

OLMSTED COUNTY NATALITY REPORT

Summary of Vital Statistics Birth Data, 2011-2020

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Prepared By:

Olmsted County Public Health Services (OCPHS)
(Insert Unit)
2100 Campus Drive SE, Suite 100
Rochester, MN 55904-4722
(507) 328-7500
www.olmstedcounty.gov

This report has been approved by the following individuals:

<p><i>Sagar Chowdhury</i> _____ Name and Title</p>	<p>12/1/2022 _____ Date</p>
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Overview

Summary: This report presents birth data in Olmsted County by the mother and child's various demographic and health characteristics.

Over the past ten years, 21,081 births have been recorded to Olmsted County residents. The overall birth rate has declined from 15.2 to 12.0 per 1,000 people. The general fertility rate has also declined over the past ten years, decreasing from 76.8 to 59.6 per 1,000 females aged 15-44 years. This results from an aging population and individuals delaying having children until later in life. Excluding people moving in and out of the county, Olmsted County's population growth is slowing.

Glossary

- **Birthweight:** The amount a baby weighs when born, measured in grams.
- **Crude birth rate:** The number of live births per 1,000 people in the total population. Also called natality.
- **Early preterm:** A baby born before 34 weeks gestation.
- **General fertility rate (GFR):** The number of live births per 1,000 females aged 15-44 years.
- **Gestation or gestational age:** An estimate of how long the fetus has developed in the mother.
- **Low birth weight (LBW):** A baby born under 2,500 grams (5 pounds 8 ounces). Includes VLBW babies.
- **Prenatal care (PNC):** Healthcare the mother and fetus get during pregnancy. Depending on the stage of pregnancy, PNC may include physical exams, weight checks, blood tests, or imaging tests (such as an ultrasound). Prenatal care educates mothers about healthy behaviors and monitors fetal well-being at different stages of pregnancy.
 - **The Kotelchuck Index determines adequate PNC.** Adequacy is calculated using the month of pregnancy that PNC began and the number of visits based on gestational age.
- **Preterm:** A baby born before 37 weeks gestation. Includes early preterm babies.
- **Rate of natural increase (RNI):** A measurement of how fast a population is growing or shrinking. RNI is based on the number of deaths and births. It does not include people moving in or out of a community.
- **Vaginal Birth after Cesarean (VBAC):** Giving birth via a vaginal delivery after a previous pregnancy was delivered by cesarean section. VBAC lowers the risk of complications and infections.
- **Very low birthweight (VLBW):** A baby born under 1,500 grams (3 pounds 5 ounces).

Methods of Analysis

Data Source(s): Data was collected from yearly death and birth files. Data was obtained from the Minnesota Center for Health Statistics (MCHS). Data is based on Olmsted County death and birth certificates reported to MCHS. Population estimates are mid-year population estimates. Population estimates were collected from the Centers for Disease Control and Prevention Wide-ranging Online Data for Epidemiologic Research (CDC WONDER)¹.

Population: Olmsted County is the seventh largest county in Minnesota by population. The population of Olmsted County at the 2020 Census was 162,847. The population has grown 13% since 2000. Roughly 22% of the county's population is a member of a racial minority. The minority population has increased by over 200% since 2000. The median age in 2020 was 37.4 years and 51% of residents were female. The county is split into eight cities and 18 townships. Rochester is the capital and largest city. Approximately 75% of the population lives in Rochester. The county has six major school districts and a 4-year high school graduation rate of 87%.

Methods: Each birth can be considered mutually exclusive. Data is collected from birth certificates and out-of-state events are included. Demographic information on births was collected from informants (usually mothers) and reported on birth certificates. Race and ethnicity were classified per the United States Office of Management and Budget 1997 standards. Adequacy of prenatal care was determined using the Adequacy of Prenatal Care Utilization Index (Kotelchuck Index)².

