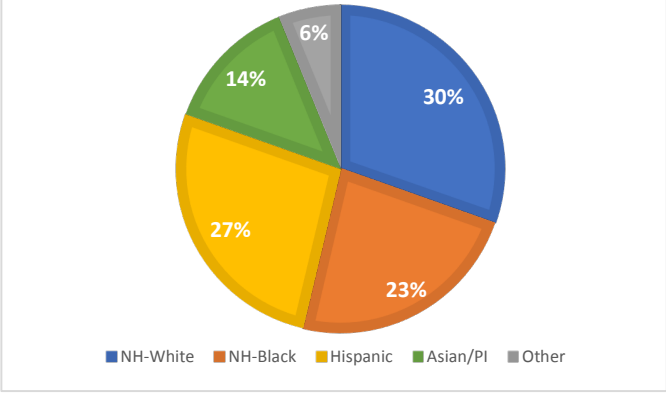


Fig. 6. Percent Preterm Birth by Race/Ethnicity*, Montgomery County, 2013-2017



* Based on total no of events

Fig. 7. Percent Low Weight Births by Race/Ethnicity, Montgomery County and Maryland, 2013-2017

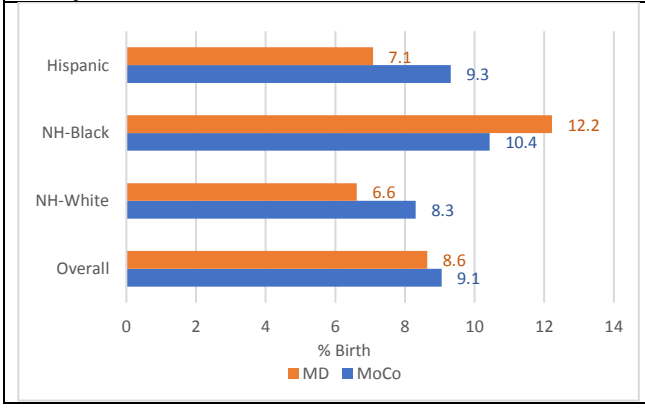
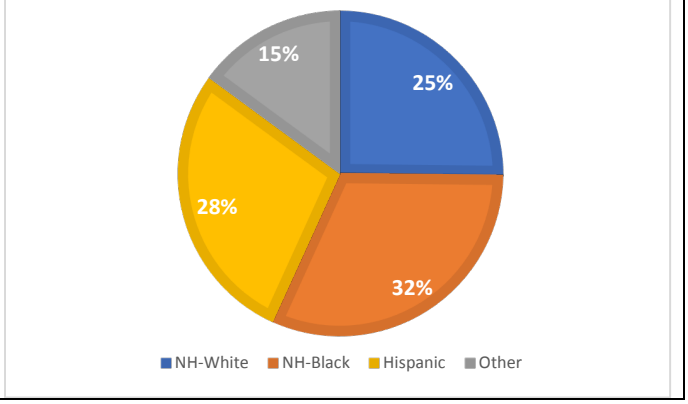


Fig. 8. Percent Low Weight Births by Race/Ethnicity*, Montgomery County, 2013-2017



* Based on total no of events

Fig. 9. Infant Mortality Rate by Race/Ethnicity, Montgomery County and Maryland, 2013-2017

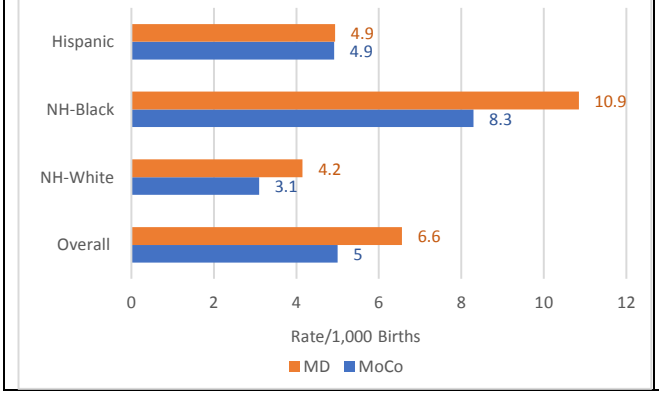
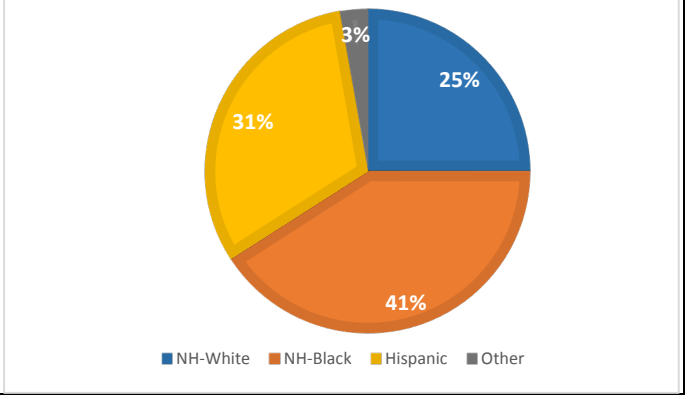


Fig. 10. Percent Infant Mortality by Race/Ethnicity*, Montgomery County, 2013-2017



* Based on total no of events

Maternal Morbidity

Fig. 11. Percent Maternal Morbidity by Race/Ethnicity, Montgomery County, 2014-2016

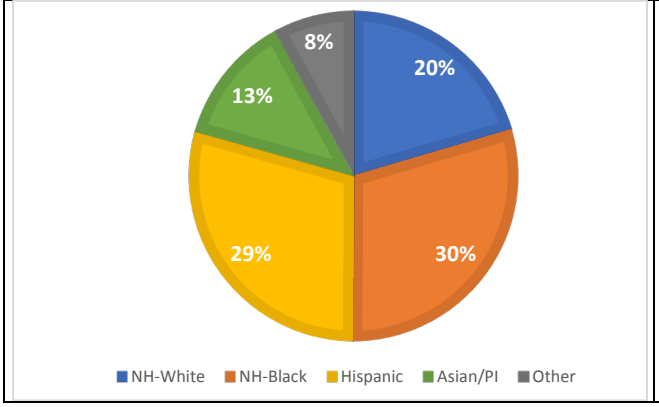
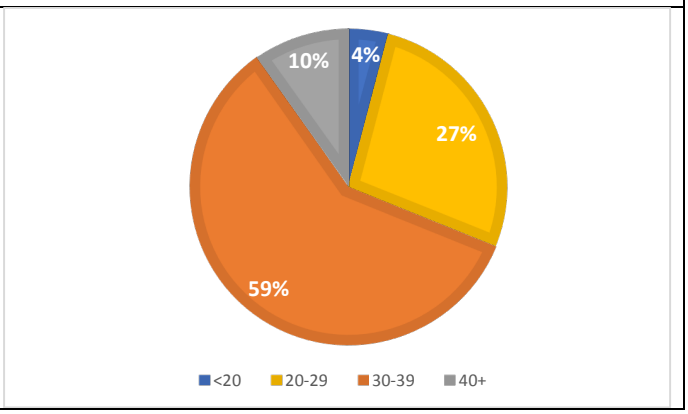


Fig. 12. Percent Maternal Morbidity by Maternal Age*, Montgomery County, 2014-2016



* Based on total no of events

DEMOGRAPHIC AND SOCIAL DETERMINANTS

The health and health needs in Montgomery County cannot be measured nor met without understanding the number of people living in the county and population characteristics. Changes in population size, density, distribution, age, race, ethnicity and migration affect the healthcare resources needed, the cost of care provided, and the conditions associated with each population group. Risks associated with disease and health conditions vary across population subgroups with different characteristics over time.

Socioeconomic status (SES) describes a person's position in society expressed on an ordinal scale using criteria that includes income, level of education attained, occupation, or a combination of these and other dimensions[13]. A person's SES is one of the strongest and most consistent predictors of morbidity and mortality and persists across most diseases throughout life and extends across many risk factors for disease[14].

SES underlies environmental exposure, health behavior, and health care, and is associated with many health problems including low birth weight, cardiovascular disease, hypertension, arthritis, diabetes and cancer. Socioeconomic disparities are the most fundamental causes of health disparities[15].

Many factors can affect pregnancy and childbirth, including preconception health status, age, access to appropriate health care across the reproductive continuum, and poverty[16]. Likewise, Infant and child health are influenced by SES and behavioral factors that include education, family income, and breast feeding, as well as the physical and mental health of parents and caregivers.

Demographics

- In 2017, the County's population was over 1.05 million (Table 2).
- The sex distribution in the County is consistent over time and is similar to that of Maryland and the U.S. (Table 2).
- The County's population is aging over time; the age distribution of the County is similar to that of Maryland and the U.S. (Table 2).
- The County's population is getting more diverse over time; both the NH-Black and Hispanic populations have increased while the NH-White population is decreasing (Table 2).

Table 2. Percent Population Estimates by Selected Characteristics, Montgomery County, Maryland, and U.S., 2013-2017

		2013	2014	2015	2016	2017		
		MoCo	MoCo	MoCo	MoCo	MoCo	MD	US
Total						1,058,810		
Gender	Male	48.2	48.2	48.2	48.4	48.3	48.5	49.2
	Female	51.8	51.8	51.8	51.6	51.7	51.5	50.8
Age Group	< 5	6.5	6.6	6.5	6.4	6.3	6.1	6.1
	5-17	17.1	17.0	17.0	17.0	16.9	16.2	16.5
	18-34	21.5	21.3	21.2	20.9	20.8	22.8	23.3
	35-64	41.7	41.4	41.3	41.1	41.0	40.0	38.5
	65+	13.3	13.7	14.1	14.5	14.9	14.9	15.6
Race/Ethnicity	NH-White	46.7	45.8	44.7	44.5	43.8	50.9	60.7
	NH-Black	17.0	17.4	17.6	17.8	18.3	29.7	12.5
	Asian/PI	14.2	14.7	14.9	14.8	15.4	6.6	5.6
	Hispanic	18.3	18.7	19.0	19.1	19.6	10.1	18.1

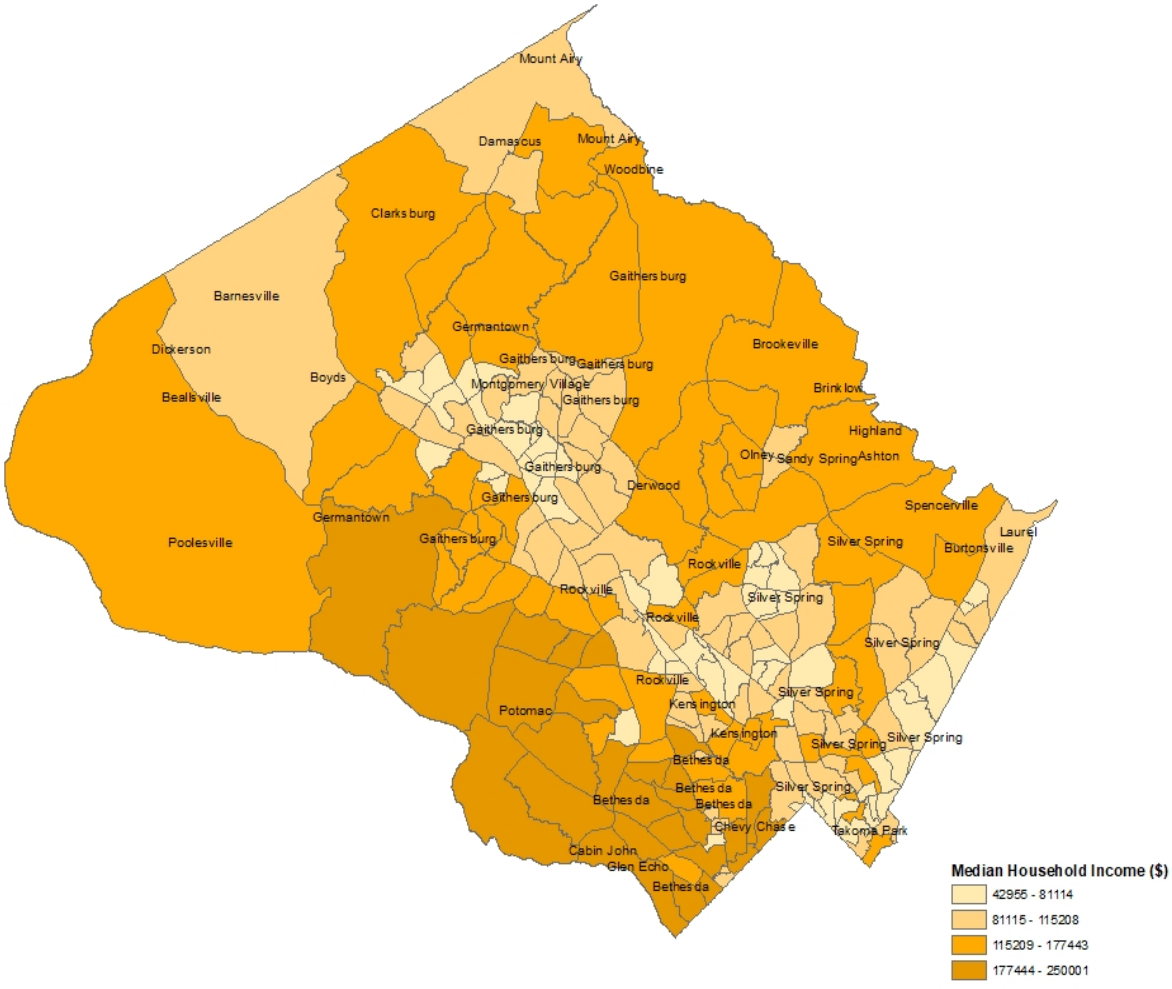
Social Determinants

- There is an increasing trend of percent families below the poverty level in the County over time (Table 3).
- Among population subgroups, Asian/PI and Hispanic groups have increasing trends of percent families below poverty level, while NH-Black has decreasing trend; NH-Black and Hispanic groups have much higher percent than NH-White and Asian/PI (Table 3).
- The overall percent families below poverty level in the County is lower than that in Maryland and much lower than the U.S. (Table 3).

Table 3. Percent Families Below Poverty Level by Race/Ethnicity, Montgomery County, Maryland, and U.S., 2013-2017

	2013	2014	2015	2016	2017		
	MoCo	MoCo	MoCo	MoCo	MoCo	MD	US
All	4.5	4.5	4.6	4.7	4.8	6.6	10.5
NH-White	2.0	1.8	1.8	1.8	1.9	3.9	6.7
NH-Black	9.6	9.3	8.8	8.9	8.7	11.2	21.3
Asian/PI	4.2	4.8	4.7	5.0	4.8	5.5	8.5
Hispanic	9.0	8.7	9.2	9.1	9.5	11.2	19.7

Map 1. Median Household Income by Census Tract, Montgomery County, 2017



- The overall unemployment rate in the County has decreased over time and is consistent across all race/ethnicity groups (Table 4).
- The unemployment rate in the County is lower than that of Maryland and the U.S. (Table 4).
- Among race/ethnicity groups, NH-Black and Hispanic groups have higher rates of unemployment than other population subgroups (Table 4).

Table 4. Unemployment Rate by Race/Ethnicity, Montgomery County, Maryland, and U.S., 2013 - 2017

	2013	2014	2015	2016	2017		
	MoCo	MoCo	MoCo	MoCo	MoCo	MD	US
All	6.3	6.5	6.1	5.8	5.4	6.1	6.6
NH-White	4.5	4.5	4.2	4.0	3.8	4.6	5.2
NH-Black	10.8	11.4	10.3	9.9	9.0	9.2	11.9
Asian/PI	4.5	4.5	4.6	4.3	4.0	4.3	5.1
Hispanic	8.4	8.1	7.8	7.3	6.9	6.0	7.6

- The overall percent of individuals with a college education or higher in the County has increased over time and is consistent across all race/ethnicity groups (Table 5).
- The percent of individuals with a college education or higher in the County is much higher than that in Maryland and the U.S. and is consistent across all race/ethnicity groups (Table 5).
- Among race/ethnicity groups, NH-White and Asian/PI groups have higher percentages of college education or higher than other population subgroups (Table 5).

Table 5. Percent Individuals with College Degree or Higher by Race/Ethnicity, Montgomery County, Maryland, and U.S., 2013-2017

	2013	2014	2015	2016	2017		
	MoCo	MoCo	MoCo	MoCo	MoCo	MD	US
All	59.2	59.2	59.7	58.1	58.3	39.0	30.9
NH-White	69.0	69.5	70.4	70.7	71.3	43.9	34.5
NH-Black	42.0	42.2	42.1	43.4	43.8	28.5	20.6
Asian/PI	65.0	66.0	66.9	67.5	68.0	63.4	52.7
Hispanic	24.9	25.8	23.0	24.6	25.1	21.6	15.2

MATERNAL AND INFANT HEALTH IN MONTGOMERY COUNTY

Overview of Maternal and Infant Health

Despite tremendous progress in recent years, maternal and infant health remains an important public health challenge in both developing and developed countries. During the 20th century maternal and child health indicators have improved with maternal and neonatal mortality rates decreasing substantially[17]. However, this progress has not been enough to achieve the United Nations Millennium Development Goals (MDG), necessitating the need for further concerted action[17]. Maternal and infant health has gained increasing attention by health organizations such as World Health Organization (WHO), United Nations International Children's Emergency Fund (UNICEF) and Centers for Disease Control and Prevention (CDC), galvanizing the efforts to promote the well-being of both mothers and their infants.

Despite spending a considerable amount on hospital based maternity care, United States has not been performing well on maternal and infant health (MIH) indicators[18]. The maternal mortality rate (MMR) has increased in recent years from 17 deaths per 100,000 in 1990 to 26 deaths per 100,000 in 2015[18]. Similarly, U.S. has a higher infant mortality rate than peer countries[19]. Parts of U.S. are falling short on meeting national standards and Healthy People 2020 targets associated with maternal and infant health[18]. Furthermore, race/ethnicity is an important predictor of access to care within the country. Blacks and minority populations generally perform worse than Whites on several MIH indicators[18].

Maternal health broadly encompasses aspects related to family planning, pregnancy, childbirth and postpartum period. Preconception health focuses on optimizing the mother's health and preparing it for a forthcoming pregnancy. In addition to focusing on behavioral and lifestyle changes, it stresses preventive actions including vaccinations and nutritional supplementation. Upon conception, it is essential to provide women access to prenatal care for continuous monitoring and evaluation of both the mother and the fetus. After birth, postpartum health including mental well-being and initiation of breastfeeding remain an important aspect of maternal health.

Consequently, maternal health is strongly associated with infant health. Women who remain healthy before and during pregnancy give birth to healthier infants with minimal risk of adverse birth outcomes. A vast majority of maternal deaths result from preventable causes during pregnancy/childbirth[20]. Hence, prenatal care is an important factor that leads to eliminating preventable deaths among mothers. Additionally, improved access to maternal and infant health leads to earlier detection and treatment of developmental delays and disabilities, enabling children to reach their full potential[21]. Maternal and infant health predicts the looming health challenges for families, communities and health care systems[21]. Thus, the health of mothers defines the health of a whole next generation.

CHAPTER I: BIRTHS

Birth Rate

Birth rate combined with other demographics can provide information about the growth of a population. Over the past decades, birth rates have declined globally, owing to several possible factors including declining marriage rate, higher economic costs, higher proportion of women joining workforce and changing family dynamics[22]. Changes in birth rate are also associated with contraceptive use and public health interventions[22].

- Montgomery County had a decreasing birth rate trend during 2008-2017, following the same trends as Maryland and the U.S.; birth rates in the County are consistently higher than those of Maryland and the U.S. (Fig. 13).
- Among population subgroups, the Hispanic group has the highest birth rate, followed by NH-Black, Asian/PI and NH-White (Fig. 14).

Fig. 13. Crude Birth Rate, Montgomery County, Maryland, and U.S., 2008-2017

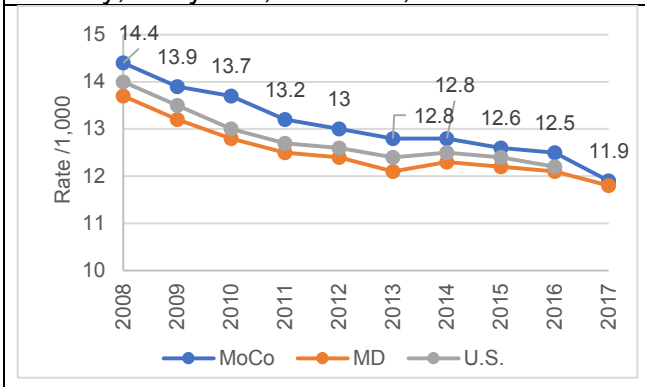
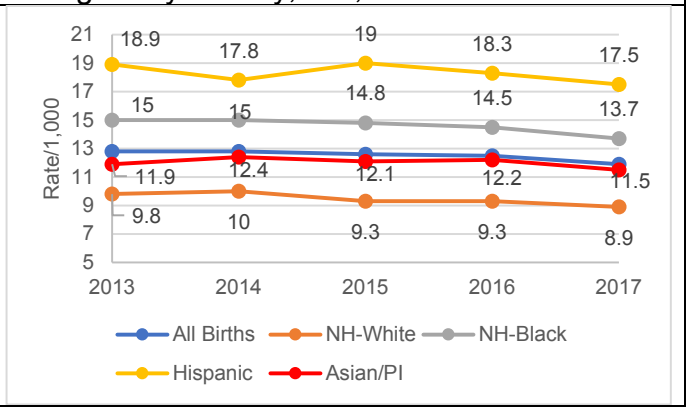


Fig. 14. Crude Birth Rate by Race/Ethnicity, Montgomery County, MD, 2013-2017



Fertility Rate

Fertility rate essentially provides the number of births to women of childbearing age. Fertility rates help to understand the growth and the structure of a population. Higher fertility rates indicate that higher numbers of young people constitute the overall population and drives growth. In developed countries, fertility rates are associated with lifestyle choices, economic forces and lower mortality rate[23]. Easier access to contraception and increasing shift towards having children later in life has led to declining fertility rates in developed countries[23]. When lower fertility rates are coupled with longer life expectancy, it results in an aging population which can have exceptional effects on health care systems and costs[24].

- Montgomery County had a decreasing fertility rate trend during 2013-2017, following the same trend as the U.S.; fertility rates in the County are consistently higher than those of the U.S. (Fig. 15). Compared to Maryland, fertility rates had been higher for the County, however, the fertility rate for Maryland is higher in 2017.
- Among population subgroups, the Hispanic group has the highest fertility rate, followed by NH-Black and NH-White (Fig. 16).

Fig. 15. Fertility Rate, Montgomery County, Maryland, and U.S., 2013-2017

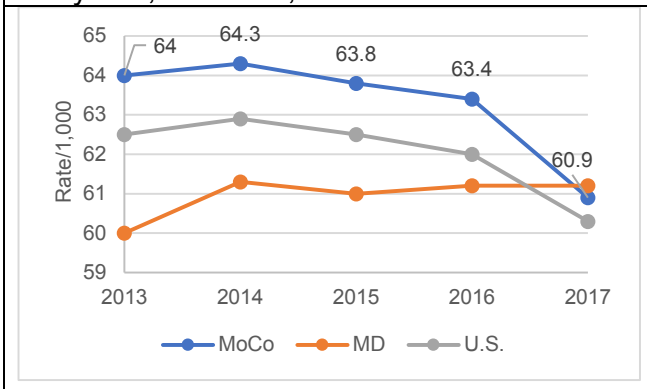
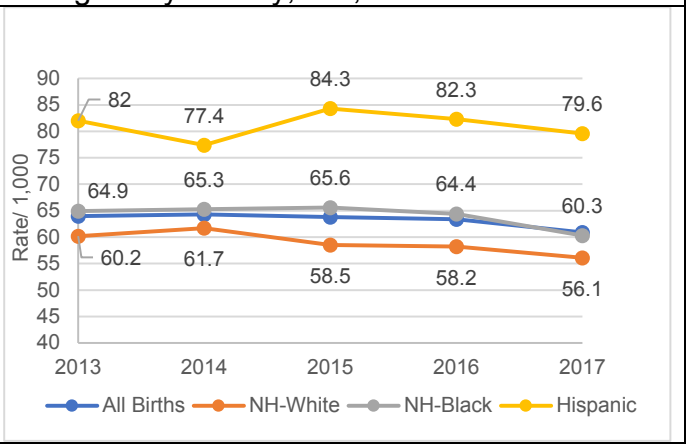


Fig. 16. Fertility Rate by Race/Ethnicity, Montgomery County, MD, 2013-2017



Adolescent Birth

Early childbearing is more prevalent among teens who have compromised socioeconomic conditions[25]. Teen pregnancy is associated with increased risk for infant mortality, preterm birth and low birth weight[26]. Moreover, younger mothers are more likely to develop complications such as fistula and obstructed labor[25].

- Adolescent (15-19 yrs. old) birth rates in the County are decreasing over time, following the same trends as Maryland and the U.S; adolescent birth rates in the County are consistently lower than those of Maryland and the U.S. (Fig. 17).
- Among population subgroups, the Hispanic group has the highest adolescent birth rate, followed by NH-Black, and NH-White which is consistent with those of the general population (Fig. 18).
- Moreover, the birth rate is consistently higher among 18-19-year-old teens in Montgomery County, compared to 15-17-year-old teens (Fig. 19).

Fig. 17. Adolescent Birth Rate in Montgomery County, Maryland and U.S., 2008-2017

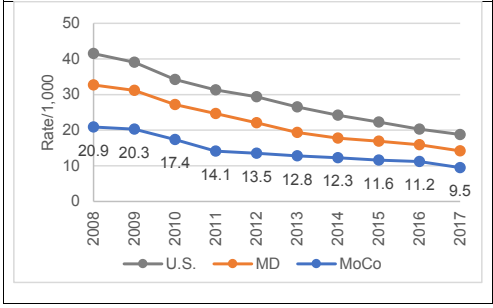


Fig. 18. Adolescent Birth Rate by Race/ Ethnicity, Montgomery County, MD, 2013-2017

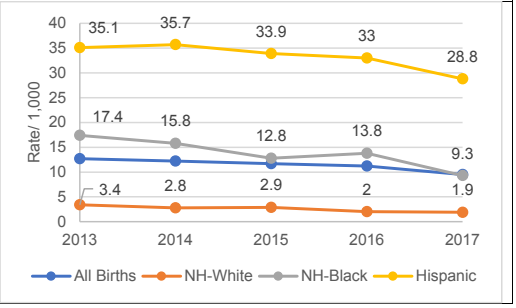
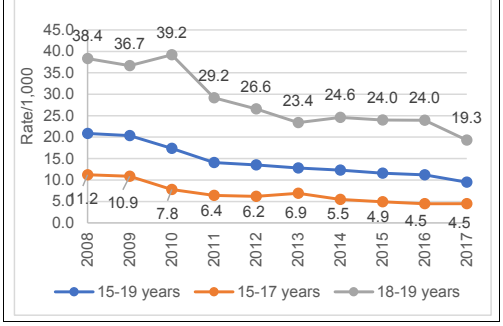


Fig. 19. Adolescent Birth Rate by Age, Montgomery County, MD, 2008-2017



CHAPTER II: MATERNAL CHARACTERISTICS AND BEHAVIORS

Maternal Age

Maternal age is an important determinant of a mother's and her child's health. As teen pregnancies result in increased risk of maternal and child morbidities, increasing maternal age is also associated with negative health outcomes. The incidence of preeclampsia, gestational hypertension, cesarean delivery, preterm birth and placental complications are higher among older mothers compared to younger mothers[27]. Additionally, increasing maternal age is associated with chromosomal abnormalities such as trisomy due to an increased chance of genetic errors[28]. With changes in birth trends, more women are giving birth at later years of their lives; maternal age is considered an obstetrical risk factor.

- Montgomery County had an increasing trend in the percentage of births to older women aged between 35 and 44, following the same trends as Maryland but consistently higher. (Fig. 20).
- Among population subgroups, the Asian/PI and NH-White groups had a higher percentage of births among women aged 35-44, followed by NH-Black, and Hispanic (Fig. 21).

Fig. 20. Percent Births among Women aged 35-44 years, Montgomery County and Maryland, 2013-2017

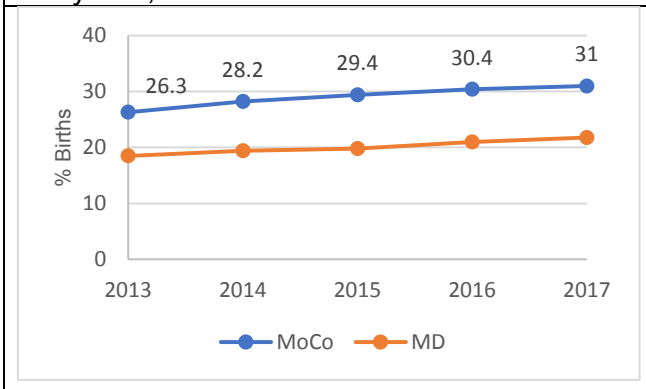
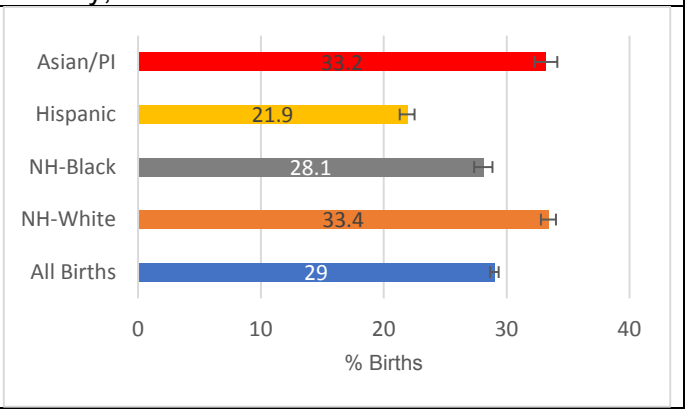


Fig. 21. Percent Births among Women aged 35-44 years by Race/Ethnicity, Montgomery County, MD 2013-2017



Marital Status

The marital status of mothers is an important predictor of maternal and infant health. Prior evidence suggests that unmarried women experience increased risk of low birth weight, preterm birth and small for gestational age (SGA) infants[29]. Fetal and neonatal mortality rates are also higher among unmarried women[29]. Lower Apgar 1 min scores and higher number of admissions to intensive care among infants of unmarried women have been reported, in comparison to married women[29]. With changing societal attitudes, more women are opting to have children outside of marriage[29]. Unmarried women experience adverse outcomes possibly due to increased emotional stress, limited access to prenatal care and lack of social support[29].

- Montgomery County follows a stable trend of percent births to unmarried women similar to that in Maryland and the U.S.; the percentage of births to unmarried women in the County is consistently lower than that of Maryland and U.S. (Fig. 22).
- Among population subgroups, the Hispanic group had the highest percentage of births to unmarried women, followed by NH-Black, NH-White, and Asian/PI (Fig. 23).

Fig. 22. Percent Births to Unmarried Women, Montgomery County, Maryland, and U.S., 2013-2017

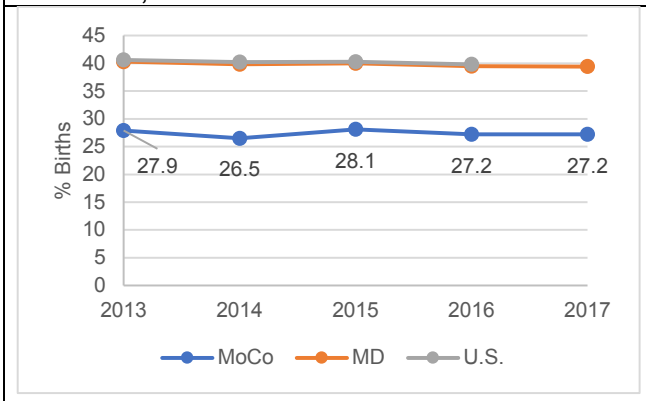
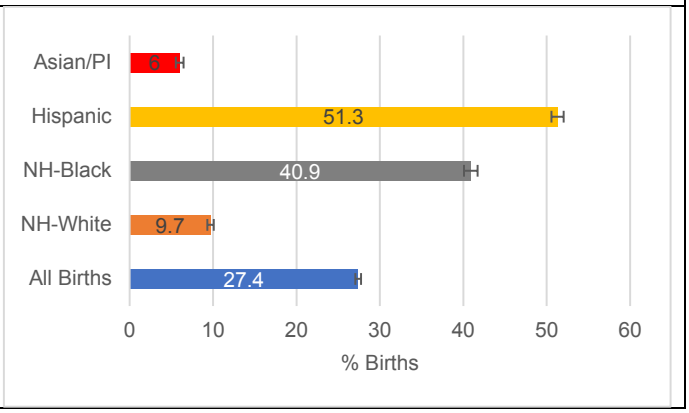


Fig. 23. Percent Births to Unmarried Women, By Race/Ethnicity, Montgomery County, MD, 2013-2017



Education Attainment

Socio-economic status of pregnant women has implications for birth outcomes. Education particularly has been shown to be a protective factor for certain adverse birth outcomes including preterm birth, stillbirth and neonatal mortality[30]. Among socioeconomic measures, education is considered to have the most influential effect on pregnancy related outcomes[30].

- The percentage of births to women without a high school education in the County fluctuated between 2013-17, while the trend seems to be decreasing in Maryland (Fig. 24).
- Among population subgroups, Hispanics had the highest percentage of births to women without high school education, followed by NH-Black, Asian/PI, and NH-White (Fig. 25).

Fig. 24. Percent Births to Women without High School Education in Montgomery County and Maryland, 2013-2017

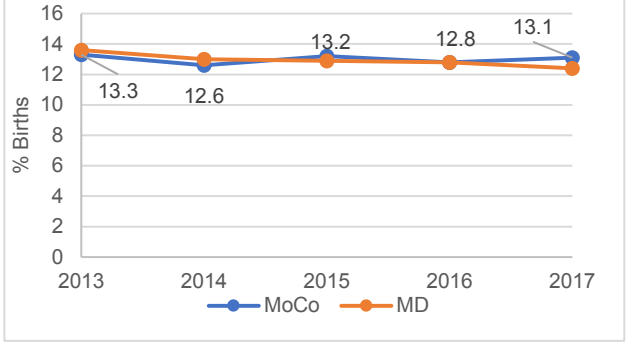
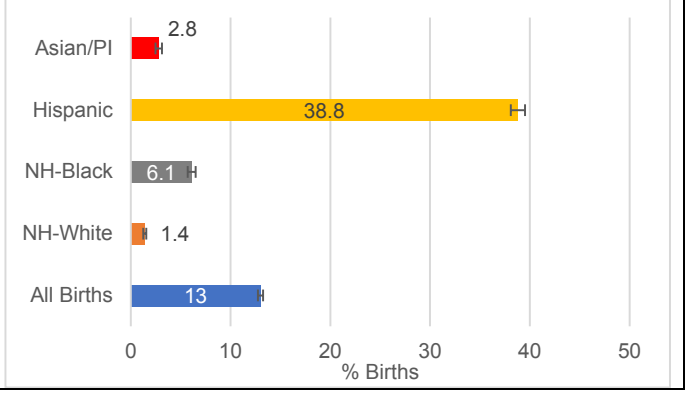


Fig. 25. Percent Births to Women without High School Education by Race/Ethnicity, Montgomery County, MD, 2013-2017



Plurality

Plural births refer to twins and higher order multiple births. With increasing use of artificial reproductive technologies and older childbearing age, multiple births have considerably increased over the past few decades. Plural births are at risk of low birth weight and preterm birth[31]. Plural births have increased risk of infant mortality. Parents with multiples experience increased anxiety, depression and stress.

- Montgomery County had an overall decreasing trend of the percentage of plural births, which had consistently remained higher than that of Maryland up until 2016. Over the recent years, the percentage of plural births has remained relatively constant for Maryland (Fig. 26).
- Among population subgroups, NH-Black and NH-White groups had a higher percentage of plural births, followed by Asian/PI and Hispanic groups (Fig. 27).

Fig. 26. Percent Plural Births in Montgomery County and Maryland, 2013-2017

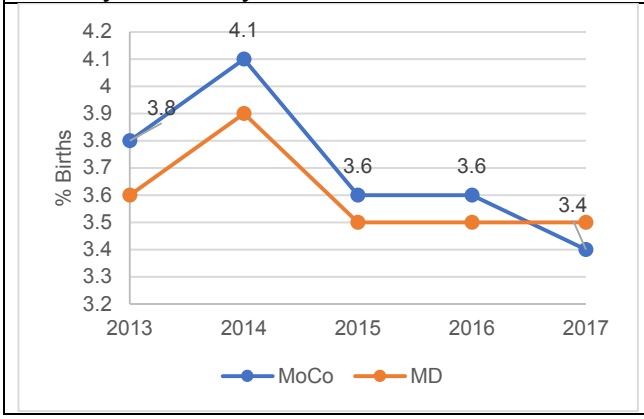
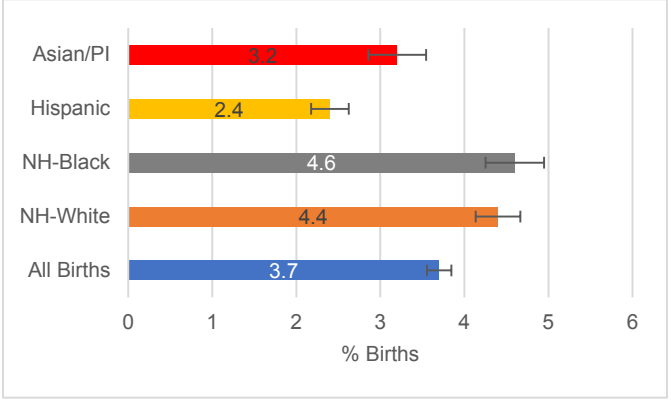


Fig. 27. Percent Plural Births by Race/Ethnicity, Montgomery County, MD, 2013-2017



Tobacco Use

Use of tobacco during pregnancy can cause serious fetal and maternal health problems due to the harmful effects of substances such as nicotine and tar. Smoking in pregnant women can cause fetal growth restriction, stillbirth, preterm birth, spontaneous abortion and sudden infant death syndrome[32]. Even after birth, children can develop behavioral disorders due to exposure to maternal smoking[32].

- Montgomery County had an overall decreasing trend of tobacco use during pregnancy, though this information collected from birth records may be under-reported (Fig. 28).
- Among population subgroups, NH-Black and NH-White had higher percentage of tobacco use during pregnancy, followed by Hispanic and Asian/PI (Fig. 29)

Fig. 28. Tobacco Use During Pregnancy, Montgomery County, MD, 2013-2017

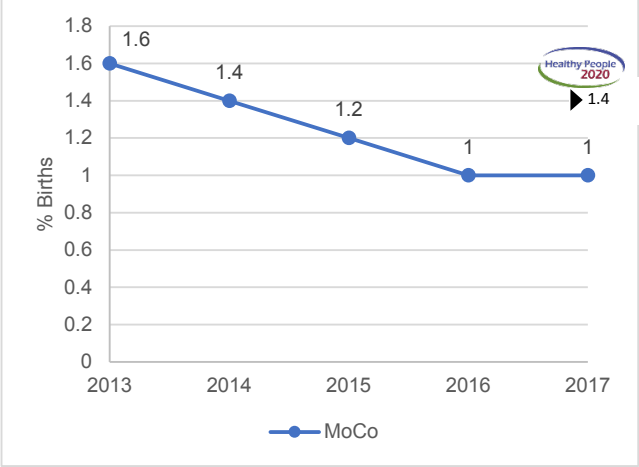
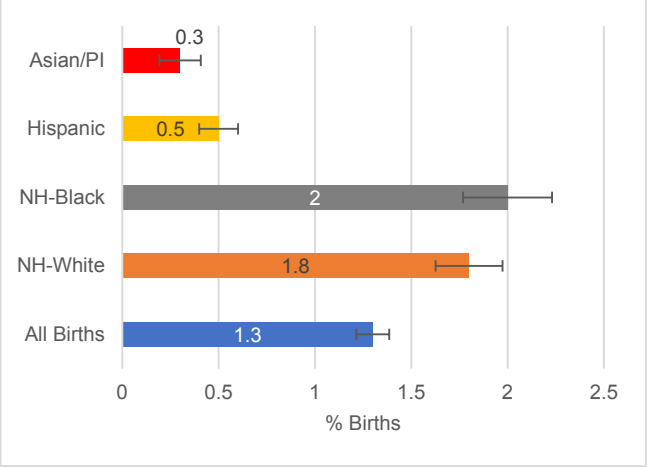


Fig. 29. Tobacco Use During Pregnancy By Race/Ethncity, Montgomery County, MD, 2013-2017



PRAMS
PREGNANCY RISK ASSESSMENT MONITORING SYSTEM

6% (95% CI: 5-7) of mothers in Montgomery County, MD reported smoking during the 3 months prior to pregnancy compared to 17% (95% CI: 16-18) in Maryland (2004-13).

2% (95% CI: 1-3) of mothers in Montgomery County, MD reported smoking during the last three months of pregnancy compared to 8% (95% CI: 8-9) in Maryland (2004-13).

Healthy People 2020

1.4 % of pregnant women do not abstain from cigarette smoking.

Alcohol Use

Drinking during pregnancy can adversely affect birth outcomes as it can cause birth defects and fetal alcohol spectrum disorder (FASD) causing mental health problems [33]. It can also compromise the intellectual abilities and motor skills of infants[33]. Although it is advisable that women do not binge drink during pregnancy, recent guidelines also suggest that alcohol should be avoided even before conception[33].

PRAMS
PREGNANCY RISK ASSESSMENT MONITORING SYSTEM

12% (95% CI: 10-14) of mothers in Montgomery County, MD reported binge drinking 3 months prior to pregnancy compared to 18% (95% CI: 17-19) in Maryland (2004-13).

91% (95% CI: 89-92) of pregnant women in Montgomery County, MD reported no alcohol use during the last three months of pregnancy compared to 91% (95% CI: 91-92) in Mayrland (2004-13).

100% (95% CI: 99-100) of pregnant women in Montgomery County, MD reported no binge drinking during the last three months of pregnancy, compared to 99% (95% CI: 99-100 in Maryland (2004-13).

Healthy People 2020

55.6 % of mothers not drinking alcohol prior to 3 months before pregnancy.

Substance Abuse

Apart from alcohol and tobacco, marijuana, cocaine, heroin, inhalants, hallucinogens and misuse of prescription-type drugs pose a serious public health challenge[34]. Maternal substance use can have pharmacological effects on the fetus depending on the type of substance used, duration of the exposure and the gestational period at which the exposure occurred[34]. Cocaine and marijuana can both readily cross the placental barrier and reach the fetus. Cocaine causes increased contractions and hypertension[34]. In infants it may cause congenital abnormalities and impair growth in later years of life. Similarly, as marijuana/cannabis can also cross the placenta it may cause harmful birth defects/ disorders[34].

Healthy People 2020

100% of pregnant women abstaining from illicit use of drugs in the last 30 days (15-44 years).

98.3% of pregnant women abstaining from alcohol during the past 30 days (15-44 years)

100% of pregnant women abstaining from binge drinking during the past 30 days (15-44 years).

Opioid Use in Pregnancy

Prescription opioid use in U.S. has reached epidemic proportions in recent years. Opioid addiction causes physical dependence, tolerance (increased dosage required to achieve the same physiological effect) and compulsive drug seeking behavior[35]. Opioid use in pregnancy has also increased tremendously, posing serious risk to infants. There is some evidence which suggests that the relative risk of certain birth defects can be elevated due to maternal opioid use. Infants who are perinatally exposed to opioids can also develop neonatal abstinence syndrome[35]. The infant can develop respiratory, neuronal (sweating, sneezing, sleep disturbance) and gastric difficulties (poor feeding, weight loss) [35]. It is highly recommended that women should be screened for opioid use during pregnancy and children born to these women should be monitored regularly.