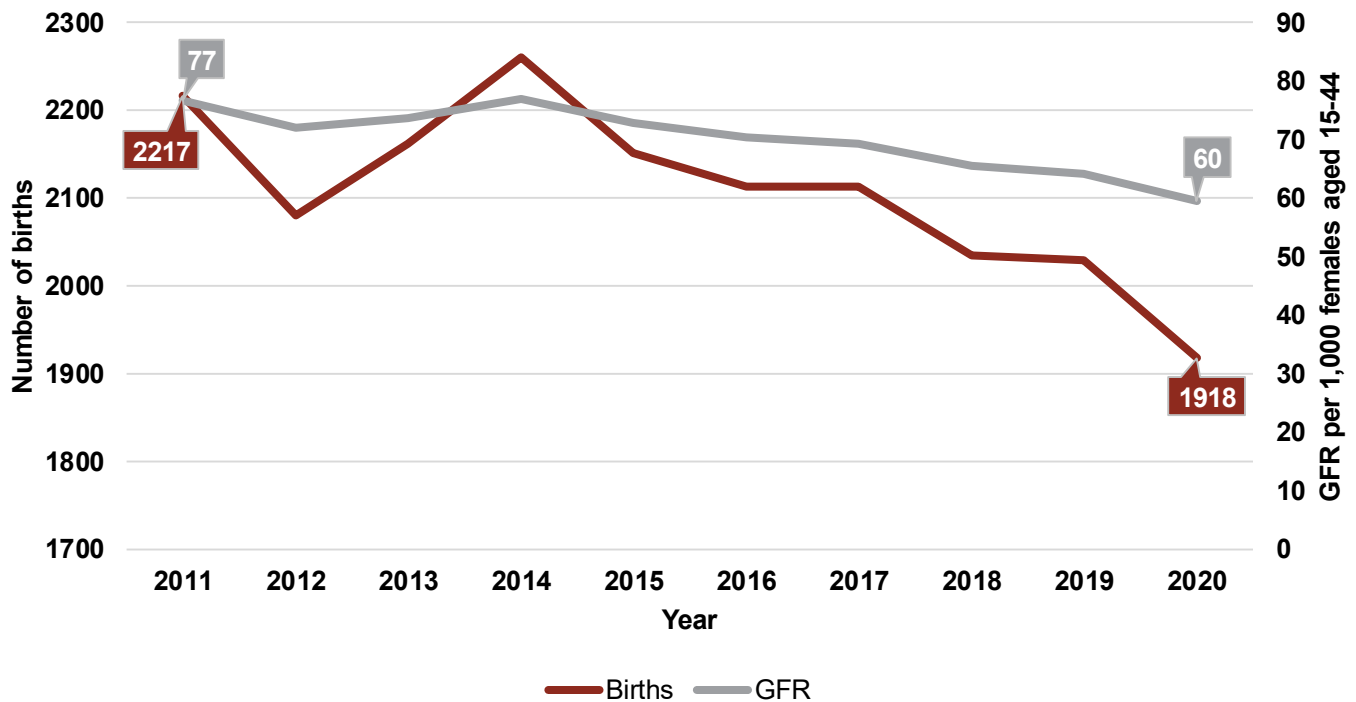
Summary age categories were grouped either into narrow; <15, 15-17, 18-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45+; or broad; <20, 20-29, 30-39, 40+. Births to mothers under 15 years and over 44 years are included in aggregate counts but excluded from rates. Descriptive statistics of less than 20 events were suppressed. Births were grouped into five-year bins to limit data suppression. IBM SPSS Statistics, Version 24 was used for analysis. Graphs and tables were created in Microsoft Excel.

Findings

The total number of births has been decreasing steadily since 2011. Over the past ten years, 21,081 births have been recorded. The average number of births per year was 2,108.1. In 2020, 1,918 births were recorded. The number of births has declined by an average of 1.5% per year since 2011. Differences were observed based on race. Births for White, non-Hispanic mothers increased in 2013 and 2014 but have decreased since, averaging a 2.3% decrease since 2015. With the exception of 2017, births to Black, non-Hispanic mothers have increased every year, averaging a 3.6% increase. Births to Asian, non-Hispanic mothers have been more variable. Annual changes range from -15.5% to +15.3%. However, the average change for Asian, non-Hispanic mothers is a 1.8% decrease. Births to Hispanic, any race mothers have also been variable, ranging from -24.6% to +33.7%. The average change for Hispanic, any race mothers is a 1.7% increase.

The overall birth rate has also decreased over the past decade. It was 15.2 per 1,000 individuals in 2011 and fell to 12.0 per 1,000 individuals in 2020. The rate of natural increase (RNI) has halved. RNI fell from 8.9 in 2011 to 4.1 in 2020. This steady decrease in RNI indicates we are seeing more deaths per year and fewer births. This is partly a result of an aging population.