- In Montgomery County, there was a higher percentage of low birth weight infants among opioid users compared to non-opioid users (Table 6).
- Similarly, a higher percentage of preterm infants were born to opioid users compared to non-opioid users (Table 6).
- Odds ratios also suggest an increased risk of low birth weight and preterm birth among opioid users compared to non-opioid users (Table 7).

Table 6. Birth Outcomes Among Opioid Users, Montgomery County, MD, 2014-2016 [36]

	Opioid Use		No Opioid Use		Total	
	n	%	n	%	n	%
Total	32	.12	26183	99.87	26215	100
Low Birth Weight	5	15.6	1936	7.4	1941	7.4
Preterm Birth	6	18.8	2473	9.4	2479	9.5
Maternal Morbidity	--	--	696	2.7	696	2.7
Length of Stay						
0	1	3.1	46	.18	47	.2
1	--	--	1850	7.1	1850	7.1
2	21	65.6	15723	60.1	15744	60.1
3	4	12.5	6675	25.5	6679	25.5
4	5	15.6	1372	5.2	1377	5.3
Method of Birth						
Cesarean	11	34.3	9266	35.4	9277	35.3
Vaginal	21	65.6	16917	64.6	16938	64.6

Table 7. Odds Ratio for Low Birth Weight and Preterm Birth Among Opioid Users[36]

	Odds Ratio	P Value
Low Birth Weight	2.41	.0722
Preterm Birth	2.37	.0533

Prenatal Care

Access to prenatal care can significantly help reduce maternal and infant mortality. It allows for early diagnosis and intervention, eliminating/reducing preventable morbidity and mortality. However, prenatal care is more effective if received earlier, ideally starting from the very first trimester. The American Academy of Pediatrics (AAP) and American College of Obstetricians and Gynecologists (ACOG) recommend examining pregnant women with no serious complications every 4 weeks during the first 28 weeks, every 2-3 weeks until 36 weeks and every week after that[37].

- Montgomery County had an overall decreasing trend for the percentage of births with late or no prenatal care; the percentage of births with late or no prenatal care in the County has been consistently lower than that of Maryland (Fig. 30).
- Among population subgroups, the NH-Black group had the highest percentage of births with late or no prenatal care, followed by Hispanic, Asian/PI, and NH-White (Fig. 31).

Fig. 30. Percent Births with Delayed/No Prenatal Care, Montgomery County and Maryland, 2013-2017

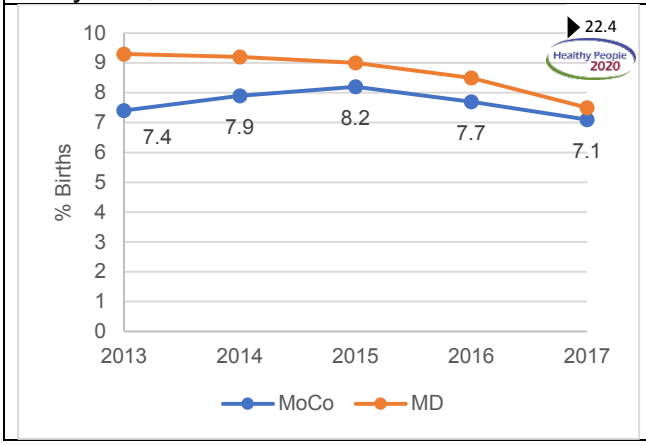
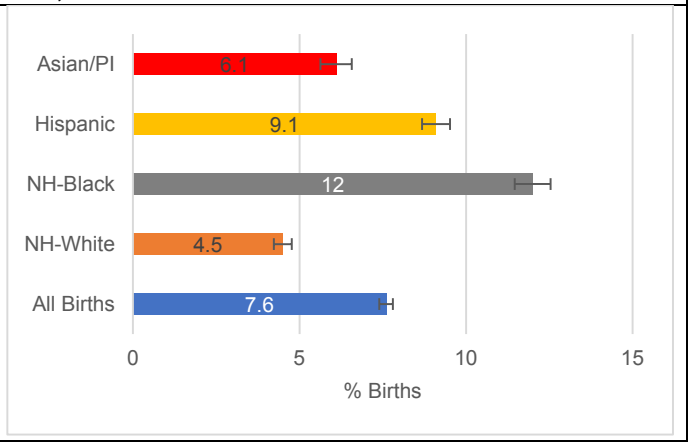


Fig. 31. Percent Birth With Delayed/No Prenatal Care By Race/Ethnicity, Montgomery County, MD, 2013-2017



PRAMS
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75% (95% CI: 72-77) of mothers in Montgomery County, MD reported initiation of prenatal care from first trimester compared to 79% (95% CI: 78-80) in Maryland (2004-13).

Healthy People 2020

22.4% of pregnant women not receiving early and adequate prenatal care.

Breastfeeding

Breastfeeding provides the golden standard of infant nutrition. Breastfed infants have reduced risk of developing type 2 diabetes, obesity, asthma, infections and sudden infant death syndrome (SIDS)[38]. Additionally, it benefits the mother by lowering the risk of heart disease, type 2 diabetes, ovarian cancer and breast cancer[38].

- Montgomery County had an overall high constant trend for breastfed infants before discharge (Fig. 32). However, this is based on data collected in birth records and may not reflect the prevalence of longer-term breastfeeding practices after hospital discharge.
- Among population subgroups, the NH-Black had the lowest percentage of breastfed infants before discharge followed by NH-White, Hispanics and Asian/PI (Fig. 33).

Fig. 32. Percent Births Breastfed Before Discharge, Montgomery County, 2013-2017

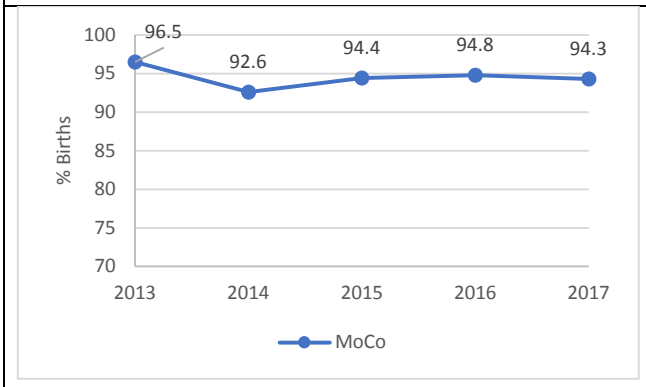
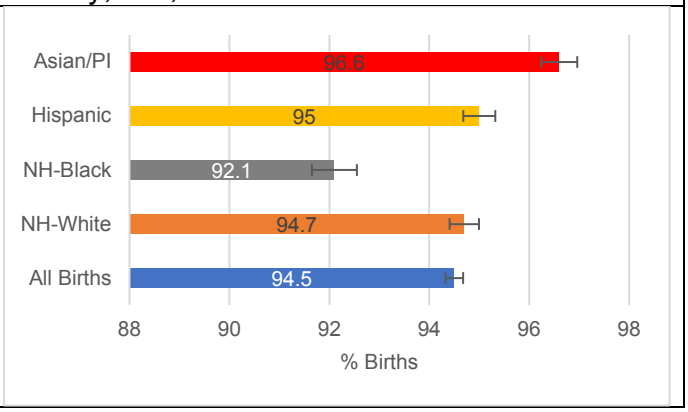


Fig. 33. Percent Births Breastfed Before Discharge By Race/Ethnicity, Montgomery County, MD, 2013-2017



CHAPTER III: BIRTH OUTCOMES

Preterm Births

Birth before 37 weeks of gestation is a likely cause of perinatal morbidity and mortality. It also predisposes children to an increased risk of developing disabilities and neurological deficiencies[39]. Additionally, care for preterm infants may require extended hospital stays which results in higher health care costs[39].

- Though fluctuating over time, the percent preterm births in the County is consistently lower than that of Maryland (Fig. 34).
- Among population subgroups, the NH-Black had the highest percentage of preterm births followed by Hispanics, Asian/PI and NH-White (Fig. 35).

Fig. 34. Percent Preterm Births, Montgomery County and Maryland, 2013-2017

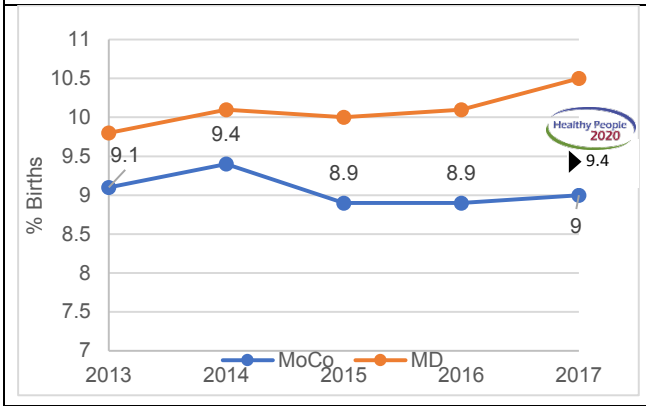
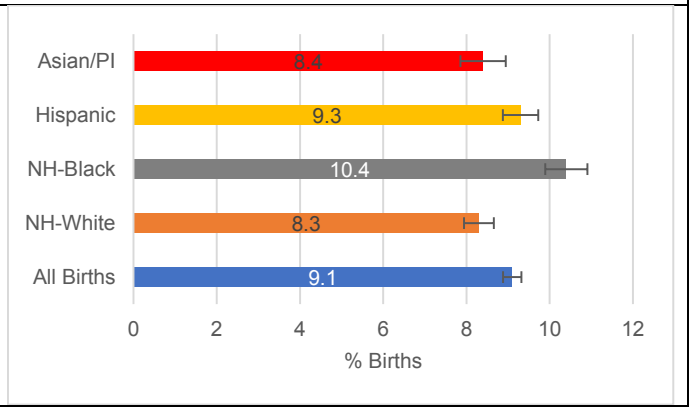


Fig. 35. Percent Preterm Births by Race/Ethnicity, Montgomery County, MD, 2013-2017



Healthy People 2020

Pretern births: 9.4% of live births

Low Birth Weight

Birth weight is another important predictor of intrauterine growth that affects the physical and mental well-being of children as they grow. Many factors such as maternal weight, height, blood pressure and age can cause low birth weight[40]. Preconception undernutrition can affect the timing of birth, and hence birth weight[47]. Low birth weight is also associated with cerebral palsy, sudden death syndrome, cognitive deficiencies, neonatal morbidity and mortality[40].

- The trend of low weights births in Montgomery County over time is similar to that of Maryland and the U.S.; percent low weight births in the County has been consistently lower than that of Maryland and the U.S. (Fig. 36)
- Among population subgroups, the NH-Black had the highest percentage of low weight births compared to other groups, and NH-White had the lowest percentage (Fig. 37).
- Similar to the trend for low birth weight, the percentage of infants with very low birth weight is highest among NH-Black, and the lowest for NH-White (Fig. 37).
- The percentage of very low weight births in Montgomery County declined over time. For Maryland, the percentage of very low weight births consistently remained higher than the County (Fig. 38).

Fig. 36. Percentage of Low Weight Births, Montgomery County, Maryland, and U.S., 2013-2017

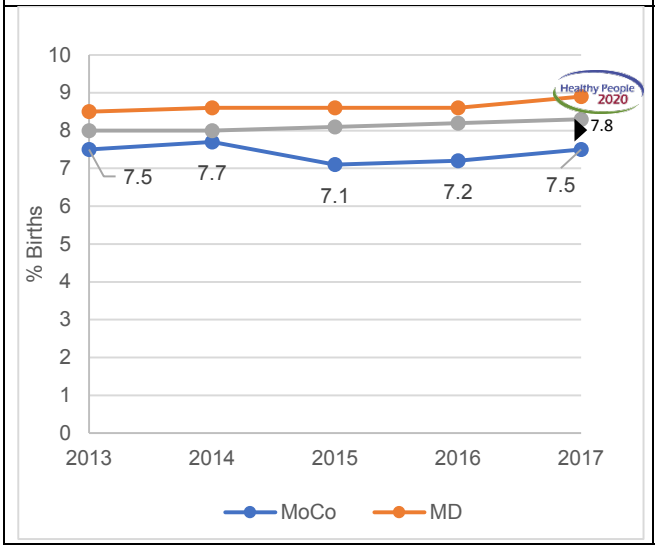


Fig. 37. Percentage of Low and Very Low Weight Births by Race/Ethnicity, Montgomery County, MD, 2013-2017

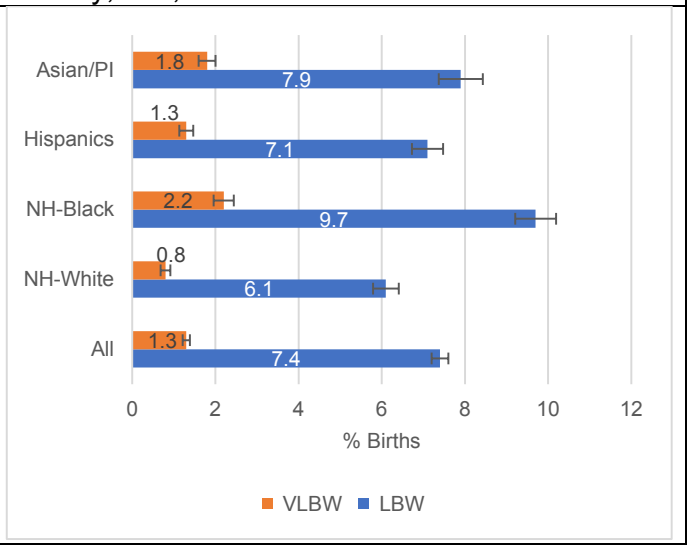
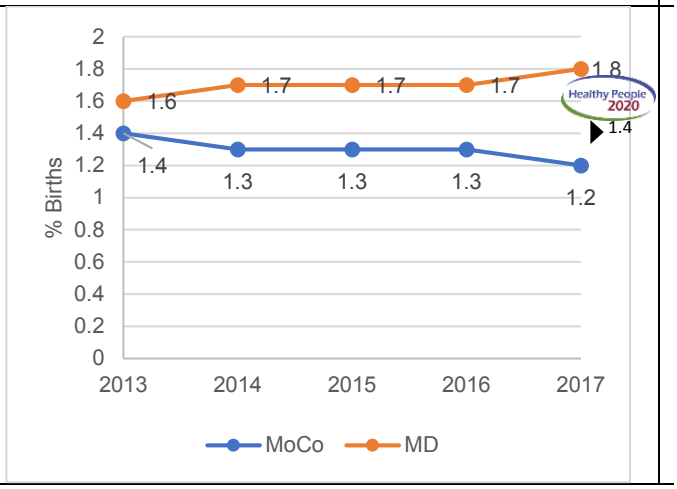


Fig. 38. Percentage of Very Low Weight Births, Montgomery County and Maryland, 2013-2017



Healthy People 2020

Low birth weight: 7.8% of live births. Very low birth weight: 1.4% of live births.

Health Care Utilization and Costs Associated with Low Weight Births

As low birth weight negatively impacts the health of an infant, it results in increased health care utilization and cost[46]. A considerable proportion of infant hospitalization and pediatric costs are attributed to low weight births in U.S, suggesting that improved birth weight can lead to substantial health care savings[46].

- The average length of hospitalization is highest among infants born with very low birth weight (< 1,500 g) followed by those weighing between 1,500g-2,500g and over 2,500g in Montgomery County and Maryland (Fig. 39).
- The average cost of hospitalization is also highest among infants born with very low birth weight (<1,500 g) followed by those weighing between 1,500g-2,500g and over 2,500g in Montgomery County and Maryland. The average cost of hospitalization among infants is lower in Montgomery County compared to Maryland (Fig. 40).

Fig. 39. Average Length of Stay (LOS) by Birth Weight in Montgomery County and Maryland, 2011-2015

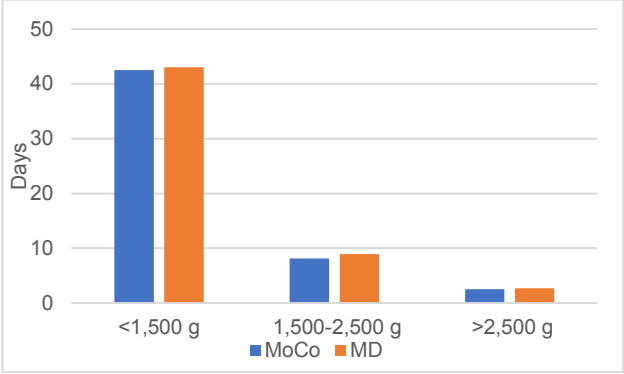
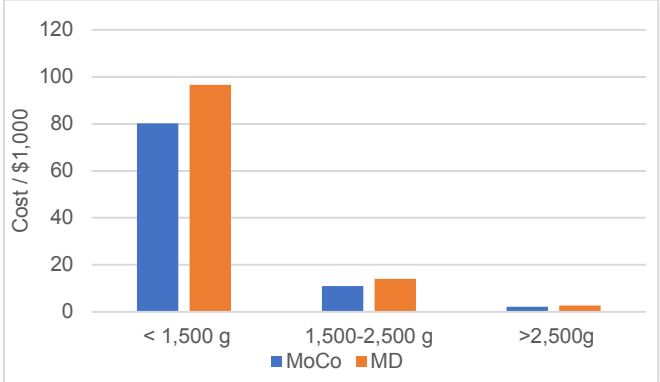


Fig. 40. Average Cost of Hospitalization by Birth Weight in Montgomery County and Maryland, 2011-15



Congenital Anomalies

Risk of developing congenital anomalies is associated with maternal characteristics such as age and maternal risk behaviors such as substance abuse. Major congenital anomalies such as cleft lip, spina bifida, and congenital heart defect are defects that are present at birth and have surgical, medical and serious cosmetic significance[41]. Minor congenital anomalies do not have as much surgical, medical or cosmetic significance; however, they are helpful in understanding maternal exposures and may help in diagnosis of more severe conditions such as Down syndrome[41]. The data collected on congenital anomalies is subject to bias as different methods of identification are used at varying times after birth[41].

Table 8. Rate of Congenital Anomaly Montgomery County from 2008-2017 and Maryland from 2010-2014

Congenital Anomaly	MoCo (2008-17) n (rate)	^MD (2010-14) n (rate)
Anencephaly	8	42
Spinal bifida/ Meningocele	12	81*
Heart Malformations	54	
Cleft lip/ Palate	69	364
Diaphragmatic hernia	6	36
Down's Syndrome	58	365
Other Chromosomal Anomalies	35	

^ Data for Montgomery County are based on those evident and recorded in birth certificates for 2008-17, which may not be comparable to those in Maryland obtained from the National Birth Defects Prevention Network based on different mechanism of case reporting for 2010-14. Interpretations and the use of these data should be cautious.

* Spinal bifida without anencephaly

Healthy People 2020

1.3 Infant deaths due to birth defects per 1,000 live births (<1 year)

22.1 cases of anencephaly per 100,000 live births

Infant Mortality

Infant mortality – death within one year of birth - remains an important aspect of public health in U.S. as the rate of infant mortality in this country is higher than peer countries. It is linked to maternal characteristics and public health practices. Socio-economic disparities among different races/ethnicities may explain some of the high infant mortality rate as socio-economic status is linked to access to nutrition, health care and education[42]. Sudden Infant Death Syndrome (SIDS), sudden unexpected infant deaths (SUIDs) and infant respiratory distress syndrome (IRDS) are some of the major causes of infant mortality[42].

- Infant mortality rates in Montgomery County fluctuated over time during 2008-17, with a decrease up to 2013, increase again between 2014 and 2016. Preliminary data from 2017 suggests that it has fallen during the last year. The trend of infant mortality in the County is consistently lower than that of Maryland and the U.S. (Fig. 41).
- Among population subgroups, NH-Black had the highest infant mortality rate, followed by Hispanic, and NH-White (Fig. 42).

Note: Where the number of events is too low to calculate a rate, data are not provided for Asian/PI infants.

Fig. 41. Infant Mortality Rate, Montgomery County, Maryland, and U.S., 2008-2017

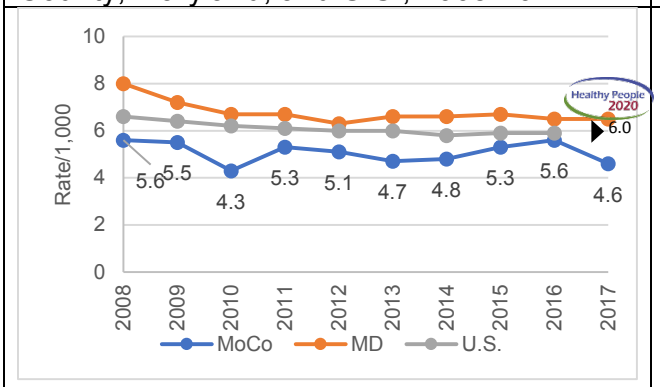
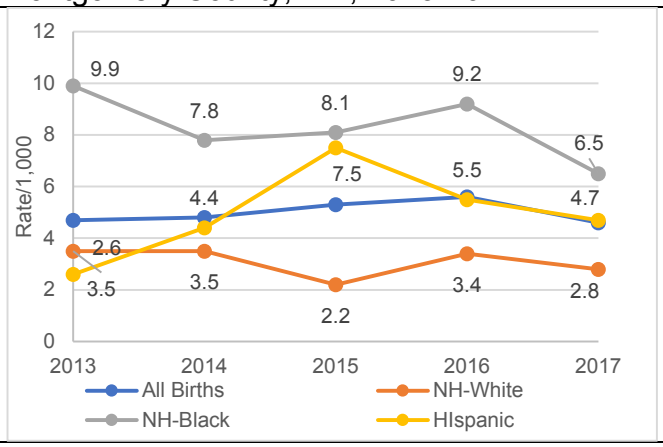


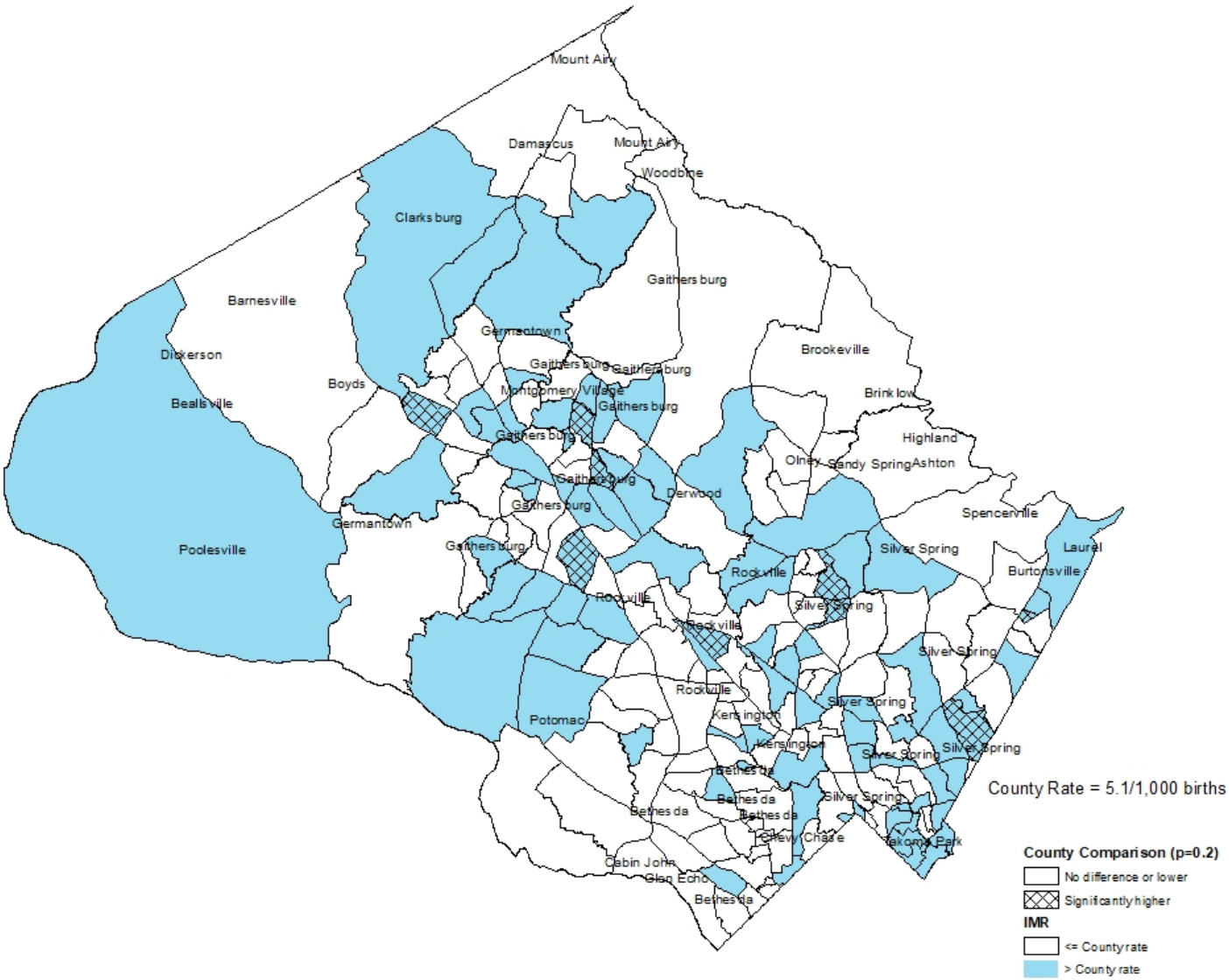
Fig. 42. Infant Mortality Rate by Race/Ethnicity, Montgomery County, MD, 2013-2017



Healthy People 2020

6 Infant deaths per 1,000 live births

Map 2. Infant Mortality Rate by Census Tract, Montgomery County, 2008-2017



Neonatal Mortality

A vast majority of deaths under the age of one occur during the first 28 days of life – the neonatal period[43]. Deaths in this category may result from infections, birth defects, birth injuries, sexually transmitted infections, nutritional deficiencies and risky maternal behaviors[43]. Preterm and low birth weight infants are more likely to experience adverse events during the neonatal period. Access to adequate health care and preventive measures such as immunization and breastfeeding can reduce the associated mortality.

- Neonatal mortality rates in Montgomery County fluctuated during 2008-17, with a decrease since 2015. The trend of neonatal mortality in the County is consistently lower than that of Maryland. (Fig. 43).
- Among population subgroups, NH-Black had the highest neonatal mortality rate, followed by Hispanic, and NH-White (Fig. 44).

Fig. 43. Neonatal Mortality Rate, Montgomery County, Maryland, and U.S., 2008-2017

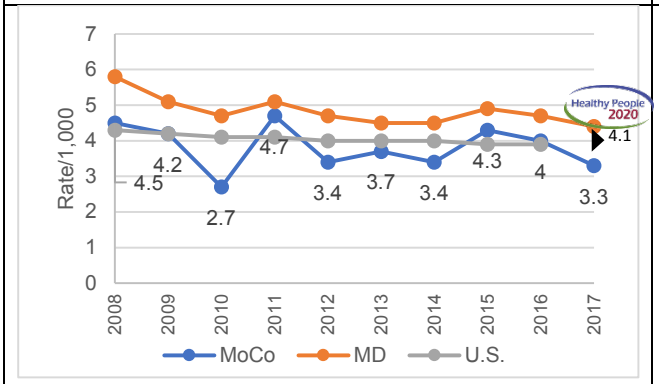
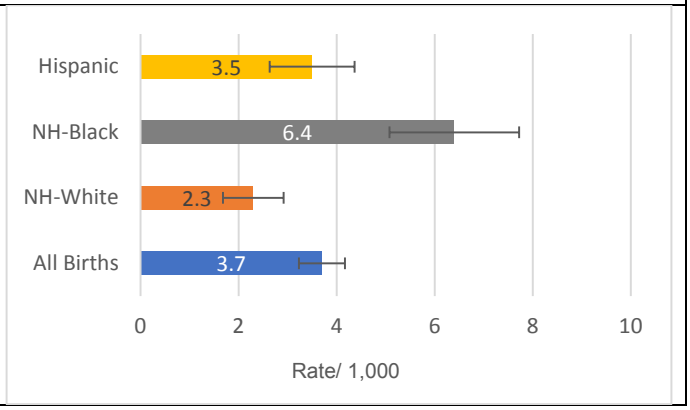


Fig. 44. Neonatal Mortality Rate by Race/Ethnicity, Montgomery County, MD, 2013-2017



Healthy People 2020

4.1 Neonatal deaths per 1,000 live births

Post-Neonatal Mortality

The cause of death for many infants during this period from 28 days to 11 months after birth is sudden infant death syndrome (SIDS)[44]. Safer sleeping practices and a safer environment for infants can help reduce the risk of death during the post-neonatal period.

- Post-neonatal mortality rates in Montgomery County have overall an increasing trend during 2008-17, similar to that from Maryland. The trend of post-neonatal mortality in the County is consistently lower than that of Maryland and U.S. (Fig. 45).
- Among population subgroups, NH-Black had the highest neonatal mortality rate, followed by Hispanic, and NH-White (Fig. 46).

Fig. 45. Post-neonatal Mortality Rate, Montgomery County, Maryland, and U.S., 2008-2017

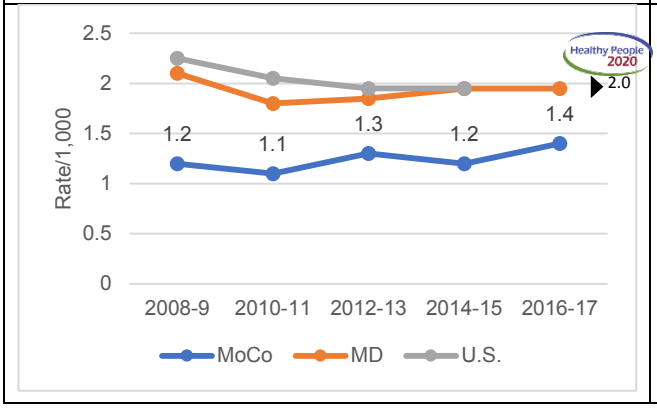
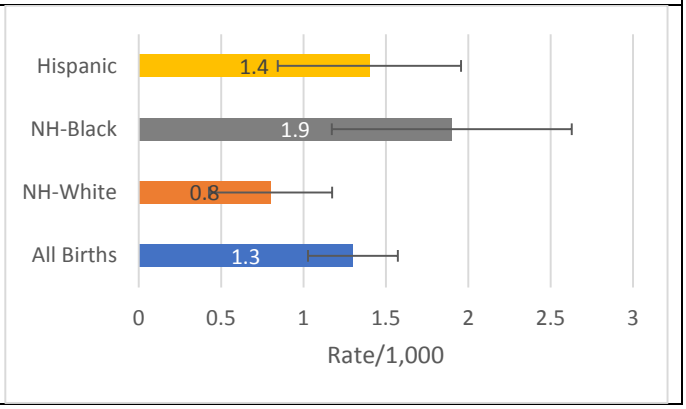


Fig. 46. Post-neonatal Mortality Rate by Race/Ethnicity, Montgomery County, MD, 2013-2017



Healthy People 2020

2.0 Post-neonatal deaths per 1,000 live births

Fetal Deaths

Maternal age, obesity, smoking, prior fetal death and maternal morbidities are risk factors for experiencing fetal loss[45]. Genetic disorders, infectious diseases and placental aberrations are among the causes of fetal loss[45]. Loss of pregnancy can be reduced if timely care for conditions such as diabetes and preeclampsia are available.

- Fetal death rates in Montgomery County fluctuated over time during 2010-17. The trend of fetal death rate in the County is consistently lower than that of Maryland (Fig. 47).
- Among population subgroups, NH-Blacks had the highest fetal death rate followed by Hispanics, NH-Whites and Asian/PI (Fig. 48).

Fig. 47. Fetal Death Rate, Montgomery County, Maryland, and U.S., 2010-2017

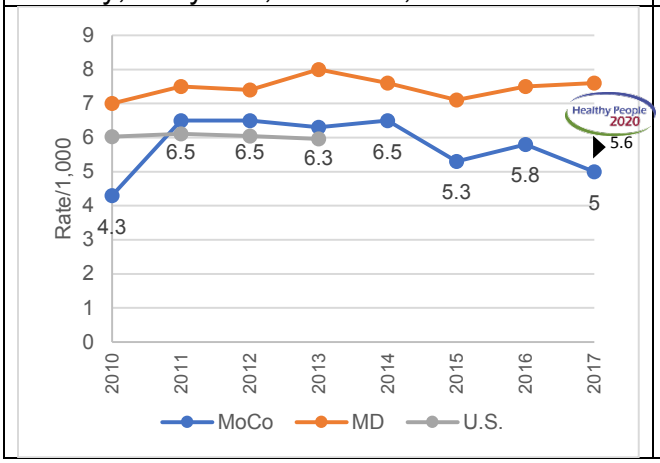
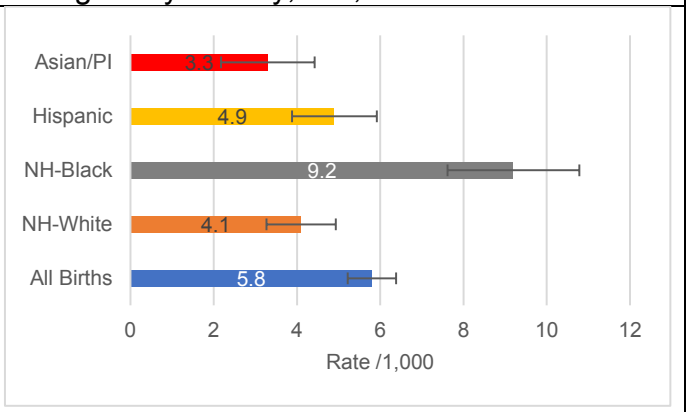


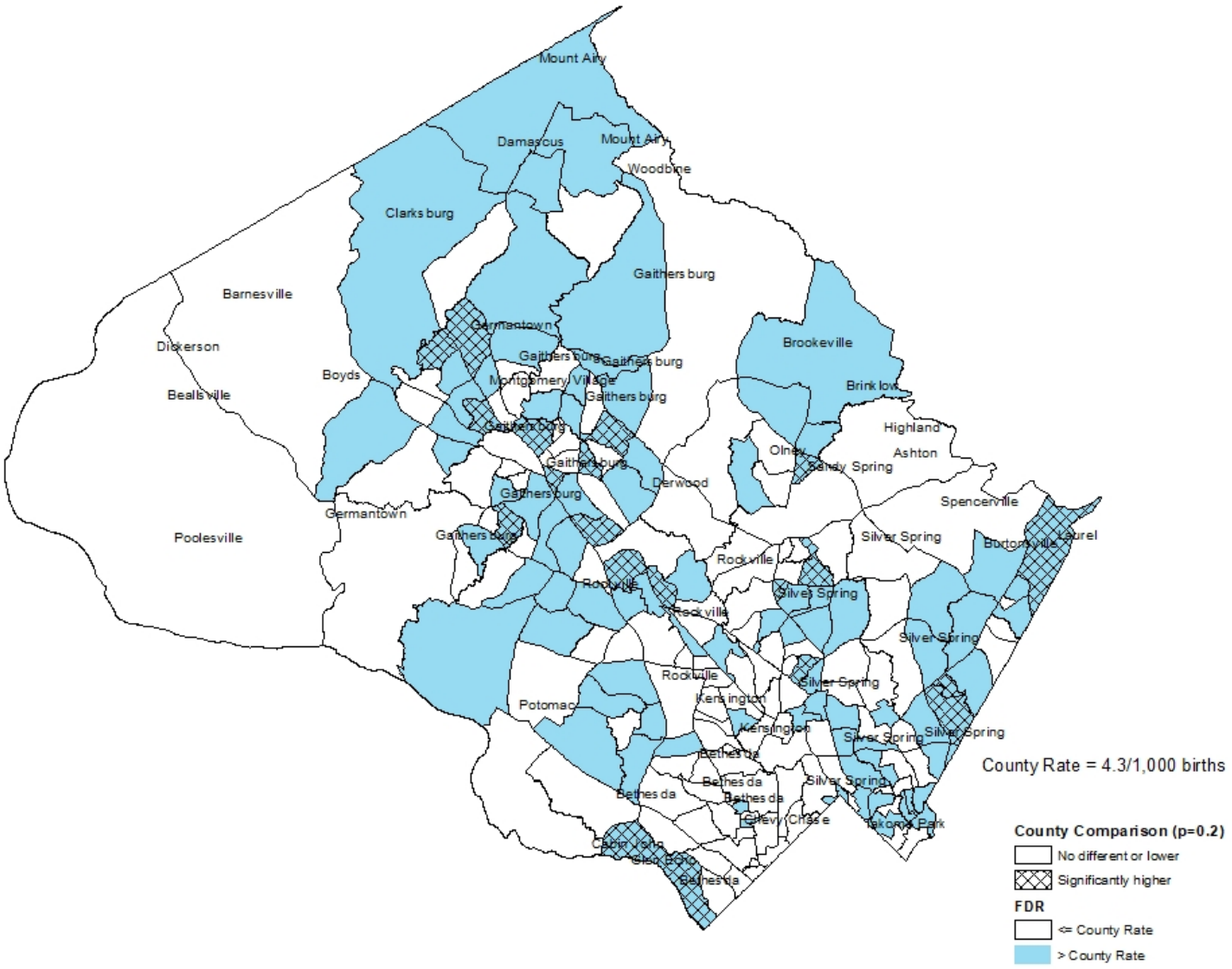
Fig. 48. Fetal Death Rate by Race/Ethnicity, Montgomery County, MD, 2013-2017



Healthy People 2020

5.6 Fetal deaths per 1,000 live births plus fetal deaths

Map 3. Fetal Death Rate by Census Tract, Montgomery County, 2010-2017



Neonatal Intensive Care Unit Admissions

Infants who are not healthy are admitted to neonatal intensive care units (NICU) after birth. This provides a safe and controlled environment to promote the development of the child as they transition from the mother's womb to the external environment. Due to compromised prenatal development, premature and low birth weight infants are often admitted to NICUs. Similarly, infections, respiratory difficulties and low blood sugar may require intensive care for the newborn.

- Montgomery County had an overall decreasing trend of NICU admissions, between 2014-17 (Fig. 49).
- Among population subgroups, the NH-Black had the highest percentage of NICU admissions followed by Hispanics, Asian/PI and NH-White (Fig. 50).

Fig. 49. Percent NICU Admissions in Montgomery County, MD, 2013-2017

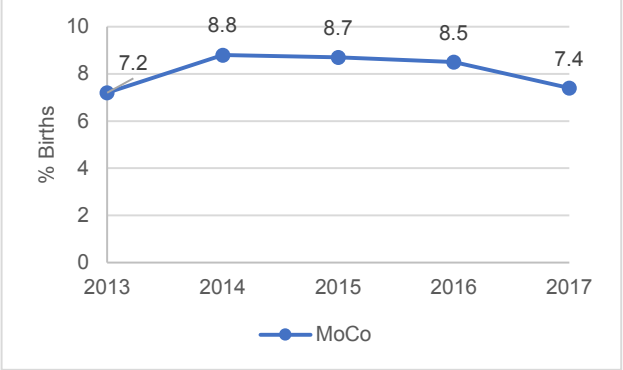
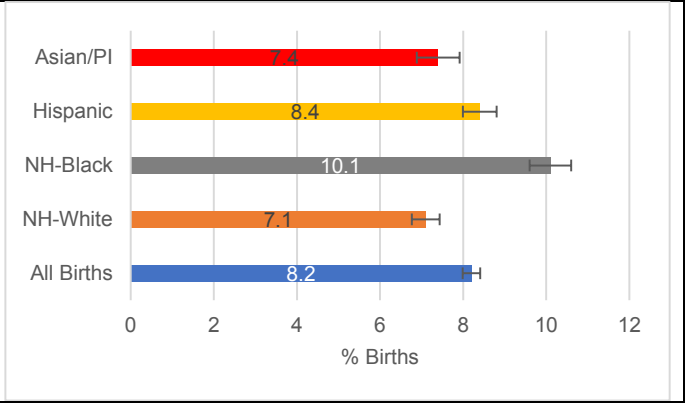


Fig. 50. Percent NICU Admissions by Race/Ethnicity, Montgomery County, MD, 2013-2017



Apgar Score

Apgar score provides a quick and concise evaluation of a newborn's health at one and five minutes after birth. The Apgar score evaluates a child's activity/muscle tone, pulse/heart rate, grimace, appearance and respiration/breathing, assigning a score of 1 for fair activity and 2 for good. Typically, scores over 7 indicate no immediate medical emergency while scores lower than 7 require closer evaluation of the child for any adverse outcomes.

- Montgomery County had an overall low percentage of births with low Apgar 5 min score ranging between 0 and 6 (Fig. 51).
- Among population subgroups, the NH-Black had the highest percentage of births with low Apgar 5 min score ranging between 0 and 6 followed by NH-White, Asian/PI and Hispanics (Fig. 52).

Fig. 51. Percent Births with Low Apgar 5min Score (0-6) Montgomery County, MD 2013-2017

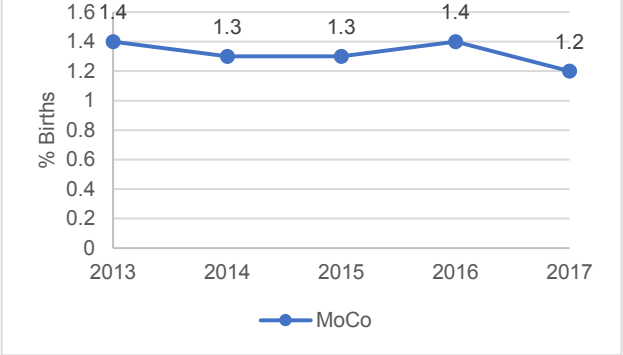
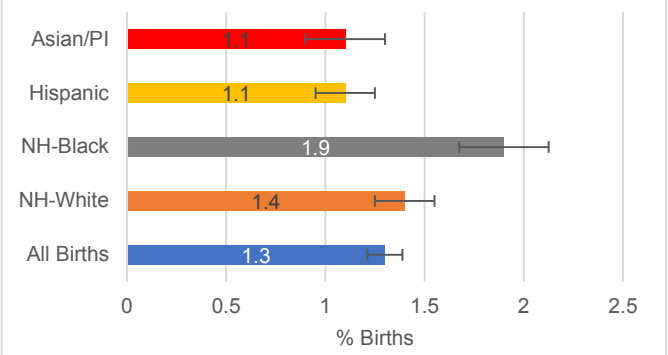


Fig. 52. Percent Births with Low Apgar 5min Score (0-6) by Race/Ethnicity, Montgomery County, MD, 2013-2017



CHAPTER IV: MATERNAL MORTALITY AND MORBIDITY

Maternal Mortality

Maternal mortality is defined as 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"[48]. 99% of worldwide maternal mortality occurs in developing countries due to inequity in access to health care, lower socioeconomic status, adolescent pregnancy, advanced maternal age, and the higher number of pregnancies a woman goes through in her lifetime[49,48]. Since 1990, there has been a decrease in worldwide maternal death by 44%, and an increase in U.S. maternal mortality by 80%[50]. These statistics indicate an unfavorable trend against the Healthy People 2020 goal of reducing maternal mortality by 10%[51]

.

Although the United States is ranked as the 12th wealthiest nation in the world, it ranks as the 47th country in maternal mortality rates[52,53]. Maryland has a maternal mortality rate of 23.5 deaths per 100,000 live births, which is higher than the national average of 20.7 deaths per 100,000 live births[54]. The number of pregnancy related deaths varies from county to county in Maryland. Baltimore City has the highest number of maternal deaths - 16 deaths in 2015, followed by Baltimore County with 10 deaths, and Montgomery County with 6 deaths[55].