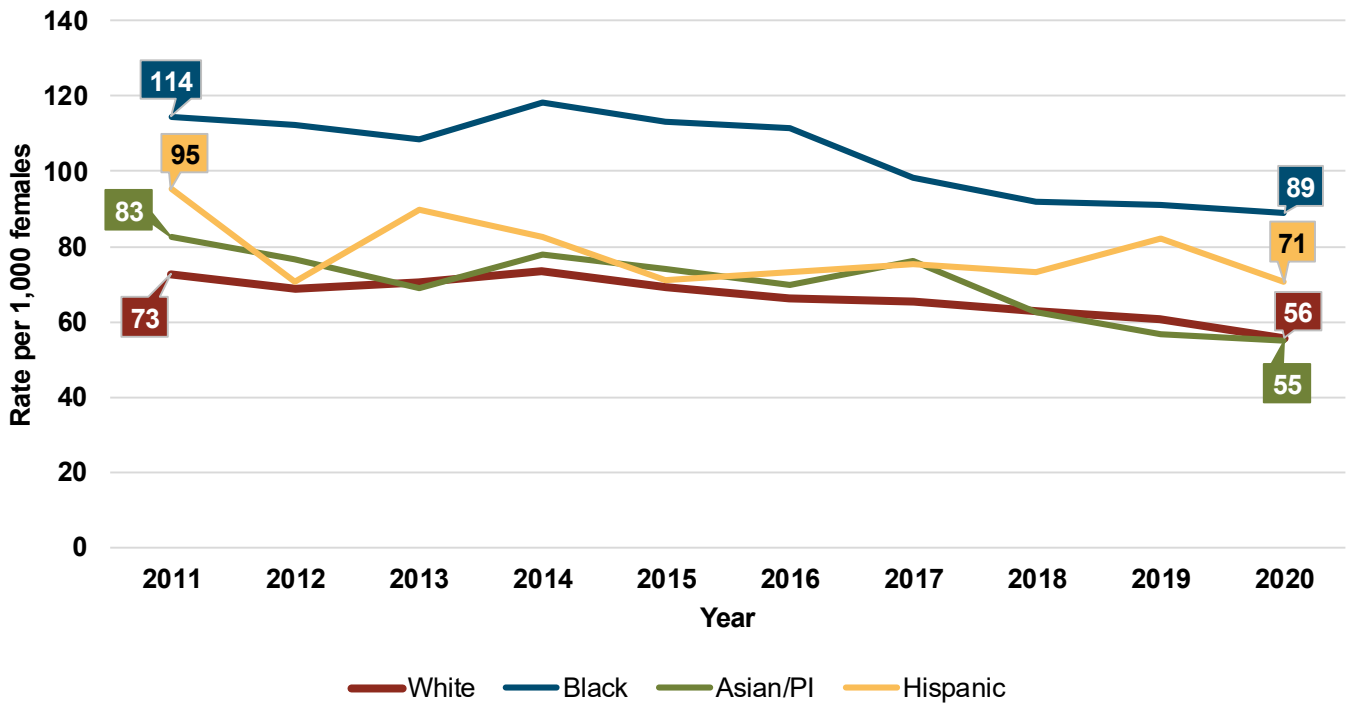
Figure 1. Live births and general fertility rates: Olmsted County 2011-2020



In 2020, the general fertility rate (GFR) for Olmsted County was 59.6 per 1,000 females aged 15-44. Similar to the overall number of births and birth rate, GFR has decreased yearly since 2011, when it was 76.8 per 1,000 females aged 15-44. However, the decrease has been steeper than the overall birth rate. Overall, GFR has decreased by an average of -2.7%. All races saw an average decrease of -2.8% for White, non-Hispanic; -2.6% for Black, non-Hispanic; -4.1% for Asian, non-Hispanic; and -2.2% for Hispanic, any race.

The average age of all mothers in 2011-2015 was 29.4 years. For first-time mothers, the average age was 27.5 years. For mothers with a history of birth, the average age was 30.6 years. The average age for all indicators increased in 2016-2020. The average age for all mothers increased to 30.2 years, first-time mothers increased to 28.3 years, and mothers with a history of birth increased to 31.4 years. The increase in the average age of mothers can also help explain the decrease in the number of births.

Figure 2. Birth rates by race and ethnicity of mother: Olmsted County 2011-2020



Unmarried mothers: Between 2011-2015, 25.6% of all births were to unmarried mothers. For first-time births, the percentage was 30.2%, and for mothers with a prior birth history, the percentage was 22.7%. The percentage of unmarried mothers decreased to 24.8% in 2016-2020. For first-time births, the percentage decreased to 28.4%. For mothers with a prior birth history, the percentage decreased to 22.6%. This could be due to the increase in maternal age.

Mother education level: Between 2011-2015, the percentage of mothers over the age of 25 without a high school diploma or GED was 6.0%. This percentage increased slightly, to 6.2%, between 2016-2020. The percentage of mothers with a bachelor’s degree or higher (i.e., master’s, doctorate, or professional degree) increased from 58.6% in 2011-2015 to 61.4% in 2016-2020.

Age of Mothers

Teen mothers: The number of births for teenage mothers has decreased over the past ten years. Between 2011-2015, 348 births were to a mother under the age of 20 (teen mother). Most teen births were seen in 18-19-year-old mothers (259, 74.4%). The number of births to teen mothers decreased to 218 per 1,000 between 2016-2020. Most births were still seen in 18-19-year-old mothers (168, 77.1%).