Maternal mortality has more heavily affected certain racial and ethnic groups than others nationally, and Montgomery County follows these trends. For the past eight decades, Black/African American women have consistantly had much higher maternal mortality rates, than White women[56]. It is important to note that maternal mortality is mostly (60%) preventable[57]. The most common contributing factors to maternal death in the U.S. include: lack of knowledge of warning signs and when to seek help, provider misdiagnosis or ineffective treatment, and lack of cordination between providers[57].15.2% of all cases of maternal mortality are associated with cardiac disease, 14.7% are associated with non-cardiac vascular diseases, followed by 12.8% from an infection or sepsis, 11.5% from hemorrhage, 10.3% from cardiomyopathy, 9.1% from thrombotic pulmonary embolism, 7.4% from cerebrovascular accidents, and 6.8% from hypertensive disorders of pregnancy[58].

Fig. 53. Number of Pregnancy-Associated Deaths by Jurisdiction, Maryland, 2015*

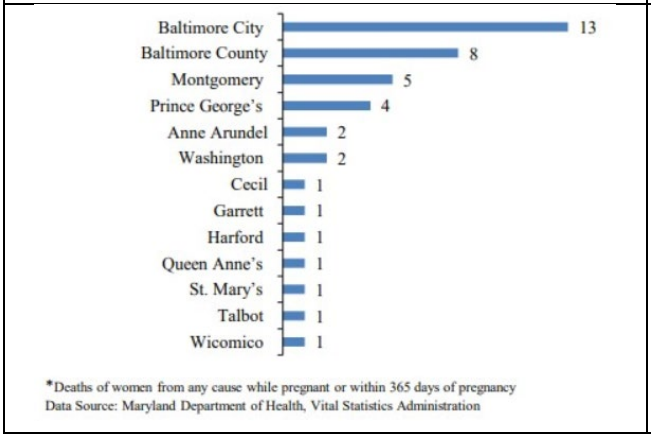
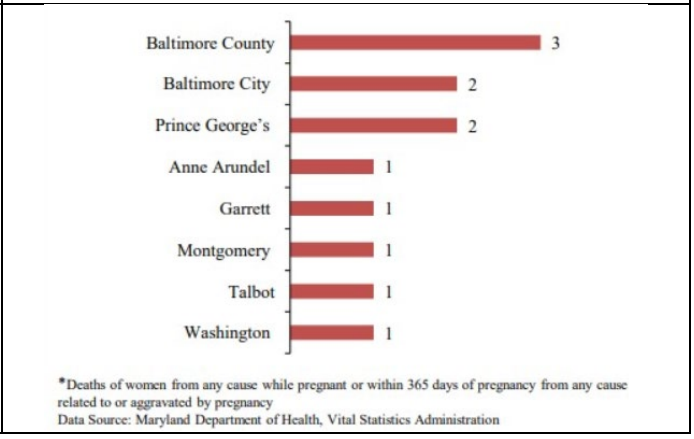


Fig. 54. Number of Pregnancy-Related Deaths Rate by Jurisdiction, Maryland, 2015*



*Source: MDH 2017 Maternal Mortality Report: https://phpa.health.maryland.gov/documents/Health-General-Article-%C2%A713-1207-Maryland-Maternal-Mortality-Review-2017-Annual-Report.pdf

Severe Maternal Morbidity

Severe Maternal Morbidity (SMM) is defined as the "unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman's health"[59]. Women who experience severe maternal morbidity can experience life-threatning conditions, such as "acute myocardial infarction, pulmonary embolism, or sespsis" which could lead to maternal mortality[60]. Similar to maternal mortality, severe maternal morbidity is also increasing in the United States[59]. Based on 2014 data, more than 50,000 women are affected every year. However, there are not clear reseaons to what is causing this increase. Some contributing factors are "maternal age, pre-pregnancy obesity, pre-existing chronic medical conditions, and cesarean delivery" [59].

There are currently 19 indicators that identify severe maternaly morbidity[61]. Some of these indicators are blood transfusions, acute cardiovascular conditions, organ failure or dysfunciton, and procedures such has hysterectomy and ventilation[61]. Severe maternal morbidity can cause illness for up to a year after birth, result in chronic disease, disability, and even dealth[62]. For women between the ages of 15 to 44, severe maternal morbidity ranks in the top 10 caues of women's death in the U.S.[63]. Prevention of maternal morbidity in developing countries is very different than developed countries like the U.S.. The Maryland Maternal Review Board reccomended "early recognition of high risk pregnancies, communication and collaboration between care providers through preconception, peripartum, and postpartum" as well as "continuity of care in transition from pregnancy care to ongoing management of medical issues" to prevent severe maternal morbidity[56].

Severe maternal mortality also burdens the mother with longer hospital stays and thus, higher medical costs[59]. The cost of delivery and hospitaliztion for mothers with SMM are 2.2 times higher than mothers without any SMM[64]. The cost of hospitalization and delivery increases as the number of SMM indicators observed increase. The cost of hositalization and delivery of someone indicating five symptoms of SMM is about 10.3 times higher of a person without any SMM[64]. SMM is not only burdensome to the mother's health, but can also affect fetal health and lead to adverse birth outcomes. Women with SMM have higher frequencies of adverse delivery outcomes[65].

The rate of severe maternal morbidity has increased by 200% since 1993, mainly due to blood transfusion[59]. Once blood transfusion is excluded as an indicator for severe maternal morbidity, the U.S. has increased SMM by only 20% over the years[59]. In Montgomery County, our non-Hispanic Black and Hispanic populations are densely affected by maternal morbidity[56]. Our non-Hispanic Black population had a maternal morbidity rate that is 60% times higher than their non-Hispanic White counter part, and our Hispanic population has a maternal morbidity that is 45% higher than their non-Hispanic White counterpart[56]. Based on our County data, women aged below 20 or over 40 were 70% more likely to experience maternal morbidity, and cesarean delivary have 3.5 times the risk of experiencing maternal morbidity compared to vaginal delivery[56].

Fig. 55. Severe Maternal Morbidity Rates, Montgomery County, MD, 2014-2016

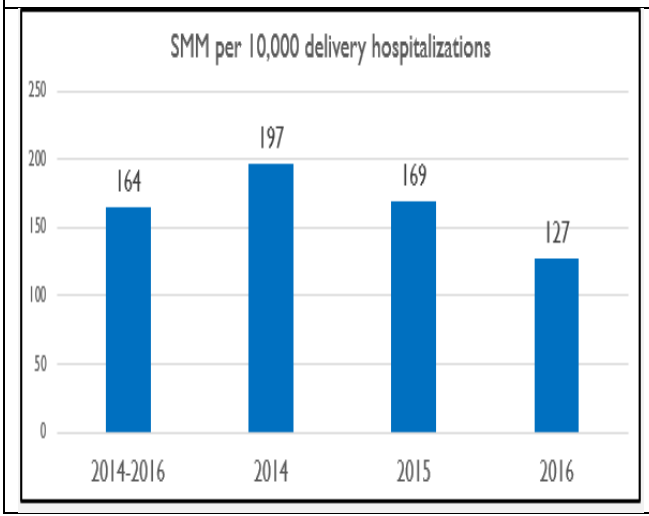


Fig. 56. Percent of severe maternal morbidity, by race/ethnicity, Montgomery County, MD, 2014-2016

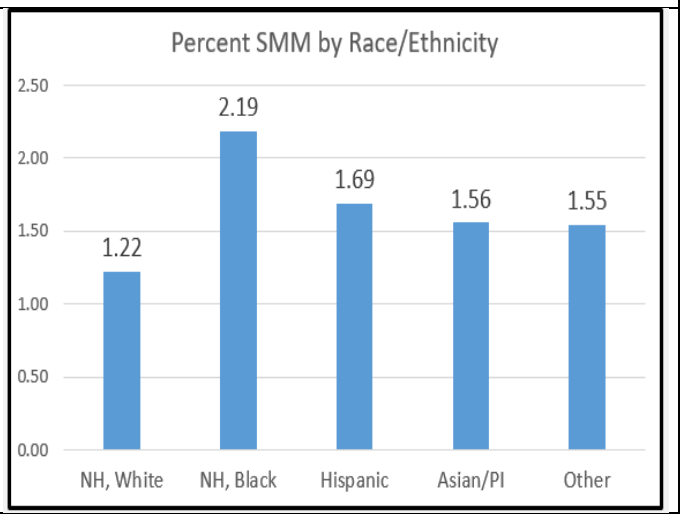


Fig. 57. Percent of severe maternal morbidity by maternal age, Montgomery County, 2014-2016

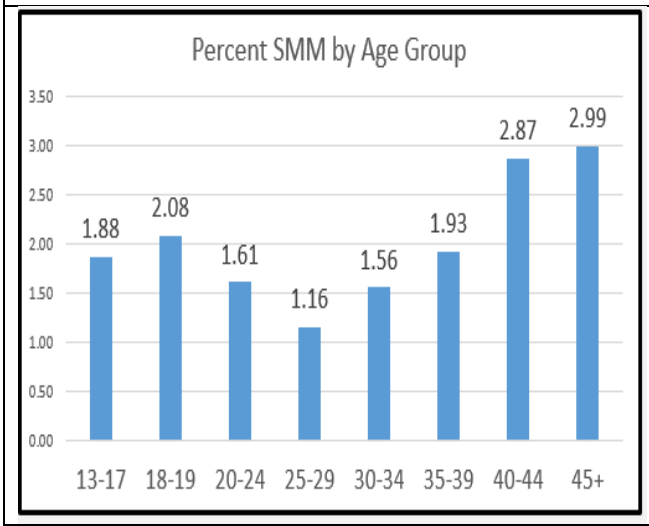


Fig. 58. Percent of severe maternal morbidity by delivery method, Montgomery County, MD, 2014-2016

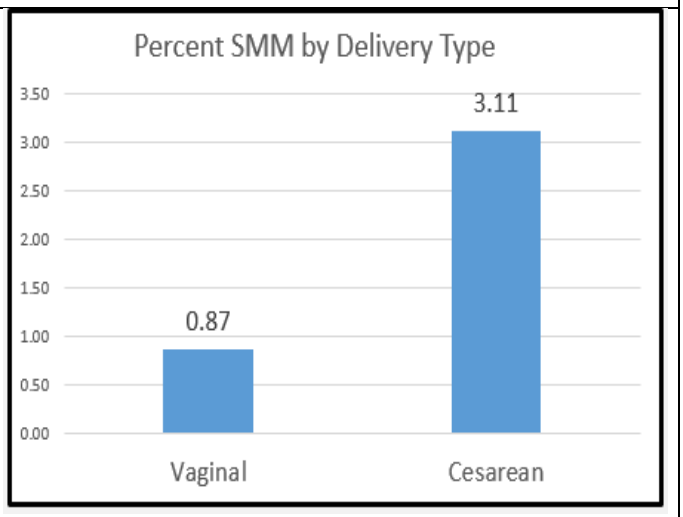


Table 9. Analysis of Risk Factors Associated with Severe Maternal Morbidity, Montgomery County, 2014-2016

	SMM Cases	Odds Ratio*	95% Confidence Interval
Race			
White, NH (N=9,090)	111	Reference	
Black, NH (N=7,361)	161	1.61	1.25-2.06
Hispanic (N=9,403)	159	1.46	1.13-1.87
Asian/Pacific Islander (N=4,433)	69	1.26	0.93-1.71
Other (N=2,782)	43	1.24	0.87-1.77
Age (N)			
<20 (N=1,090)	22	1.74	1.10-2.74
20-29 (N=11,279)	147	Reference	
30-39 (N=18,860)	321	1.24	1.01-1.52
40+ (N=1,840)	53	1.69	1.23-2.34
Delivery Method (N)			
Vaginal (21,700)	189	Reference	
Cesarean (N=11,369)	354	3.50	2.92-4.20

Adverse Birth Outcomes

Severe maternal morbidity is significantly associated with adverse birth outcomes, and is mostly preventable. SMM also has a significant association with lower birth wieght and shorter gestation age – the two most common factors leading to adverse birth outcomes[65]. Gestation period (pregnancy length) and birth weight can have significant impact on the infants health as well as the family's emotional and economic status[66]. After birth defects, conditions that follow children who were born preterm or low birth weight are the leading cause of infant mortality[65].

In the crude analysis of county data, we found that severe maternal morbidity increased the chances of both preterm birth, and giving birth to a low-birth-weight baby by 57% and 87% respectively. After adjusting for different variables in a multivariate analysis, no significant association were found between severe marternal morbidity and preterm births (table 10). However, a statistically significant association remained between severe maternal morbidity and low weight births. Women with severe maternal morbidity are 37% more likely to have low weight births with their counterparts (OR=1.37; 1.09-1.73) (table 11).

Fig. 59. Percent Low Birth Weight, Montgomery County, Maryland, and U.S., 2012-2016

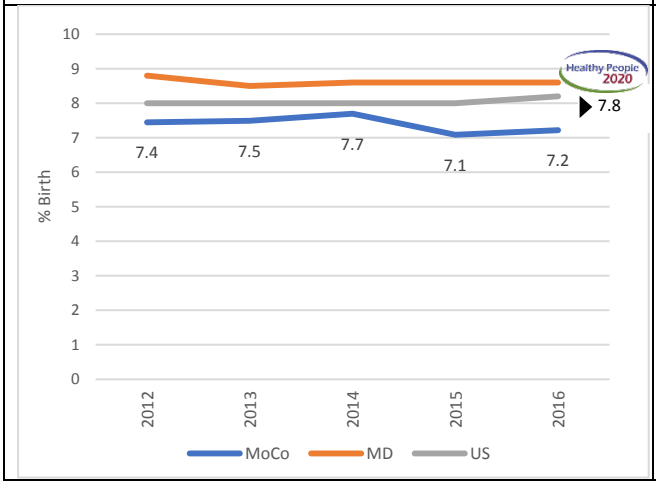


Fig. 60. Percent Low and Very Low Weight Births by Race/Ethnicity, Montgomery County, 2012-2016

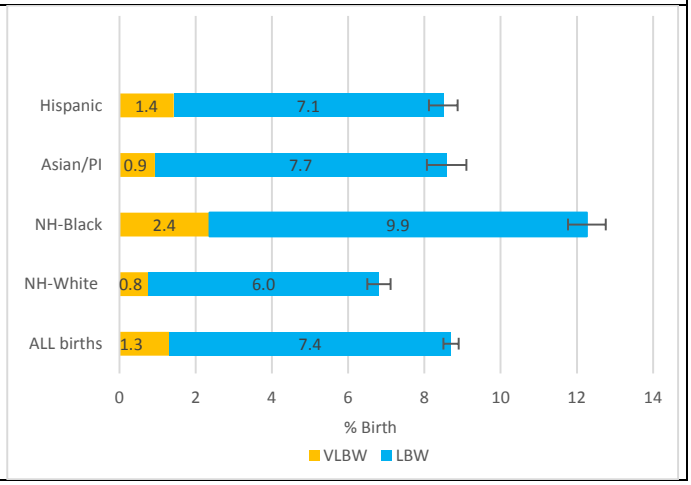


Table 10. Crude and Adjusted Analysis on Risk Factors Associated with Preterm Births, Montgomery County, 2014-2016

		Crude		Adjusted	
		OR	95% CI	OR	95% CI
SMM					
	Yes	1.57	1.26-1.96		
	No	Ref.			
Age					
	<20	0.082	0.62-1.07	0.89	0.68-1.17
	20-29	Ref.		Ref.	
	30-39	1.05	0.95-1.14	0.99	0.90-1.09
	40+	1.48	1.25-1.75	1.2	1.01-1.42
Race/Ethnicity					
	NH-White	Ref.			
	NH-Black	1.09	0.97-1.22		
	Asian/PI	0.98	0.86-1.12		
	Hispanic	1.11	0.91-1.14		
	Other	0.94	0.97-1.10		
Delivery Method					
	Vaginal	Ref.		Ref.	
	Cesarean	2.34	2.15-2.54	2.36	2.17-2.57
Marital Status					
	Yes	Ref.		Ref.	
	No	1.2	1.11-1.30	1.24	1.14-1.34
Education					
	Less than HS	1.02	0.96-1.08		
	HS and Above	Ref.			
Primary Payer					
	Medicaid	0.96	0.88-1.05		
	Medicare	1.61	0.76-3.41		
	Commercial	Ref.			
	Self	0.88	0.62-1.24		
	Other	1.11	0.85-1.45		
Later/No Prenatal Care					
	Yes	1.15	1.13-1.17	1.15	1.13-1.17
	No	Ref.		Ref.	

Table 11. Crude and Adjusted Analysis on Risk Factors Associated with Low Weight Birth, Montgomery County, 2014-2016

		Crude		Adjusted	
		OR	95% CI	OR	95% CI
SMM					
	Yes	1.87	1.49-2.35	1.37	1.09-1.73
	No	Ref.		Ref.	
Age					
	<20	0.84	0.63-1.14	0.93	0.69-1.26
	20-29	Ref.		Ref.	
	30-39	1.04	0.94-1.16	0.98	0.89-1.09
	40+	1.56	1.30-1.88	1.22	1.01-1.47
Race/Ethnicity					
	NH-White	Ref.			
	NH-Black	1.09	0.96-1.23		
	Asian/PI	1.09	0.95-1.26		
	Hispanic	1.02	0.90-1.16		
	Other	0.88	0.73-1.06		
Delivery Method					
	Vaginal	Ref.		Ref.	
	Cesarean	2.68	2.44-2.95	2.67	2.43-2.94
Marital Status					
	Yes	Ref.		Ref.	
	No	1.38	1.27-1.50	1.43	1.32-1.57
Education					
	Less than HS	0.97	0.91-1.05		
	HS and Above	Ref.			
Primary Payer					
	Medicaid	1.02	0.92-1.12		
	Medicare	0.98	0.35-2.72		
	Commercial	Ref.			
	Self	0.72	0.47-1.10		
	Other	0.96	0.70-1.32		
Later/No Prenatal Care					
	Yes	1.09	1.06-1.11	1.09	1.07-1.11
	No	Ref.		Ref.	

Maternal Postpartum Depression and Mental Health

Up to one in seven women is affected by postpartum depression[67]. Postpartum depression is associated with significant neonatal and maternal morbidity. The Maryland Pregnancy Risk Assessment Monitoring System (PRAMS) reports that, for mothers who delivered between 2004 and 2008, and between 2012 and 2013, nearly 14 percent reported symptoms of postpartum depression. The rates of postpartum depression were highest among Asian, Black non-Hispanic, young (less than 25 years of age), non-college educated and single mothers. Approximately 20 percent of mothers who delivered between 2009 and 2013 reported symptoms of perinatal anxiety in Maryland.

In 2015, the Maryland General Assembly enacted Senate Bill 74/Chapter 6 to establish the Task Force to Study Maternal Mental Health. The Task Force met eight times between September 2015 and November 2016 and worked on Maryland data, provider tools, public needs, policy in other states and co-morbid conditions. The Task Force released a report[68] in December 2016 that included the following recommendations:

- Improve early identification of postpartum depression and other perinatal mood and anxiety disorders through increased screening and patient education;
- Develop continuing maternal mental health education for providers who interact with women of reproductive age;
- Expand psychiatric consultation programs to assist obstetric, primary care, psychiatric and pediatric providers in addressing the emotional and mental health needs of pregnant and postpartum patients;
- Develop a Maryland Maternal Mental Health Initiative to coordinate ongoing advocacy, education, awareness, and treatment efforts;
- Develop and expand peer support networks and navigation to create opportunities for individuals with lived experience and to assist women and their families in maneuvering a complex system of care;
- Expand the array of maternal mental health services by establishing specialized day and inpatient programs, including mother-baby units;
- Take steps necessary to address co-morbid maternal mental health conditions including those related to substance abuse disorders, high risk pregnancies, perinatal loss and intimate partner violence;
- Expand access to paid family and medical leave to provide flexibility in the balancing of work and family demands; and
- Create a standing Maternal Mental Health Commission to help guide state policy and decision-making.

DHHS PROGRAMS AND SERVICES

Overview

Montgomery County DHHS promotes a "no wrong door" approach in providing health services for Montgomery County residents, including those seeking services for maternal and infant health. County residents can call or go to a community health center to enroll in maternal and infant health services that include family planning, pregnancy testing, prenatal care, home-based case management for pregnant women, teen pregnancy support, and infants at risk case management. Each of the DHHS programs outlined below complement one another and enables care referrals and transition between county health services and local health and social services providers. Challenges in getting timely access to care remain especially for new immigrants. Additionally, limited resources, lengthy enrollment processes, limited health literacy, poor communication between healthcare providers and those seeking care, long waiting periods to access mental health services and lack of transportation resource to mental health treatment facilities, continue to impact the most vulnerable mothers and their infants living in the county.

African American Health Program: Start More Infants Living Equally (SMILE) Program

The African American Health Program has a Maternal and Child Health focus area that seeks to decrease the high rate of Black infant mortality and improve the likelihood of good pregnancy outcomes among Black women in Montgomery County, through the S.M.I.L.E. (Start More Infants Living Equally) Program.

S.M.I.L.E. provides the tools and support that aim to improve the likelihood of healthy birth outcomes. The program is administered by registered nurse case managers who are passionate, loyal, and highly committed to partnering with mothers from pregnancy to a baby's first birthday. The care provided includes:

- Childbirth and Breastfeeding Education Classes
- Case management of mothers and infants, including home visits and telephone consultations.
- Ongoing breastfeeding support after delivery.
- Customized referrals to public and private community resources.
- Support groups and networking opportunities.

Fig. 61. Participant Enrollment and Referrals by Year, SMILE Program, Montgomery County, MD, 2013-2017

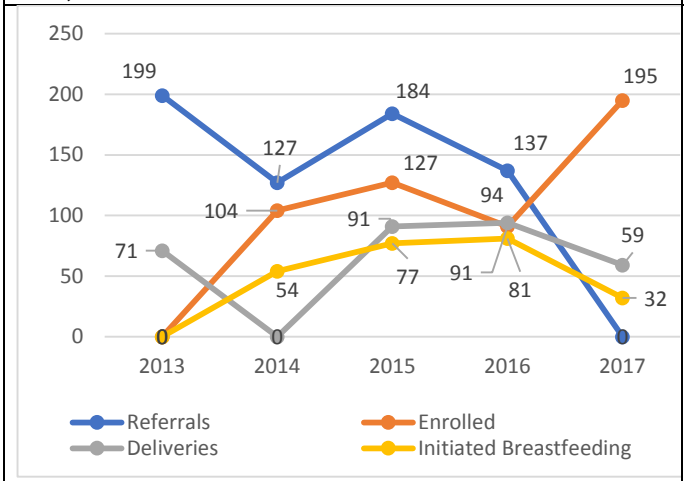
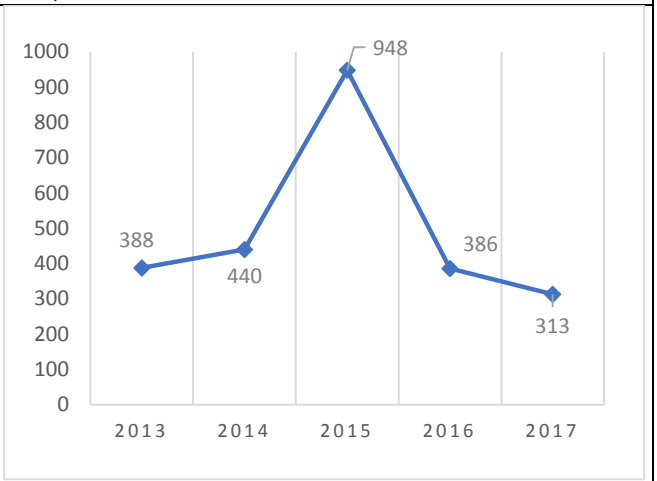


Fig. 62. Number of Clients Tested for HIV by Year, SMILE Program, Montgomery County, MD, 2013-2017



Community Health Services

Area Health Centers in Montgomery County, Maryland

Montgomery County DHHS has two Area Health Centers. The Germantown Health Center (GHC), on Middlebrook Road in Germantown) serves northern Montgomery County including, and north, of Rockville and the Silver Spring Health Center (SSHC) is in downtown Silver Spring on Fenton Street and serves the communities in the County that are south of Rockville. The Centers include eighteen Community Health Nurses, twelve Community Service Aides/Community Health Workers, two Office Services Coordinators, two Principal Administrative Aides and two Nurse Administrators.

The Area Health Centers offer a variety of non-medical maternal and child health services. Their primary function is to provide home-based case management services to at-risk pregnant and parenting families. The Germantown Community Health Center and the Silver Spring Health Center offer a variety of Maternal Child Health services including:

- Home Based case management to low income, uninsured pregnant women who are participants in the Maternity Partnership Program (MPP);
- Home Based Nurse case management for Infants at Risk referred to program from local hospitals;
- Immunization Clinics for children;
- Care Coordination for Pregnant and Parenting Teens: Nurse case management in collaboration with School Health Nursing;
- Home Birth Validation;
- Lead Poisoning Prevention;
- Pregnancy testing and counseling; and
- Care Coordination for high risk pregnant women through the Babies Born Healthy Program

Maternity Partnership Program (MPP)

A public/private partnership between Montgomery County Department of Health and Human Services, Area Health Centers, and two local hospital systems, Holy Cross Hospitals and Adventist Health Care, the ***Maternity Partnership Program*** provides comprehensive prenatal care, home-based case management and labor and delivery for approximately 2,000 uninsured, pregnant women each year. The Area Health Centers provide home-based case management services throughout the pregnancy and up to 6 months postpartum, and the hospital systems provide prenatal, intrapartum (hospital labor and delivery), and postpartum services.

The Maternity Partnership Program was developed as the County's response to the increased numbers of uninsured pregnant women settling in the area. The Maryland Medicaid program had, and continues to have, a generous income eligibility for pregnant women, which provided Medicaid coverage for prenatal care, labor and delivery for eligible residents. But Montgomery County was experiencing a surge in the number of immigrants settling in the area searching for economic opportunity. Many of the new immigrants were not documented residents and therefore were not eligible for Medicaid. The County signed its first contract with Holy Cross Hospital in Silver Spring to help support the provision of prenatal care for "uninsured pregnant women" in 1989. As a true Public/Private Partnership, Holy Cross provided the prenatal care, the three Area Health Centers (Silver Spring, Rockville and Germantown) provided home-based case management and the State supported the Labor and Deliveries through the Emergency Medicaid Program. The first year the program supported 866 pregnant women through their prenatal, labor and delivery and postpartum periods. Since that time the number of enrolled women has fluctuated based on immigration rates, pregnancy rates and changes in Medicaid regulations.

Maternity Partnership Program Eligibility: To enroll in the Maternity Partnership Program a woman must present in person to one of the three Offices of Eligibility Support Services (Germantown, Rockville and Silver Spring) to apply. To qualify for the program a woman must be pregnant, show proof that she is low income (at or below 135% Federal Poverty Level) and verify that she is residing in Montgomery County. Once she is determined eligible, the Office of Eligibility Support Services sends a referral to one of the two Area Health Centers (Germantown or Silver Spring) based on the patient's zip code. Simultaneously, the Offices of Eligibility Support Services submits the application to Maryland Medicaid to get approval for Emergency Medicaid which will cover the cost of the impending labor and delivery at one of the hospitals.

Maternity Partnership Orientation: The Area Health Centers bring all the women in to the Center for a program orientation at the beginning of their care. At the orientation they receive the details of the program, and the location, date and time of their first prenatal care appointment. The Center staff also provides a brief prenatal class discussing important topics such as nutrition, warning signs of pregnancy, things to avoid while pregnant, resources, importance of breastfeeding and family planning. The Center staff also provide each woman with her first bottle of prenatal vitamins. Each patient has a brief interview with a Community Health Nurse to be screened for depression and other risk factors of pregnancy to help the nurse determine the needed level of case management services.

Maternity Partnership Prenatal Care: Patients of the Maternity Partnership Program are asked to pay a $450 co-pay to the hospital clinic for the prenatal care services, though no patient is denied services based on inability to pay. A patient is assigned to one of four area hospitals; Holy Cross Hospital - Silver Spring, Holy Cross Hospital - Germantown, Washington Adventist Hospital or Shady Grove Adventist Hospital. All prenatal care is provided in hospital-based clinics. The care is comprehensive and follows ACOG guidelines.

Maternity Partnership Dental Care: All patients enrolled in the Maternity Partnership Program also receive free or very low-cost dental care through the Montgomery County Department of Health and Human Services' Oral Health Program. There is a strong association between poor dental health and premature birth and low birth infants. Knowing the importance of dental health services and oral health education, DHHS created the Maternity Partnership Program Oral Health Initiative.

Maternity Partnership Case Management: The Area Health Center Staff provide home visits to all MPP patients. Depending on the needed level of care, the visits will be as few as once per trimester or as frequent as every two weeks. Visits continue throughout the pregnancy and up to 6 months postpartum. The goal of case management is to ensure that the pregnant mother has the care, resources and education to have a healthy pregnancy and deliver a healthy, full term infant. Referrals are made to appropriate health and human services depending on the need.

Upon discharge the family must meet the following goals: the infant is established with a primary care provider (pediatrician) and is up to date on their immunizations; the mother is established with a primary care provider and has established and is prepared to follow a reproductive life plan ensuring that she will not have a subsequent pregnancy until she is ready.

Maternity Partnership Care Coordination: The staff at the Area Health Centers work closely with the clinic staff throughout the pregnancy. The Health Center team communicates regularly with the Clinic Social Workers to keep each other abreast of any new concerns or social service needs. Together the team often makes referrals for Behavioral Health Services, helps with food and housing concerns, supports women dealing with intimate partner violence, to name a few. Area Health Center nurses participate in the weekly "High Risk Rounds" to keep up-to-date on the medical conditions impacting the mom and baby.

Fig. 63. Teenage Admissions by Year, MPP, Montgomery County, MD, 2009-2017

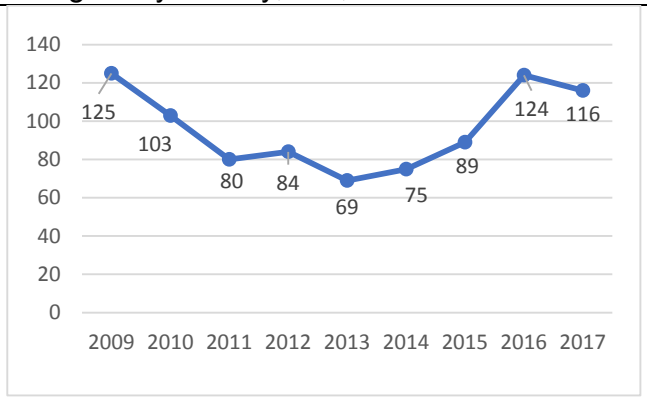
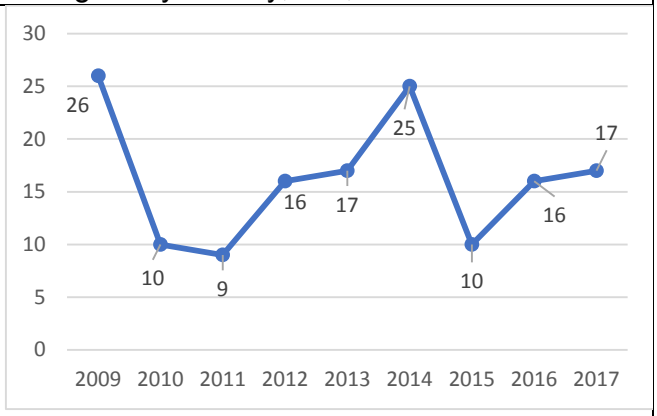


Fig. 64. Fetal Infant Losses by Year, MPP, Montgomery County, MD, 2009-2017



Data Collection (Outcome Measures/Statistics): The hospital provide the MPP Program Staff with birth outcome data for all Maternity Partnership patients. The rates of positive birth outcomes are consistently good, considering the social and financial situation of many of the participants. In 2018, the infant mortality rate among the program participants was 3.2 infant deaths per 1,000 pregnancies. This compares very favorable with the overall infant mortality rate in Montgomery County of 8.5 infant deaths/1,000 pregnancies. The rate is also lower that the overall infant mortality rate of 10.3/1000 among Latino mothers in the County, which is significant considering 86% of all Health Center patients identify as "Latino".

Table 12. Maternity Partnership Enrollment, FY 2000

Year	# Patients Enrolled in the MPP
2000	866
2001	1,257
2002	1,279
2003	1,431
2004	1,596
2005	1,798
2006	2,340
2007	2,323
2008	2,372
2009	2,375
2010	1,999
2011	1,950
2012	1,755
2013	1,668
2014	1,635
2015	1,771
2016	1,905
2017	1,749
2018	1,605

Care Coordination for Pregnant Teens

Although the County's teen birth rate has decreased significantly over the past ten years (from 21.6/1,000 births in 2006 to 11.2/1,000 births in 2016) there were many pregnant teens enrolled in Montgomery County Public schools during the 2017/2018 school year. The Montgomery County Department of Health and Human Services' (DHHS) Care Coordination for Pregnant Teen Program is a collaborative effort between the Department's School Health Services and the Area Health Centers to provide coordinated school-based and home-based case management to all pregnant teens enrolled in Montgomery County Public Schools.

When a teen is identified as pregnant by any high school or middle school personnel, the teen is sent to the School Health Nurse for school-based case management. The School Health Nurse also makes an immediate referral to a Community Health Nurse in the Area Health Centers for home-based case management. In tandem, the two nurses work to ensure, that the teen has health insurance, is receiving prenatal care, is in a safe home, and has the necessary resources for the baby - including but not limited to crib and car seat, is prepared for the baby's arrival, is prepared to return to school, and has the plan in place to delay subsequent pregnancies. With the nurses' assessments and eyes in both the home and the school, the duo can learn a great deal about the teen, her health and her social situation. The School Health Nurse also can provide a safe place at school for the Community Health Nurses to meet with the teen and discuss concerns. Many teens do not feel comfortable discussing personal and relationship information in their homes.

Teen Care Coordination Eligibility: All pregnant and parenting teens residing in the County and enrolled in Montgomery County Public Schools are eligible for the program. If a teen is not enrolled in school, the Area Health Centers provide home-based case management only.

Intensive Team Meetings: At around the third trimester, the program also refers the teen to the County's Service Integration Program for an Intensive Team Meeting (ITM). If the teen and her parents/guardians agree, an ITM is arranged and all appropriate service providers are invited to attend. The Intensive Team Meeting follows an integrated practice model, allowing the program to utilize resources and information outside of School Health and Community Health Services. The model builds on the collaborative work and experience of many staff and programs. Staff from programs such as Child Care Locate, Child Care Subsidy, Child Welfare Services, Emergency Housing Services and Income Support Services, as well as pertinent school personnel including counselors, assistant principals and interested teachers all attend the meeting, with the teen and her parents. The mission of the meeting is to help the teen achieve the shared goals of having a healthy baby, returning to and graduating from High School and delaying subsequent pregnancies.

Data Collection (Outcome Measures/Statistics): In Fiscal Year 2017 the program provided coordinated case management for 66 pregnant teens and held 31 Intensive Team Meetings. The Infant mortality rate for mothers 19 and under in Montgomery County was 16.2/1,000 pregnancies which is significantly lower than the overall infant mortality rate for teens in all of Maryland of 19.2/1,000 pregnancies. Low Birth Weight Rates see similarly positive rates for adolescents having babies in Montgomery County: 10.6% of live births to teen mothers residing in Montgomery County were born weighing less than 2500 grams whereas 11% of births to adolescents in all of Maryland were of low birth weight.

Although teen pregnancy is seeing great declines in Montgomery County, it is as important as ever to provide intensive case management services to all pregnant teens to improve the outcomes for the baby and the teen mother. Montgomery County's two-pronged case management program is a novel approach to working with teens, both in the school and in the home. Also essential in the program's structure are the Integrated Services provided to each teen during the Intensive Team Meetings. The ITMs that were most successful were those that had the most services attending. When the case management burden was spread across many disciplines and services the teens benefited the most, receiving support with housing, child care, and food and income assistance.

Infant at Risk Program

The Infant at Risk Program is a program of the Maryland Department of Health. The State requests that all Delivery hospitals refer high risk infants and mothers to their local health department for community-based services using the Postpartum Infant and Maternal Referral (PIMR) form. The Area Health Centers receive approximately 150 Infant at Risk referrals each year from local hospitals.

Background: The Maryland Department of Health instituted the use of the PIMR approximately seven years ago in April of 2011. This form is intended for use by Maryland hospitals to refer high risk infants and mothers at hospital discharge to their local health department for community-based services. The form is used throughout the State, though it is not required.

- Program Eligibility: The form is submitted at the discretion of the hospital staff but is suggested to be used for the following:
  - Teen Mother;
  - No prenatal care;
  - Substance Abuse;
  - Mental health issue;
  - Domestic Violence;
  - Unstable housing/homelessness;
  - Previous infant death;
  - Previous preterm birth;
  - Very low birthweight (<1500gm); and
  - Any other circumstance deemed to be a serious risk for mother or infant.
- Data Collection: Over the past three years, the number of Infant at Risk referrals has increased considerably from 129 referrals in FY16 to 191 referrals in FY18.

Table 13. Infant at Risk Referrals by Fiscal Year, 2016-2018

Fiscal Year	# of Infant at Risk Referrals
FY 2016	129
FY 2017	153
FY 2018	191

Additional Maternal and Child Health Services Offered by Area Health Centers

Immunizations

The Area Health Centers are satellite sites for the DHHS Immunization Program which offer immunizations to children under the age of 19 that are required for attendance in school as part of the Vaccine's for Children Program in collaboration with School Health Services. The Centers for Disease Control (CDC) and Maryland Department of Health recommend that all children be immunized against vaccine preventable communicable diseases and that providers follow CDC's Advisory Committee on Immunization Practice (ACIP) recommended schedule of vaccines.

The Area Health Centers partner with Dennis Avenue Immunization Program and the Maryland Department of Health's Vaccine for Children (VFC) Program to provide vaccinations to eligible children ages 0-18 years. The Vaccine for Children Program is administered at the national level by CDC and the National Center for Immunization and Respiratory Diseases. The program was established by an act of Congress in 1994. The Maryland program is administered by the Department of Health and to date has more than 750 providers enrolled who practice at 1,000 public and private practice vaccine delivery sites throughout the State. CDC contracts with vaccine manufacturers to buy vaccines at reduced rates. Participating providers order federally funded vaccines through the MD state VFC Program and receive routine vaccines (including influenza) at no cost. The Area Health Centers offer Immunization Clinics weekly by appointment only. VFC providers agree to order and provide all age-appropriate ACIP-recommended vaccines to VFC-eligible patient populations. In exchange for federally funded vaccines, enrolled providers agree to partner with the VFC Program to ensure that program requirements are met in order to protect the integrity of the program as well as the provider's vaccines and patients.

The VFC Program is an entitlement program. Children must meet federal VFC eligibility criteria to receive public vaccines to ensure vaccines are going to the intended populations. Children from birth through 18 years of age must meet at least one of these criteria at each immunization visit to be eligible to receive VFC-supplied vaccines:

- are Maryland Medicaid eligible;
- are uninsured; or
- are Native American or Alaskan Native; or
- are underinsured (children who have health insurance that does not cover immunization).

The Area Health Centers offer Back to School Clinics during the summer months to assist the DHHS Immunization Program to have full compliance with children vaccinated in time for school.

Pregnancy Tests

The Area Health Center Pregnancy Test Program offers free pregnancy tests to any female county resident seeking DHHS prenatal health services or on an emergency basis to diagnose pregnancy and to provide women with the information and support needed to make an informed decision in a private, safe and non-judgmental environment regarding their reproductive health care. There is no fee for the test and patients are accepted on a walk-in basis.

A clinic staff member meets with the patient, reviews pregnancy symptoms, contraceptive status, last normal menstrual cycle, menstrual regularity, medication, or drug use. Clinic staff performs the hCG qualitative urine test; which detects the presents of hCG hormone if the patient is pregnant. Results are given privately to the patient and options are discussed in an unbiased manner. Information on all options are provided to each patient so that she will have relevant resources to review.
The Area Health Centers perform approximately 200 pregnancy tests per year.

Home Birth Validation

Maryland law requires that all births that occur within the State be registered with the Department of Health. Registration of the child's birth establishes the facts of birth and will be used throughout the child's lifetime for a variety of legal purposes. When a baby is born outside of an institution, the local health department of the jurisdiction where the birth occurred is required to attempt to verify the facts regarding the birth. This requires a public health nurse to conduct a home visit to verify the live birth within the first two weeks of the delivery and to complete a verification of birth worksheet.

After the infant is born, the parents should notify the DHHS Office of Vital Records, which then notifies the corresponding Health Center based upon the zip code where the birth occurred. The Health Center assigns a Community Health Nurse who contacts the family and sets up a home visit. At the home visit each of the following types of documentation may be provided to allow for the facts of birth to be verified so the birth can be registered. These include:

- Proof of Identity of Parent(s)
- Evidence of Pregnancy
- Evidence that a Live Birth Occurred
- Evidence of Mother's Presence in Maryland on the Date of the Live Birth

Birth certificates are signed at the discretion of the health officer. If the facts of birth cannot be verified, families may seek a court order from the Circuit Court for Montgomery County that lists the facts about the birth and orders the Secretary of the Department of Health and Mental Hygiene to create the birth record.
The Area Health Centers verify approximately 4 Home Births per year.

Lead Poisoning Program

The Montgomery County Lead Poisoning Prevention Program works with families of children with high blood lead levels to help reduce the levels and prevent further poisoning. It is recommended that all children in Maryland receive lead blood level testing at ages 12 and 24 months. Laboratories are mandated to report any level of 5 µg/dL to the Maryland Department of the Environment. The Maryland Department of the Environment, Childhood Lead Registry performs childhood blood lead surveillance for Maryland. The registry provides blood lead test data to the Maryland Department of Health, including Medicaid, ImmuNet, and local health departments as needed for case management. In Montgomery County, the percentage of children one year of age being tested for lead have increased by 12.6% between 2015 and 2017, from 38.8% in 2015 to 51.4% in 2017.

The program provides services to the community to increase awareness about the hazards of lead exposure, to increase the number of children tested for blood lead poisoning, and to decrease lead poisoning in children. In collaboration with Maryland Department of Environment, the program offers home visitation, environmental home inspections, and health education to families of severely lead-poisoned children.