Table 1. Birth rates by age group: Olmsted County 2011-2020

Birth rate	2011-2015		2016-2020	
	N	Rate	N	Rate
Teen mothers				
15-19 years	344	15.9	218	9.3
15-17 years	85	6.0	47	3.0
18-19 years	259	34.6	168	22.1
Other age groups				
20-24 years	1,484	69.3	1,085	47.2
25-29 years	3,595	130.5	3,058	106.3
30-34 years	3,842	130.9	3,905	134.0
35-39 years	1,348	57.2	1,648	58.6
40-44 years	223	9.9	272	11.7
45-49 years	32	1.3	21	0.9

Births to mothers under 15 years are excluded from rates.

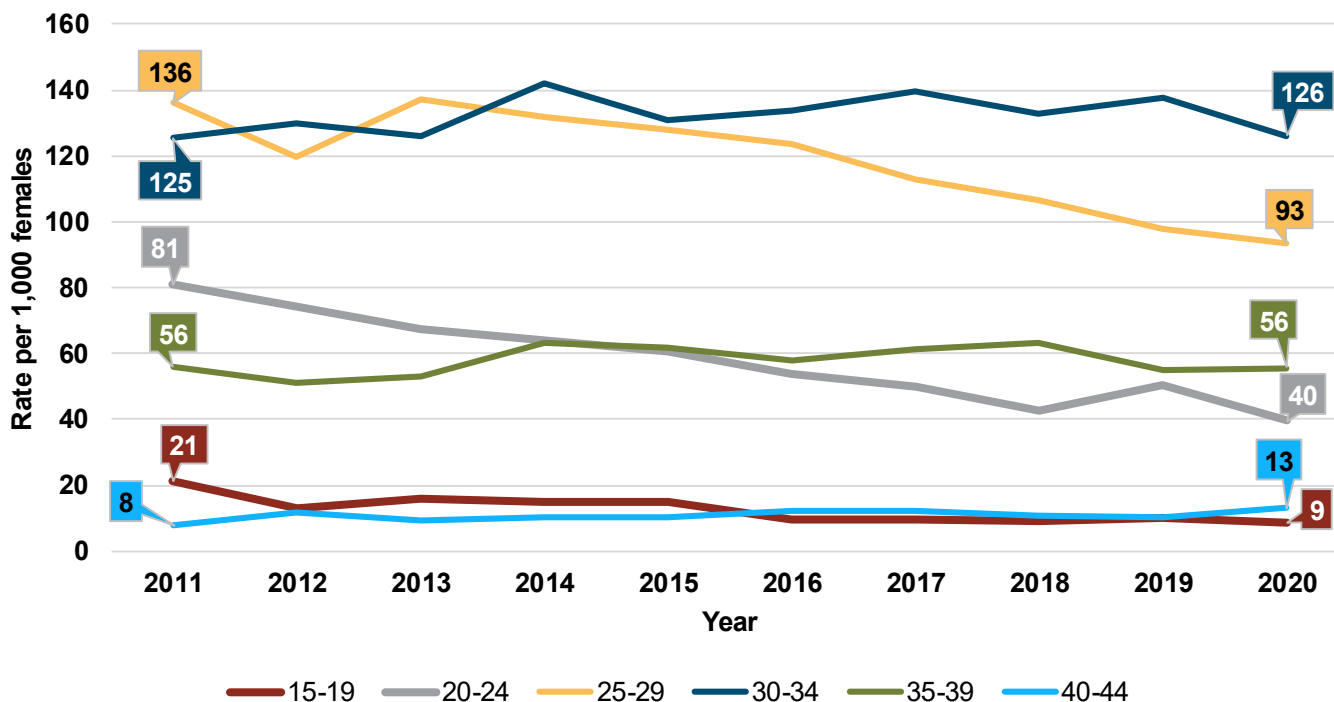
Source: Minnesota Center for Health Statistics

Mothers in their 20s: The number of births for mothers in their 20s also decreased. Between 2011-2015, 1,484 births were to mothers aged 20-24, and 3,595 were to mothers aged 25-29. Between 2016-2020, 1,085 births were to mothers aged 20-24, and 3,058 were to mothers aged 25-29. The birth rate for 20-24-year-olds was 69.3 per 1,000 in 2011-2015 and 47.2 per 1,000 in 2016-2020. The birth rate for 25-29-year-olds was 130.5 per 1,000 in 2011-2015 and 106.3 per 1,000 in 2016-2020.