Services include:

- Case management for children who have blood levels of at least 10 micrograms per deciliter
- Education and outreach to schools, day care centers, landlords, residents and the medical community about lead poisoning throughout the County at health fairs, community events, clinic waiting rooms and DHHS waiting rooms
- Monitoring the incidence of childhood and environmental lead poisoning and lead poisoning hazards
- Promotion of lead-safe environments for children in Montgomery County

Table 14. Number and Percentage of Children 0-72 Months Old Tested for Lead with Number and Percentage of New (Incident) and Existing (Prevalent) Cases of Blood Lead Level ≥ 10 µg/dL and Blood Lead Level 5-9 µg/dL in Montgomery County, 2013 – 2017

Calendar Year	Population of Children 0-72 Months	Children Tested		Blood Lead Level ≥ 10 µg/dL			
		Number	Percent	Prevalent Cases		Incident Cases	
				Number	Percent	Number	Percent
2013	90,774	20,308	22.4	26	0.1	24	0.1
2014	92,252	19,308	20.9	19	0.1	16	0.1
2015	93,606	19,989	21.4	32	0.2	26	0.1
2016	94,806	22,392	23.6	31	0.1	25	0.1
2017	95,846	25,594	26.7	28	0.1	32	0.1

Calendar Year	Population of Children 0-72 Months	Children Tested		Blood Lead Level 5-9 µg/dL			
		Number	Percent	Prevalent Cases		Incident Cases	
				Number	Percent	Number	Percent
2013	90,774	20,308	22.4	175	0.9	159	0.8
2014	92,252	19,308	20.9	133	0.7	120	0.6
2015	93,606	19,989	21.4	147	0.7	134	0.7
2016	94,806	22,392	23.6	180	0.8	165	0.7
2017	95,846	25,594	26.7	137	0.5	159	0.6

Source: Maryland Department of the Environment, Lead Poisoning Prevention Program. October 2018. Childhood Blood Lead Surveillance in Maryland: Annual Report Calendar Year 2017. Supplementary Data Tables: Supplement #4. https://mde.maryland.gov/programs/LAND/Documents/LeadReports/LeadReportsAnnualChildhoodLeadRegistry/LeadReportCLR2017Supplement_4.pdf

Administrative Care Coordination Unit (ACCU) and Dedicated Administrative Care Coordination Team (DACCT)

The Montgomery County Department of Health and Human Services Administrative Care Coordination Unit (ACCU) works to improve the effectiveness and efficiency of the Medicaid Managed Care Program, HealthChoice. As the single point of entry for outreach, education and care coordination of HealthChoice enrollees, the ACCU provides direct assistance to current HealthChoice beneficiaries, strengthens provider relations through direct collaboration with Managed Care Organizations (MCO), providers, specialists and local agencies to ensure beneficiaries' optimal linkage to appropriate resources. The ACCU also advocates for beneficiaries by mediating disputes and grievances through MCO education. The Ombudsman investigates disputes between the HealthChoice enrollees and the MCO. These cases are referred by the State Complaint Resolution Unit to the local ombudsman. The ACCU also carries out the Maryland Prenatal Risk Assessment.

The goal of the **Dedicated Administrative Care Coordination Team** (DACCT), Administrative Care Coordination Unit (ACCU), Ombudsman Program is to improve the effectiveness and efficiency of the Medicaid Managed Care Program, HealthChoice. While the ACCU serves all Medical Assistance beneficiaries, the DACCT provides care coordination only to pregnant women.

Funded by the Maryland Department of Health, the ACCU met two state performance measures in FY 2018: educating and linking eligible Medical Assistance beneficiaries to dental care services and other resources (target met by 93%; target goal set at 90%); and providing education and informational packets on nutritional support services to eligible pregnant women and linked to other programs (target met by 90%; target goal set at 90%).

Below is a snapshot of the program statistics from FY2018:

Table 15. Montgomery County's ACCU Program Data, Fiscal Year 2018

FY'18 MONTGOMERY COUNTY ACCU

PROGRAM DATA	TOTAL
I. MDH Referral:	
• Newborns Not Linked to MCO at Delivery (Report HMMR#6500-R002)	391
• Pregnant Women Education (CLCC and CRU referrals)	546
• Identified Pregnant Women Below 264%	2,271
• Maryland Prenatal Risk Assessments	1,717
• Local Health Services Requests	514
II. Other Referrals Sources	
• Other Referral Sources (OESS, Walk-in, Self-Referrals and from other Counties	169
• Potentially Eligible Client who did not have MA# at the time of report	33
III. Dental Referrals to LHD from CRU	
• Number of successful contacts	25
• Number of family members who needed assistance with accessing dental care	12
IV. Prenatal Risk Assessments Performed	
• MCA (No MA/MCO)	127
• Aetna	7
• Amerigroup	512
• Kaiser	347
• MedStar	90
• Maryland Physician Care	147
• Priority Partners	245
• University of Maryland Health Partners	52
• United Health Care	190
V. Other Aggregate Number Not Included in Part A or B	
• MCO Collaboration	23
• Other Collaboration Efforts	59

Collaborations:

The ACCU participates in quarterly meetings of the Maryland Dept. of Health, Managed Care Administration at which technical assistance and policy updates are provided.

In addition, the Montgomery County ACCU, collaborates with its counterparts in Prince George's, Howard and Anne Arundel counties and organizes quarterly joint meetings with each MCOs Special Needs Coordinators to address the needs of vulnerable populations including the homeless. The ACCU also meets with MCO Obstetrician case managers to share and update information about their Maternity Case Management Program. This program is designed to assist high risk pregnant women in improving birth outcomes. Representatives from each MCO, Beacon Health Options, Office of Eligibility and Support Services (OESS), Maryland Health Connection, and Healthy Smile Dental Program are invited to share their work processes and provide feedback on resolving issues affecting MA beneficiaries.

The ACCU/Ombudsman team, in collaboration with the Dedicated Administrative Care Coordination (DACCT) program, OESS, the Nutritional Support Program (WIC), Healthy Smiles Dental Program, Planned Parenthood, Amerigroup, Aspire Counseling, "Healthy Mothers, Healthy Babies", and Silver Spring Health Center (Parent Cafés) organized a baby shower in 2018 for pregnant women in their 2nd or 3rd trimester. The goal of this event was to educate pregnant women on nutrition and breastfeeding support groups, post-partum care, family planning methods, newborn safety and healthcare coverage, child birth classes, networking support groups for expectant parents, prenatal and postpartum depression signs and symptoms, and provide them with HealthChoice education. To develop a working relationship with the providers in the community, ACCU/DACCT program staff continued to make office visits to pediatrician and obstetrician providers to address their needs and provide them with updates on any MCO or Medicaid regulatory changes.

To improve early access to prenatal care, the ACCU collaborates with to identify potential eligible pregnant women for care coordination, MCO education and linkage to appropriate local resources. Program staff attend MCO Consumer Advisory Board Meetings to work to improve services and care coordination of the MCO members. The ACCU invites representatives from Amerigroup, United Health Care, Priority Partners, Kaiser Permanente, Aetna, Maryland Physicians' Group, and MedStar Family Choice to attend ACCU/DACCT staff meetings to share information on Case Management's Health Promotion and Wellness programs and the Maternity Case Management Program designed to provide the expectant mother with educational health support during pregnancy and after the baby is born.

The ACCU participates as part the Interagency Coalition on Adolescent Pregnancy (ICAP) by attending monthly meetings and providing Medical Assistance (MA) updates and changes from the MCOs to ICAP members. The ACCU partners with School Health Services, Health Centers, and ICAP members to provide HealthChoice education to pregnant and parenting teens and link them to appropriate services such as Nutritional Support Services, Childbirth classes, Healthy Smiles Dental Program, mental health services and maternity resources. The ACCU/Ombudsman team serves as a member of the Discovery Station Early Head Start, Family Services Inc. Advisory Committees and provides Medical Assistance (MA) updates from the MCOs at each semi-annual meeting.

Program staff work with Montgomery County Public Schools to provide MA/HealthChoice education to diverse immigrant groups of parents and link them to local resources. ACCU continues to collaborate with the Montgomery County Fetal and Infant Mortality Review (FIMR) and Community Team Action (CAT) by attending their meetings and providing input during case review after a fetal demise or infant death had occurred. Information gathered during the meetings helps to determine if timely referral to the MCO for case management could have potentially prevented a loss.

Table 16. ACCU Performance Measures Data, July 2015 – June 2018

Performance Measure	07/2015 – 06/2016 Total	07/2016 – 06/2017 Total	07/2017 – 06/2018 Total	07/2015 – 06/2016 Monthly Average	07/2016 – 06/2017 Monthly Average	07/2016 – 06/2017 Monthly Average
Number of HealthChoice recipients who had access/linkage to health care issues resolved within 30 days.	1445	2170	2409	120.4	180.8	200.8
Number of Maryland Prenatal Risk Assessment forms to be forwarded to the Department within 48 hours of receipt by the local health department.	2778	1722	1727	231.5	143.5	143.9
Number of ACCU/Ombudsman referrals completed within the time frame requested by CRU:						
a. Ombudsman	62	50	57	5.2	4.2	4.8
b. ACCU	914	1059	865	76.2	88.3	72.1
Number of Local Health Service Request Forms processed and returned to MCO within 30 days from receipt of referral	390	703	465	32.5	58.6	38.8
Number of Prenatal Risk Assessments completed (Education, Navigation, Utilization of Care resources)	214	256	603	17.8	21.3	50.3
Number of Pregnant Women screened and enrolled in a Managed Care Organization (MCO) for Prenatal Services	308	395	627	25.7	32.9	52.3
Number of Pregnant Adolescent up to age 19 years of age screened and enrolled in a MCO	52	3	8	4.3	0.3	0.7
Number of Newborn Referrals not linked to MCO at delivery completed within 30 days	0	188	174	0.0	15.7	14.5
Number of Prenatal Providers contacted for outreach and education	115	85	115	9.6	7.1	9.6
Number of Care Coordination Encounters completed to assist client access MA services	34	40	626.5	2.8	3.3	52.2
Number of Ombudsman referrals from DHMH/CRU	73	50	77	6.1	4.2	6.4
Number of Home Visits	218	489	451	18.2	40.8	37.6
Number of ACCU referrals from DHMH/CRU for HealthChoice Education	781	938	906	65.1	78.2	75.5
Number of Local Health Services Requests Referrals	389	771	532	32.4	64.3	44.3
Number of Newborn Referrals	0	194	361	0.0	16.2	30.1
Number of Prenatal Referrals Received	0	0	167	0.0	0.0	13.9
Number of Prenatal Risk Assessment Assigned	179	265	829	14.9	22.1	69.1
Total Number of Referrals Received for the month	1659	2356	2845	138.3	196.3	237.1

Emerging Issues in Maternal and Infant Health for HealthChoice Beneficiaries in Montgomery County

In FY2018, ACCU reached 83% of the stated 90% performance measure of eligible beneficiaries who are identified with issues of mental health, substance use, or tobacco use will receive information and linkage to services and resources. ACCU staff will continue to educate the beneficiaries about their MA benefits and link them to Beacon Health Options and Montgomery County Mental Health/Substance Abuse Screening and Referral program /ACCESS to Behavioral Health Services, as well as to link the non-MA recipients to community services to decrease barriers to health care. ACCU staff will continue to focus on pre-conception health, early prenatal care and primary prevention.

Fetal and Infant Mortality Review (FIMR) Board and Community Action Team (CAT)

The Montgomery County Improved Pregnancy Outcomes Program, which consists of the Fetal and Infant Mortality Review (FIMR) Board & Community Action Team (CAT), was created to assess systems of care surrounding pregnancy, childbirth and infancy, and develop an action-oriented process for change.

FIMR Boards were established in 1988 by the U.S. Department of Health and Human Services, Health Resources & Services Administration in five states to identify factors that contribute to fetal or infant loss and improve local healthcare delivery systems.

Maryland obtained federal funding to begin a FIMR Program in 1997, and Montgomery County established its FIMR Board & CAT the following year. Maryland's FIMR Program is supported by Title V – Maternal Child Health Block Grant funds, and the State is responsible for disbursing funds to individual counties. Since 2009, every county in Maryland has been represented by a FIMR Board. Fewer than half of all Maryland counties have a separate Community Action Team.

The overall goals of the Improved Pregnancy Outcomes Program are to:

- Reduce fetal and infant mortality overall;
- Address racial disparities in pregnancy outcomes; and
- Promote good preconception health.

The FIMR Board is responsible for conducting detailed, de-identified reviews of fetal or infant losses among county residents and identifying possible factors that contributed to a poor pregnancy outcome. Each year, FIMR carefully reviews approximately 100 to 130 fetal demise and infant deaths. The FIMR Board meets four times yearly. For each case review, the Board looks at factors beyond the immediate cause of death. Reviews include:

- Whether the mother was able to access health care, and any barriers she faced;
- Whether she had other children and / or previous losses;
- Chronic health issues prior to becoming pregnant, including mental health issues;
- Role of the father in this pregnancy and / or whether the mother had support from other family members;
- Type of work the mother did if she worked outside the home & whether there were schedule or transportation issues.

Systems Successes involve aspects of the pregnancy or postpartum period that went well. This may include:

- Pregnancy was identified as high risk, where appropriate;
- Early prenatal care;
- Good social support for the mother;
- Culturally appropriate services;
- Excellent hospital care; and
- Postpartum visit and referral to primary care physician.

Systems Failures are also noted, and may include:

- Lack of programs to meet specific needs;
- Poor communication with healthcare providers; and
- Failure to address chronic health conditions that impact pregnancy.

FIMR board recommendations are forwarded to the Community Action Team (CAT), an advisory / advocacy team that prioritizes and carries out FIMR recommendations by identifying the best ways to put changes in place "on the ground" to assure that mothers and infants receive high quality health care. It is responsible for devising the most effective ways to make changes in the community.

FIMR Board Members currently include:

- Holy Cross Hospital (Silver Spring & Germantown locations) – Obstetrician; High Risk Perinatal Manager; Perinatal Educator
- Shady Grove Medical Center – Clinical Nurse Manager
- Washington Adventist Hospital – Chief Medical Officer; Director of Women's Services
- Capital Women's Care – Obstetrician
- Community Advocate, Health Officer, Ret.
- Family Medicine Physician and Clinical Investigator
- HHS Health Resources & Services Administration, Div. of Healthy Start & Perinatal Services – Director, Ret.; Senior Nurse Consultant
- Johns Hopkins HealthCare – Maternity Case Manager
- United Health Care – Maternal Child Health Coordinator
- Montgomery County League of Women Voters, SAMHSA, Ret.
- University of Maryland – Program Director, Expanded Food & Nutrition Education Program (EFNEP)
- Montgomery County Health Officer & Chief of Public Health Services
- Montgomery County Dept. of Health and Human Services (DHHS), Communicable Disease & Epidemiology, Ret.
- Montgomery County DHHS - Nurse Administrator, Germantown Health Center
- Montgomery County DHHS - Nurse Administrator, Silver Spring Health Center

- Montgomery County African American Health Program - Clinical Director
- Montgomery County DHHS – Coordinator, Administrative Care Coordination
- Montgomery County DHHS – Consultant, School Health Services
- Montgomery County DHHS – Special Projects Program Manager

Community Action Team Members currently include:

- Aspire Counseling - Intake Coordinator
- Holy Cross Hospital (Silver Spring location) - Perinatal Educator; Perinatal Education Manager
- Family Health Care – Physician, Family Medicine
- Adventist HealthCare, Center for Health Equity & Wellness – Physician Internal Consultant; Parent Education Coordinator
- Washington Adventist Hospital – Chief Medical Officer, Director of Women's Services
- MedStar Montgomery Hospital – Manager, Maternal Newborn Center; Maternal Nurse
- Community Advocate, Health Officer, Ret.
- Family Medicine Physician and Clinical Investigator
- HHS Health Resources & Services Administration - Director of Healthy Start & Perinatal Services, Ret.
- Johns Hopkins HealthCare – Maternity Case Manager
- United Health Care – Maternal Child Health Coordinator
- Montgomery County League of Women Voters, SAMHSA, Ret.
- Primary Care Coalition – Program Director
- Community Clinic, Inc. – WIC Services Coordinator
- University of Maryland – Program Director, Expanded Food & Nutrition Education Program (EFNEP); Professor, School of Public Health
- By Your Side Doula Services – Director
- Montgomery County Health Officer & Chief of Public Health Services
- Montgomery County Dept. of Health and Human Services (DHHS), Communicable Disease & Epidemiology, Ret.
- Montgomery County DHHS - Nurse Administrator, Germantown Health Center
- Montgomery County DHHS - Nurse Administrator, Silver Spring Health Center
- Montgomery County African American Health Program – Program Manager; SMILE Program Nurse Case Manager; Program Specialist
- Montgomery County DHHS – Consultant, School Health Services
- Montgomery County DHHS – Coordinator, Administrative Care Coordination Unit
- Montgomery County DHHS – Special Projects Program Manager
- Montgomery County DHHS Dept. of Correction & Rehabilitation – Social Worker

Records for fetal death and infant birth/death for Montgomery County residents are provided by the Maryland Vital Statistics Administration. Approximately 100-130 records are received annually, and each record is reviewed and entered into an Excel spreadsheet created to track losses and identify emerging trends. Cases are selected for review based on State priorities and identified trends. For example, a significant increase in teen mothers or women of advanced maternal age, women who began pregnancy with untreated health conditions, or women who experienced third trimester fetal loss indicates a need to review cases that include one or more of these factors.

Collecting information for FIMR cases also involves a full review of the mother's prenatal and postpartum medical records, along with reports on services she received. Reviews contain data about the neighborhood where the mother lived during the pregnancy, and include information related to the proximity of public transportation, grocery stores, and medical facilities. Maternal interviews conducted in-person are another key element of FIMR case review. Interviews allow the bereaved mother to share her story and express any concerns she had before, during or after her pregnancy. Comments from the father or other immediate relatives are included, where appropriate. Bereavement materials and information about grief support groups are also provided.

The Maryland Department of Health (MDH) requires that at least 50% of all cases reviewed by FIMR involve Black / African American mothers. FIMR Board reviews in Montgomery County involve Black / African Americans mothers in approximately 75% of cases reviewed.

The most frequently made FIMR Board recommendations include:

- Refer Black / African American women to SMILE Program nurse case management in any future pregnancy.
- Increase awareness among physicians & Black / AA women of their higher risk for fetal / infant loss.
- Use community health workers to educate pregnant & postpartum women.
- Summarize patient condition in writing and check for understanding.
- Provide referrals to nutritionist.
- Review "kicks count" fetal movements at every PNC appointment.
- Increase awareness of family planning services.
- Encourage women to wait at least 18 months before starting new pregnancy after loss.

Community Action Team (CAT) initiatives are based on Board recommendations and incorporate new research and resources. For example, a letter was sent last year to obstetricians in the targeted zip codes of 20904, 20906 and 20874. The letter highlighted the fact that Black / African American women are at higher risk of having a poor pregnancy outcome and encouraged physicians to treat their pregnancies as high risk. The letter is being updated and this year's version cites a new ACOG recommendation for daily aspirin use by pregnant women who are at high risk of preeclampsia. While the ACOG recommendation does not specifically mention the racial disparity risk, it defines high risk conditions that include diabetes, high blood pressure and obesity, all of which are more prevalent in the Black / African American community.

Other CAT initiatives include the following:

- The Improved Pregnancy Outcomes Program Manager presented on infant mortality and CAT target populations as part of a panel at the African American Health Program "Health Literacy & Infant Mortality" event in September 2017.
- CAT Chair Carol Jordan delivered a presentation on infant mortality and racial disparities to OB, Labor & Delivery and Mother-Baby Unit nurses at Shady Grove Medical Center in October 2017.
- FIMR Board Co-Chair Dr. Carol Garvey co-presented with AAHP Program Manager Arlee Wallace on efforts to address infant mortality & racial disparities at a Montgomery County Medical Society Board meeting in December 2017.
- Dr. Garvey presented on improving pregnancy outcomes at a Montgomery Cares Board meeting in December 2017.
- CAT Co-Chair Pat Keating was a guest on FIMR CAT member Dr. Jennifer Todd's "Women Transcending" podcast. Pat spoke in a 30-minute interview about changes in childbirth practices during the last several decades.
- FIMR-CAT Program Manager Sheilah O'Connor participated on a panel at a Primary Care Coalition symposium in November 2018, at which she highlighted the racial inequities in pregnancy outcomes and explained the functions of the FIMR and the CAT.

The CAT created three subgroups in 2018 to advance specific efforts:

- Social Media Subgroup - to increase awareness of infant mortality & related racial disparities via the Montgomery County DHHS Twitter account and Facebook page. A series of brief items on infant mortality & disparities was also provided to the Montgomery County Medical Society for its weekly e-newsletter.
- Legislative Subgroup - to track legislative proposals that impact maternal and infant health, including mental health, at the State and local level.
- Grants Subgroup - to explore funding for stress management peer support groups for Black/African American pregnant women.

The CAT develops and distributes various educational and outreach materials in different languages across community partner events. The CAT also recruited a student from University of Maryland to update a spreadsheet of all perinatal programs available in Montgomery County. This spreadsheet is designed to identify possible gaps in services or duplication of services for pregnant and postpartum women and is used as a planning tool by CAT.

FIMR CAT staff organized educational visits to learn more about the role of community partners in improving pregnancy outcomes. Visits were made to:

- Mamatoto Village in Washington DC;
- Crossway Community in Kensington, Maryland; and
- Holy Cross Hospital Labor & Delivery unit and clinic in Germantown, Maryland

Fig. 65. Characteristics of Mothers and Fathers with Fetal/Infant Loss, reviewed by FIMR, Montgomery County, 2014-2017

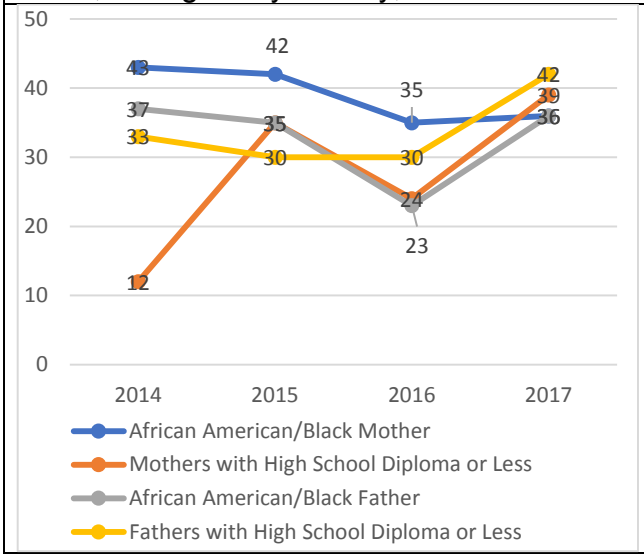


Fig. 66. Characteristics of Mothers with Fetal/Infant Loss (Cont.), reviewed by FIMR, Montgomery County, 2014-2017

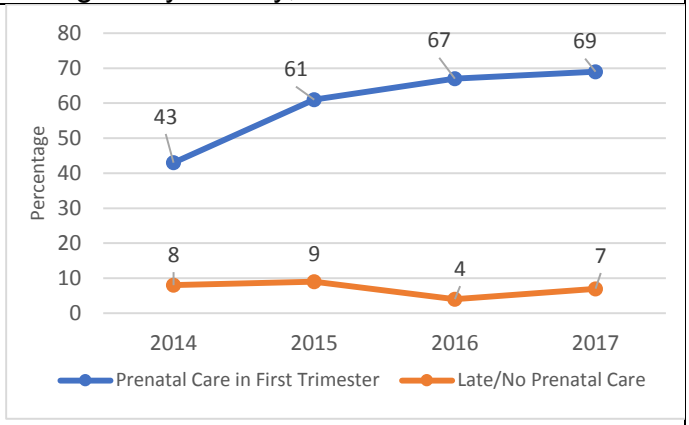
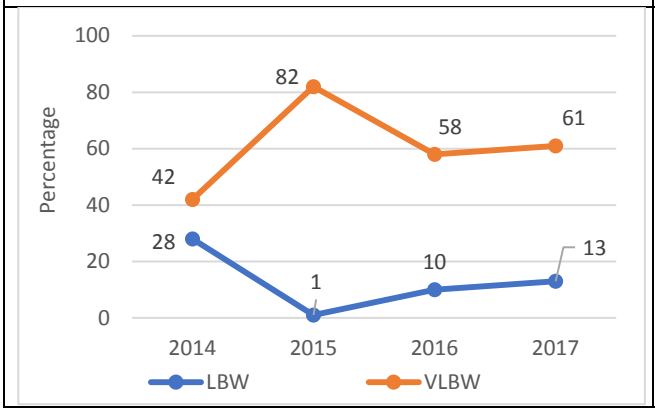


Fig. 67. Characteristics of Fetal/Infant Loss, reviewed by FIMR, Montgomery County, 2014-2017



Babies Born Healthy: Maryland Department of Health Grant Program

The Maryland Babies Born Healthy (BBH) Program is a three-year-old grant program from the Maryland Department of Health, initiated in response to Maryland's high disparities in infant mortality rates. Originally, the grant was in Baltimore City, Baltimore County, Charles County, Prince George's County and Wicomico County. In FY18, the State added Montgomery County and Arundel County to the program. The Maryland BBH program objectives include:

- Reduce Maryland's overall infant mortality rates by 10%; and
- Reduce Maryland's disparities in infant mortality by reducing infant mortality rates by 59% among non-Hispanic Black infants.

Accomplishing these objectives would bring Maryland into compliance with the Healthy People 2020 Objective of 6.0 infant deaths per 1,000 live births.

Montgomery County BBH is a comprehensive program utilizing Community Health Workers (CHWs) to deliver targeted care coordination services to African American women receiving Medicaid residing in zip codes 20903 and 20904, where the population is at highest risk for adverse pregnancy outcomes in Montgomery County. Components of the program include community outreach, care coordination, screening, community education, and ensuring that pregnant women in these communities are receiving prenatal care as well as other needed health and social service resources to maintain healthy pregnancies and healthy babies by establishing referral networks with local agencies resulting in warm hand-off, follow-up and addressing social determinants of health. The goal of the program is to retain 90% of the care coordination participants from enrollment to six weeks post-partum. All staff from the program will actively participate in the Fetal & Infant Mortality Review Board and the Community Action Team to strategically align planning. Staff will also receive health equity training and learn to work across cultures. The program will integrate data to continually refine and improve its approach and meet evaluation requirements.

A Community Health Nurse visits all potential program participants and screen for Depression, Substance Abuse, Intimate Partner Violence, and Social Determinants of Health. The Nurse also creates a care plan and assigns a Community Health Worker. All participants are educated on topics including: the definition of preterm birth/labor (anything before 38 weeks), harmful effects of smoking, harmful effects of drugs and alcohol, prenatal nutrition and foods to avoid during pregnancy, harmful effects of Intimate Partner Violence, safe sleep for infants, importance of breastfeeding, and family planning and child spacing.

The Community Health Workers follow the Care Plan developed by the Community Health Nurse and make all necessary referrals (Behavioral Health, Substance Abuse Disorder, Tobacco Cessation, Domestic Violence Services) and provide Care Coordination. Care Coordination includes: Linkages, Support and Education including but not limited to: Prenatal care, Health Insurance, Housing, Social Services, Transportation, Primary Care (mom and baby), Substance Abuse Disorder treatment, Child Care, Behavioral Health Treatment, Dental Care, STI Prevention and treatment, Home Visiting Services, Domestic Violence Services, Breastfeeding Support, Family Planning Services, Nutrition Support, Safe Sleep Information, Tobacco Cessation, and Infant and Child Development.

- Babies Born Healthy Outreach and Education: All Babies Born Health Staff also work on Community Outreach and Education to ensure that the community is aware of the program and making referrals and to get the word out about Safe Infant Sleep, Importance of Breastfeeding and the Definition of Preterm Birth.

- Babies Born Healthy Geotracking: Ongoing tracking to continuously monitor the risk factors and neighborhoods that place a woman at highest risk for poor pregnancy outcomes. This will allow staff to identify high risk women who currently are missed from Montgomery County's other ongoing programming and allow the BBH Program to identify other variables that should be added as targets.
- Babies Born Healthy Participation Incentives and Additional Services: To help encourage the participants to stay active in the program the following incentives and additional services are available as part of the grant funding:
  - Help with transportation to prenatal care and other essential appointment
  - Help with resources for child care during for prenatal care appointments
  - Pack-n-Plays
  - Diapers
  - Breast Pumps
  - Sleep Sacks (wearable blankets)
  - Grocery Store Gift Cards
  - Lactation Consultant
  - Support Groups
  - Childbirth Education Classes
  - Baby Care Classes

Data Collection (Outcome Measures/Statistics): As part of the grant requirements, program staff collect the following data points:

- Percentage of participants who smoke that quit smoking
- Percentage of participants referred for mental health services who participate in the treatment
- Percentage of participants referred for substance abuse who participate in treatment
- Percentage of participants who regularly take prenatal vitamins
- Percentage of participants who start prenatal care in the first trimester
- Number of live births
- Number of live births who are low birth weight or very low birth weight
- Number of fetal deaths
- Number of neonatal deaths

Table 17. Baby Born Healthy Program Goals and Performance Measures

Baby Born Healthy Goals	Performance Measures
1. Establish referral networks with health care providers, hospital system(s), agencies and community-based organizations for referrals of at-risk pregnant women (uninsured, previous adverse pregnancy outcome, and/or social risks) resulting in warm hand-offs, follow-up and addressing social determinants of health.	1. Community Engagement activities with 20+ organizations working with high risk pregnant women living in the identified zip codes. 2. Program staff will participate in 25 outreach events, meetings, community activities, door knocking, etc. 3. 15+ organizations will make referrals to Montgomery County Babies Born Healthy (MCBBH)
2. Target outreach and recruitment efforts to identified census tracts at high risk for infant mortality.	1. Integration of “State List “of potential pregnant woman receiving Medicaid, living in the selected zip codes with other referral sources 2. Database of all Perinatal Risk Assessment Forms created 3. 40+ Appropriate Referrals from local Health, Social Service and Community providers
3. Develop procedures for comprehensive patient engagement, follow-up and retention.	1. 80% retention of program participants from enrollment to 6 weeks Postpartum 2. 75% participation rate after referred to program 3. 30+ Care Coordination participants in Year 1 4. 60% program participants receive referrals/links to health and social services beyond prenatal care 5. 50% program participants receive support (transportation, child care) or incentive items (pack-n-play, diapers)
4. Provide care coordination/navigation services to at-risk pregnant women from pregnancy through 6 weeks post-partum to link women to essential services associated with improved birth outcomes.	1. 90% of all referrals/data base contacts are screened by the Community Health Nurse 2. Program participants will attend 85% of recommended/scheduled prenatal care visits with provider 3.80% of Care Coordination Participants follow prenatal recommendations: no tobacco

	use, no substance use, good nutrition, prenatal vitamins throughout pregnancy 4.80% of Care Coordination Participants will remain in the program through 6 weeks postpartum
5. Align BBH efforts with FIMR, MOTA (Minority Outreach and Technical Assistance) or other MCH-related efforts in Montgomery County	1. 80% Care Coordination Participants follow prenatal recommendations: no tobacco use, no substance use, good nutrition, prenatal vitamins 2. 89% of Program Participants will not deliver before 37 weeks gestation 3. 93% of babies born to Program Participants will weigh more than 5 pounds 8 ounces 4. 80% will follow postnatal teaching at six weeks postpartum: safe infant sleep, breastfeeding, family planning/child spacing

Family Planning

As of October 2018, the Board of Education has developed an agreement with DHHS to make latex condoms and sexual health education available in all high school health rooms. Montgomery County Public Schools (MCPS) will collaborate with DHHS to strengthen the MCPS comprehensive health education curriculum, especially in the content area standard of disease prevention and control. The Health Care for the Uninsured Program of Montgomery County DHHS helps support a network of safety net clinics that provide primary health care to uninsured adults residing in Montgomery County. This County support, as well as Federal Title X funding, allows local clinics to provide some family planning serivces to low income residents of the County. Clinics in Montgomery County providing family planning services include: Community Clinic, Inc., Mansfield Kaseman Health Clinic, Mary's Center, Mobile Medical Care, Planned Parenthood - Gaithersburg Center, Proyecto Salud, and Mercy Health Clinic.

However, there remains a critical need for additional family planning services in Montgomery County. Montgomery County DHHS offers no direct family planning services and subsidized family planning services for low income residents are not always readily available.

DHHS PROGRAM AND SERVICES CONTACT INFORMATION

African American Health Program–SMILE Program.... 240-777-1833
14015 New Hampshire Avenue, Silver Spring, MD 20904

Area Health Centers

Germantown Health Center 240-777-0311
12900 Middlebrook Rd, 2nd Floor, Germantown, MD 20874

Silver Spring Health Center 240-777-0311
8630 Fenton Street, Silver Spring 20910

Babies Born Healthy Program..... 240-777-3118
8630 Fenton Street, 10th Floor, Silver Spring, MD 20910

Montgomery County Fetal & Infant Mortality (FIMR)
Board & Community Action Team 240-777-3967
12900 Middlebrook Rd, 2nd Floor, Germantown, MD 20874

Medicaid Resource Center DHHS Offices 240-777-1815
1401 Rockville Pike, 1st Floor, Rockville MD 20852

Montgomery County Maryland Health Connection 240-777-1815
Get Health Insurance online at www.MarylandHealthConnection.gov

Mental Health/Substance Abuse Screening and Referral 240-777-1770
255 Rockville Pike, First Floor, Rockville, MD 20850

Silver Spring Services Center 240-777-0311
8818 Georgia Avenue, Silver Spring, MD 20910

Dental Services

Silver Spring Health Center
8630 Fenton Street, Silver Spring, MD 20910 240-777-1875

DHHS Colesville Center
14015 New Hampshire Avenue, Silver Spring, MD 20904 240-777-1875

UpCounty Regional Services Center
12900 Middlebrook Road, Germantown, MD 20874 240-777-1875

DHHS Offices at 1401 Rockville Pike
1401 Rockville Pike, Rockville, MD 20852 240-777-1875

CONCLUSION

Overall, Montgomery County had lower adverse pregnancy-related conditions compared to Maryland and the U.S. nationally. However, disparities exist among population subgroups by race/ethnicity, maternal age, and geographic area. Montgomery County has the most diverse population in Maryland and is becoming more diverse over time. The maternal and infant health, as well as health care utilization and costs associated with changing demography, social determinants, health care access are expected to be impacted exponentially. It is therefore critical to monitor and evaluate population health and services provided by DHHS programs on an ongoing basis to anticipate ongoing and future challenges. Efforts and resources should be targeted and allocated to address the findings of this report.

Though consistently lower than the Maryland and the U.S., infant mortality rates among NH-Blacks are 3 times or higher than NH-Whites.

Race/Ethnicity

- Hispanics have the highest adolescent birth rates, percentage births to unmarried women, and percentage births to women without high school education, as compared to other groups.
- NH-Whites and Asians have highest percentages of women aged 35-44 years giving births, followed by NH-Blacks and Hispanics.
- NH-Blacks have the highest percentage of tobacco use during pregnancy, births with delayed/no prenatal care, preterm births, low weight births, infant mortality rates, neonatal mortality rates, fetal deaths, and severe maternal morbidity than other groups.

Maternal Age

Younger (<20 years old) and older (40+ years old) mothers have increased risks of severe maternal morbidity.

Geographic Variations

Geographic variations of infant and fetal deaths are presented by census tract, based on information available in the respective data.

The risks of adverse pregnancy-related conditions vary by race/ethnicity, maternal age, and geography. Information presented in this report can be used to target intervention efforts for population subgroups at high risk of adverse pregnancy-related conditions, to evaluate services provided by DHHS programs, and to better plan and allocate resources. An important use of surveillance data is to monitor trends following the initiation of prevention programs in order to evaluate their effectiveness.

This report is strengthened by the use of data from multiple sources that provide a more comprehensive picture of disease burden and population health than would a single source, as well as by examining the disease burden in the County by population subgroups, circumstances in which people are born, grown up, live and age, and services provided by DHHS programs for better allocating resources and targeting intervention. Ongoing efforts are being made to further enhance data variety and quality for population health surveillance. Consumer and provider education are critical components of disease prevention and health promotion. This can be accomplished through the dissemination of population health statistics and prevention information at professional meetings and conferences. Pamphlets and brochures with information on disease prevention and health promotion can be provided to patients and clients at providers' offices. This information can also be made available through traditional and online media.

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APPENDICES

APPENDIX A: TERMS AND DEFINITIONS

TERM	DEFINITION
Age-specific birth rate	Number of births to mothers of a specific age per 1,000
Age-specific death rate	Number of deaths in a specific age group per 1,000 or
Crude birth rate	Number of live births per 1,000 population
Crude death rate	Number of deaths from all causes per 1,000 or per 100,000
General fertility rate	Total number of births per 1,000 females aged 15-44
Fetal death	The death of a product of human conception, before its complete expulsion or extraction from the mother, regardless of the duration of the pregnancy, as indicated by the fact that, after the expulsion or extraction, the fetus does not breathe or
Fetal mortality rate	Number of reportable
Infant death	Death occurring to a person under one year of age
Infant mortality rate	Number of infant deaths per 1,000 live births.
Live birth	The complete expulsion or extraction of a product of human conception from the mother, regardless of the period of gestation, if, after the expulsion or extraction, it breathes or shows any other evidence of life, such as heart beat, pulsation
Life expectancy	The average number of years of life remaining for an individual of a particular age group
Low birth weight	A live birth weighing less than 2,500 grams (5.5 pounds)
Maternal death	Deaths due to pregnancy, childbirth and the puerperium (ICD-10 codes O00-O95, O98-O99, A34) occurring either during
Maternal mortality rate	Number of maternal deaths per 100,000 live births
Neonatal mortality rate	Number of neonatal deaths per 1,000 live births
Perinatal death	The death of a fetus of 28 or more weeks' gestation or of an infant less than 7 days of age. Other commonly used definitions for perinatal death range from 20 to 28 weeks' gestation through seven to 28 days of life

Perinatal death rate	The number of perinatal deaths divided by the number of fetal deaths of 28 or more weeks' gestation plus the number of live
Postneonatal death	Death occurring to an infant between 28 days and one year of age
Postneonatal mortality rate	Number of postneonatal deaths per 1,000 live births
Severe Maternal Morbidity	Unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman's health. Delivery hospitalizations with severe maternal morbidity is identified using administrative hospital discharge data and the International Classification of Disease (ICD) diagnosis and procedure codes.

Source: Maryland Department of Health Vital Statistics Administration. Maryland Vital Statistics Annual Report 2017. https://health.maryland.gov/vsa/Pages/reports.aspx

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APPENDIX B: TECHNICAL NOTES

Data Sources

The Office of Planning and Epidemiology uses various data sources to compile information on disease burden and population health, including vital records, inpatient and outpatient hospitalization, disease registry, surveys, area health resources file, and Census. Data on births and deaths are provided by Vital Statistics Administration of Maryland Department of Health. Pregnancy Risk Assessment Monitoring System (PRAMS) data are provided by Maternal and Child Health Bureau of Maryland Department of Health. Data on population estimates are derived from the American Community Survey (ACS) of U.S. Census Bureau.

In addition, Office of Planning and Epidemiology uses other data sources such as program data collected in electronic medical records and electronic integrated case management system to conduct surveillance and program evaluation. These datasets are used to produce statistical information for health care professionals, researchers, and policy makers as part of surveillance activities.

Data Quality and Confidentiality

Data quality is assessed on a routine basis, in terms of completeness, timeliness and accuracy, and is documented to help interpret results from analyzing these population datasets. All data collected and housed by the Office of Planning and Epidemiology complies with the state and federal privacy and confidentiality regulations. Data or data analysis may be requested through the Office of Planning and Epidemiology.

Disparities on Race and Ethnicity

The Office of Planning and Epidemiology follows the recommendation of the National Center for Health Statistics of classifying health conditions according to the self-reported race/ethnicity of the individual. Information on race/ethnicity recorded in each data source is used to illustrate disease burdens for population subgroups. There are variations of data quality on race/ethnicity recorded in each population dataset, in terms of completeness and accuracy, thus interpretations of results are to take this into consideration. Though this information can be used to address important topic such as health equity, race/ethnicity is a self-reported item and is subject to the usual limitations of this type of information.

Rate

The rates provided in this report are estimations of the proportion of population with specific health conditions. This rate is usually expressed as per 1000 population and is calculated by the formula:

$$\text{Rate} = \frac{\text{Number of Persons with Specific Conditions}}{\text{Total Population at Risk}} * 1{,}000$$

Graphs

Graphs have varying scales depending on the range of the data displayed. Therefore, cautions should be exercised when comparing such graphs.

Standard Errors

The standard errors (S.E.) of the rates were calculated using the following formula:

$$S.E. = \sqrt{\frac{w_j^2 n_j}{p_j^2}}$$

where,

- w_j = fraction of the standard population in age category
- n_j = number of cases in that age category
- p = person-years denominator

Confidence Intervals (CI)

The confidence interval is a method of assessing the magnitude and stability of a rate or ratio. The 95% CI represents a range of values that has a 95% probability of including the true rate or ratio. Observed rates are subject to statistical variation. Thus, even if the underlying risk of specific health condition is identical in two subpopulations, the observed rates for the subpopulations may differ because of random variation. The confidence interval describes the precision of the observed rate as an estimate of the underlying risk of having a specific health condition, with a wider interval indicating less certainty about this estimate. The width of the interval reflects the size of the subpopulation and the number of cases with specific health conditions. Smaller subpopulations with fewer health conditions lead to wider confidence intervals. The 95% confidence intervals used in the report are based on the Poisson distribution.

The standard error can be used to calculate the confidence interval. If the interval produced for one rate does not overlap the interval for another, the probability that the rates are statistically different is 95% or higher. (This test can be inaccurate for rates based on fewer than 10 events.) The formula used is:

$R \pm z\ (SE)$

where,

- R = age-adjusted rate of one population
- z = 1.96 for 95% confidence limits
- SE = standard error as calculated above

APPENDIX C: SOURCES OF ADDITIONAL INFORMATION

For more information on maternal and infant health, please refer to the following resources:

- Maternal/ Infant Health Programs, Montgomery County Department of Health and Human Services

  https://www.montgomerycountymd.gov/HHS/ProgramIndex/MaternalIndex.html
- 2018 Fetal & Infant Mortality Review Board Annual Report

  https://www.montgomerycountymd.gov/HHS/Resources/Files/Reports/Annual%20Rpt%20FIMR%20%20CAT%20ONLY%20FY18%20Final%208-31-18.pdf
- Montgomery County African American Health Program

  http://aahpmontgomerycounty.org/
- Montgomery County Latino Health Initiative

  http://www.lhiinfo.org/en/
- 2016 Community Health Needs Assessment

  https://www.montgomerycountymd.gov/HHS/Resources/Files/Reports/2016CommunityHealthNeedsAssessment.pdf
- Montgomery County, Maryland Interagency Coalition on Adolescent Pregnancy

  http://www.mcicap.org/
- Maryland Department of the Environment, Lead Poisoning Prevention Program

  https://mde.maryland.gov/programs/land/leadpoisoningprevention/Pages/index.aspx
- Healthy New Moms: Maryland's Maternal Mental Health Campaign

  https://healthynewmoms.org/
- Maternal, Infant and Child Healthy, Healthy People 2 020

  https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-child-health
- Maternal & Child Health Bureau, Health Resources and Services Administration, U.S. Department of Health and Human Services

  https://mchb.hrsa.gov/
- Peristats, March of Dimes

  https://www.marchofdimes.org/peristats/Peristats.aspx
- Peristats provides national, state, and local perinatal data by maternal characteristics (age, race/ethnicity, plurality, health insurance, poverty), behavioral risks (tobacco, alcohol and illicit drug use), and pregnancy-related risks (infections, obesity).
- The Pregnancy Risk Assessment Monitoring System (PRAMS), Centers for Disease Control and Prevention

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

- The Maryland PRAMS is a surveillance project supported by the Centers for Disease Control and Prevention. The Maternal and Child Health Bureau (MCHB), Vital Statistics Administration, and Maryland Department of Health and Mental Hygiene (DHMH) have a cooperative agreement with the CDC to participate in PRAMS. The project surveys new mothers randomly about their behaviors and experiences before, during and shortly after pregnancy. PRAMS findings may be used to guide recommendations for developing or modifying intervention programs or for securing resources for program changes.
- Report on Infectious Disease, 2013-2017, Montgomery County, Maryland
  https://www.montgomerycountymd.gov/HHS/Resources/Files/Infectious%20Disease%20Report_10-15-18_FINAL.pdf
- Health in Montgomery County, 2008-2016, A Surveillance Report on Population Health, Montgomery County, Maryland
  https://www.montgomerycountymd.gov/HHS/Resources/Files/Reports/PopHealthReportFINAL.pdf
- Montgomery County Self-Sufficiency Standard: Interactive Update to the 2016 Report
  https://www.montgomerycountymd.gov/HHS-Program/OCA/CommunityAction/interactiveSelfSufficiency.html

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