Mothers in their 30s: The number of births to mothers in their 30s increased. Between 2011-2015, 3,842 births were to mothers aged 30-34, and 1,348 were to mothers aged 35-39. Between 2016-2020, 3,905 births were to mothers aged 30-34, and 1,648 were to mothers aged 35-39. The birth rate for 30-34-year-olds was 130.9 per 1,000 in 2011-2015 and 134.0 per 1,000 in 2016-2020. The birth rate for 35-39-year-olds was 57.2 per 1,000 in 2011-2015 and 58.6 per 1,000 in 2016-2020.

Mothers in their 40s: The number of births to mothers in their early 40s increased. For mothers in their late 40s, the number decreased slightly. Between 2011-2015, 223 births were to mothers aged 40-44, and 32 were to mothers aged 45-49. Between 2016-2020, 272 births were to mothers aged 40-44, and 21 were to mothers aged 45-49. The birth rate for 40-44-year-olds was 9.9 per 1,000 in 2011-2015 and 11.7 per 1,000 in 2016-2020. The birth rate for 45-49-year-olds was 1.3 per 1,000 in 2011-2015 and 0.9 per 1,000 in 2016-2020.

Figure 3. Birth rates by selected age of mother: Olmsted County 2011-2020



Cigarette Use

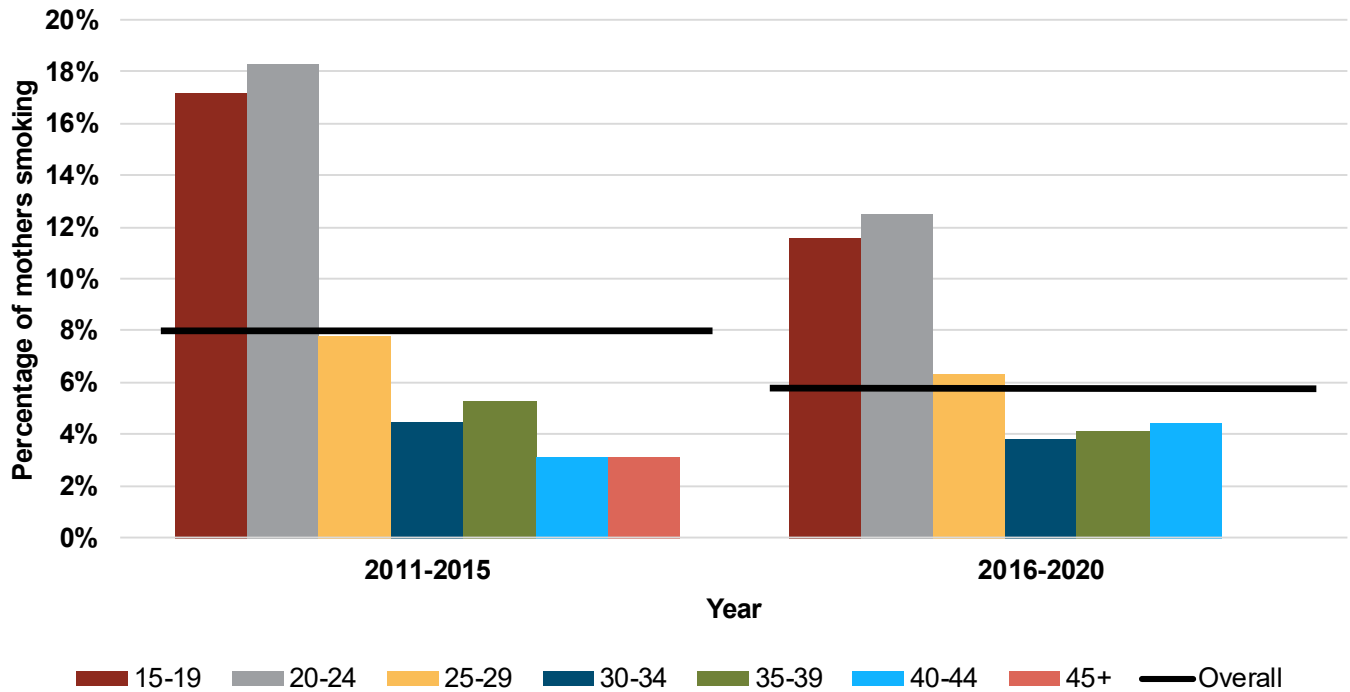
Between 2011-2015, 8.0% of mothers reported smoking cigarettes at some point while pregnant. Smoking decreased slightly as the pregnancy continued. The percentage of mothers smoking by trimester were 7.8% in first, 6.6% in second, and 6.3% in third. Between 2016-2020, 5.7% of mothers reported smoking cigarettes at some point while pregnant. The percentages of mothers smoking by trimester were 5.6%, 4.8%, and 4.6%. The overall percentage of non-smoking mothers was higher than each trimester. This indicates some mothers smoked in attempted to quit but ended up smoking again during their pregnancy.

Differences were observed based on race. White, non-Hispanic mothers were more likely to smoke than non-White mothers. In 2011-2015, 8.9% of White, non-Hispanic mothers smoked. The percentage decreased to 6.5% in 2016-2020. However, smoking was less common in all other racial groups.

Differences were also observed based on age. Younger mothers were more like to smoke than older mothers. Mothers aged 20-24 had the highest smoking rate (18.3% in 2011-2015 and 12.5% in 2016-2020). Teen mothers followed (17.2% in 2011-2015 and 11.6% in 2016-2020), and mothers aged 25-29 (7.8% in 2011-2015 and 6.3% in 2016-2020). Smoking was least common among older mothers. The percentage of mothers 30 years and older that smoked ranged from 3.1% to 5.3% in 2011-2015 and 0.0% to 4.4% in 2016-2020.

The data provided only includes cigarette smoking. Use of e-cigarettes is excluded. Nicotine from both products can harm fetal development.

Figure 4. Percentage of mothers smoking by selected age groups: Olmsted County 2011-2020



Health Service Utilization

Prenatal care (PNC): Between 2011-2015, 63.3% of mothers had adequate PNC. An additional 28.6% had intermediate care, and 8.1% had inadequate or no PNC. The percentage of mothers with adequate PNC decreased to 58.8% in 2016-2020. However, the percentage with intermediate PNC increased to 32.9%. Inadequate or no PNC increased slightly to 8.7%.

Differences were observed based on race. The percentage of White, non-Hispanic mothers with adequate PNC decreased from 65.1% in 2011-2015 to 59.9% in 2016-2020. Similar to overall trends, intermediate PNC increased from 28.7% to 34.0%. Inadequate or no PNC stayed the same for both time periods at 6.2%.

For Black, non-Hispanic mothers, adequate PNC decreased from 55.0% in 2011-2015 to 52.3% in 2016-2020. Intermediate PNC increased from 29.3% to 31.8% over the same time period. Inadequate or no PNC was similar between 2011-2015 and 2016-2020, only increasing slightly from 15.7% to 15.9%. The percentage of Asian, non-Hispanic mothers with adequate PNC decreased from 60.9% in 2011-2015 to 59.4% in 2016-2020. Intermediate PNC increased from 28.0% to 29.9%, and inadequate or no PNC decreased slightly from 11.1% to 10.7%. For Hispanic, any race mothers, adequate PNC increased from 58.3% in 2011-2015 to 59.3% in 2016-2020. Intermediate PNC was similar, 26.2% for 2011-2015 and 26.5% for 2016-2020. Inadequate or no PNC for Hispanic, any race mothers decreased from 15.4% to 14.2%.

Adequate PNC decreased in every age group between 2011-2015 and 2016-2020. Generally, adequate PNC increased and inadequate, or no PNC decreased with age. Adequate PNC was highest in 40+ mothers at 73.4% in 2011-2015 and 68.7% in 2016-2020. Teen mothers had the lowest adequate PNC in the same time frames at 57.1% and 55.1%, respectively. Teen mothers also had the highest inadequate or no PNC. In 2011-2015 the percentage of teen mothers with inadequate or no PNC was 21.6% but decreased to 20.1% in 2016-2020. Despite having the highest adequate PNC, 30+ mothers had the lowest inadequate or no PNC rate at 6.5% in 2011-2015 and 7.0% in 2016-2020.

Table 2. Adequacy of PNC: Olmsted County 2011-2020

Adequacy of Prenatal Care	2011-2015		2016-2020	
	N	Percent	N	Percent
Inadequate or no PNC				
Age group				
Overall	867	8.0%	839	8.3%
>20 years	74	21.6%	43	20.1%
20-29 years	435	8.6%	374	9.2%
30-39 years	337	6.5%	388	7.0%
40+ years	21	8.3%	33	11.3%
Race and ethnicity				
White, non-Hispanic	509	6.2%	455	6.2%
Black, non-Hispanic	166	15.7%	195	15.9%
Asian, non-Hispanic	95	11.1%	88	10.7%
Hispanic, any race	93	58.3%	91	59.3%
Adequate PNC				
Age group				
Overall	6,839	63.3%	5,935	58.8%
>20 years	196	57.1%	118	55.1%
20-29 years	3,215	63.7%	2,322	56.9%
30-39 years	3,242	62.9%	3,295	59.8%
40+ years	185	73.4%	200	68.7%
Race and ethnicity				
White, non-Hispanic	5,377	65.1%	4,410	59.9%
Black, non-Hispanic	582	55.0%	642	52.3%
Asian, non-Hispanic	521	60.9%	490	59.4%
Hispanic, any race	351	58.3%	381	59.3%

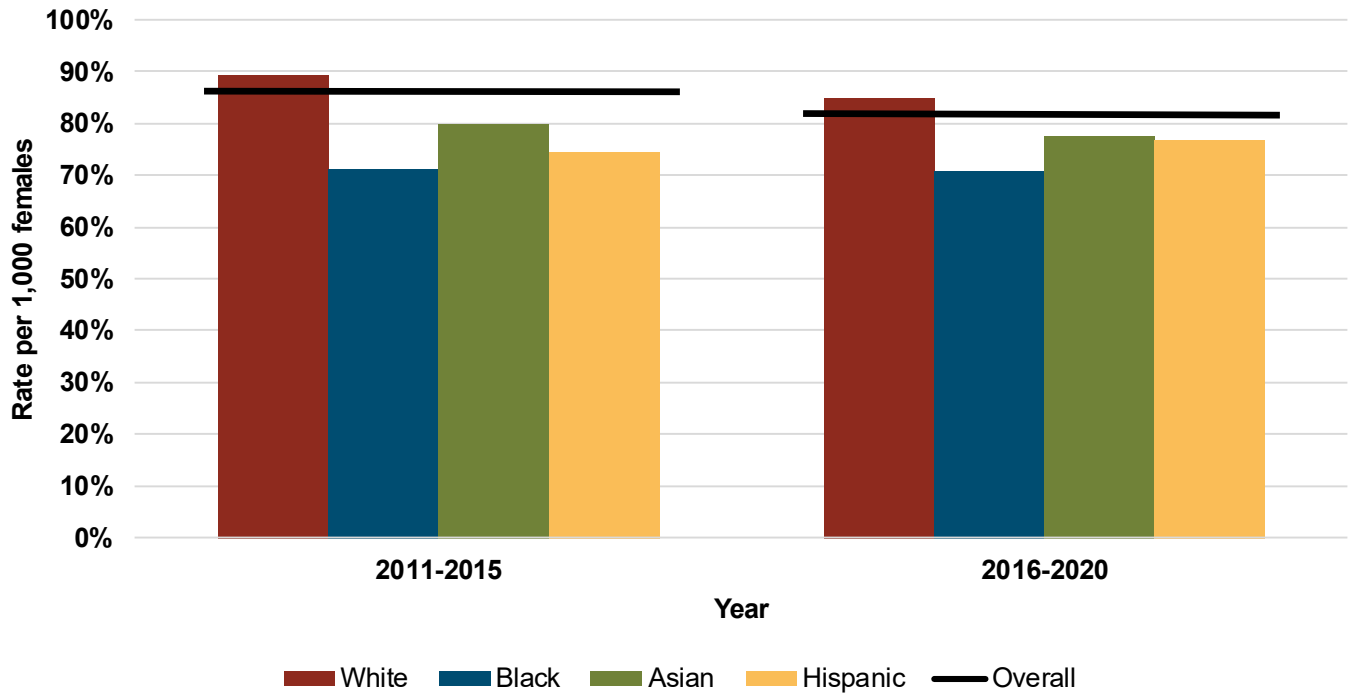
Adequacy is determined by the Adequacy of Prenatal Care Unitization Index.

Source: Minnesota Center for Health Statistics

Between 2011-2015, 85.9% of mothers started PNC in the first trimester of pregnancy, 12.3% started in the second trimester, and 1.8% started in the third trimester. The percentage of first trimester PNC decreased to 82.0% in 2016-2020. Second trimester PNC start increased to 16.5% and third trimester PNC start decreased to 1.5%.

First trimester PNC was lowest among Black, non-Hispanic mothers (71.1% in 2011-2015 and 70.8% in 2016-2020). White, non-Hispanic mothers had the highest first trimester PNC start (89.3% in 2011-2015 and 84.9% in 2016-2020). Among Asian, non-Hispanic mothers, 79.7% had a first trimester PNC start in 2011-2015 and decreased to 77.5% in 2016-2020. Hispanic, any race mothers had the smallest change in first trimester PNC (71.1% in 2011-2015 and 70.8% in 2016-2020). Similar trends were seen in third trimester PNC for all races.

Figure 5. First trimester PNC start by race of mother: Olmsted County 2011-2020



Method of delivery: The cesarean delivery rate was 24.6% in 2011-2015. The rate increased to 25.4% in 2016-2020. Overall, cesarean delivery was more common in older mothers than younger mothers. This is due to the increase in high-risk pregnancy with age. Changes in cesarean delivery rates varied by age group. Women in their 20s were more likely to have a cesarean delivery in 2016-2020 than 2011-2015 (15.7% compared to 19.7% in 20-24 and 22.1% compared to 22.3% in 25-29). The opposite was true for women in all other age groups.

Differences were observed based on race. Cesarean delivery increased for all racial groups. For White, non-Hispanic and Black, non-Hispanic, the cesarean rate increased less than 0.5%. For Asian, non-Hispanic, the cesarean rate increased from 23.0% in 2011-2015 to 25.3% in 2016-2020. For Hispanic, any race, the cesarean rate increased from 23.2% in 2011-2015 to 27.0% in 2016-2020.

Vaginal birth is the preferred route of delivery as it lowers the risk of complications and infections. In mothers with a history of Cesarean, this process is called vaginal birth after cesarean (VBAC). In 2011-2015 the overall VBAC rate was 26.3%. The VBAC rate increased to 28.1% in 2016-2020. This rate is much higher than the national average. The Black, non-Hispanic VBAC rate is higher than the overall rate (37.0% for 2011-2015 and 34.3% for 2016-2020). The White, non-Hispanic VBAC rate is lower than the overall rate (24.1% and 26.1% for 2011-2015 and 2016-2020). Asian VBAC rates increased from 27.4% to 31.7%, and Hispanic VBAC rates increased from 26.6% to 29.2% for both time frames.

Infant Health Characteristics

Gestation: The proportion of preterm infants increased slightly, from 7.2% in 2011-2015 to 7.8% in 2016-2020. Despite the increase in premature births, the percentage of early preterm births stayed the same at 3.4%.

There were differences observed between Hispanic and non-Hispanic mothers. Births to non-Hispanic mothers all had similar proportions of preterm infants regardless of race. Prematurity ranged from 7.1% to 8.0% in 2011-2015. The percentage of premature births for all three race groups increased in 2016-2020, ranging from 7.6 to 8.1%. Infants born to Hispanic, any race mothers had the lowest premature birth rate in 2011-2015 at 6.9%. However, the rate increased to the highest of any race in 2016-2020 at 9.0%.

The prematurity rate for single births increased slightly between 2011-2015 (5.6%) and 2016-2020 (6.6%). The rate for twin, triplet, or quadruplet deliveries also increased. The multiple birth prematurity rate increased from 51.3% in 2011-2015 to 53.6% in 2016-2020.

Birthweight: The proportion of infant birthweight stayed consistent between 2011-2015 and 2016-2020. Infants born with a LBW was 94.0% for both periods. The percentage of VLBW increased from 1.0% to 1.1%, but the overall percentage of LBW or VLBW stayed at 6.0%.

Similar trends to overall were observed for race and ethnicity. For Black, non-Hispanic; White, non-Hispanic; and Hispanic, any race mothers the percentage of normal birthweight infants ranged from 92.5% to 94.7% in 2011-2015. 2016-2020 had a slightly larger range, from 91.7% to 94.7%. For both time frames Asian, non-Hispanic, infants had a higher proportion of LBW or VLBW (10.0% in 2011-2015 and 9.0% in 2016-2020).

The LBW rate for single births increased slightly between 2011-2015 (4.5%) and 2016-2020 (4.9%). However, the LBW rate for twin, triplet, or quadruplet deliveries increased from 45.8% to 49.4%. Given the overall LBW rate stayed consistent but single and multiple LBW both increased, the trend can be explained due to the -30.5% decrease in multiple births.

Table 3. Gestational age and birthweight characteristics by plurality and maternal race: Olmsted County 2011-2020

Plurality	2011-2015					2016-2020				
	Total births	Early pre-term	Pre-term	Very low birth-weight	Low birth-weight	Total births	Early pre-term	Pre-term	Very low birth-weight	Low birth-weight
	N	Percent	Percent	Percent	Percent	N	Percent	Percent	Percent	Percent
All births	10,873	3.4%	7.2%	1.0%	6.0%	10,208	3.4%	6.9%	1.1%	6.0%
Singleton	10,489	2.3%	5.6%	<1.0%	4.5%	9,941	2.7%	6.6%	<1.0%	4.9%
Multiple	384	33.1%	51.3%	7.3%	45.8%	267	29.6%	53.6%	10.9%	49.4%
Race and ethnicity										
White, non-Hispanic	8,312	3.4%	7.1%	<1.0%	5.3%	7,440	3.1%	7.7%	<1.0%	5.3%
Black, non-Hispanic	1,066	3.5%	8.0%	2.0%	7.5%	1,252	4.0%	10.0%	1.9%	8.3%
Asian, non-Hispanic	862	3.6%	7.5%	<1.0%	10.0%	829	4.1%	7.6%	1.7%	9.0%
Hispanic, any race	612	3.8%	6.9%	2.0%	6.6%	656	4.6%	9.0%	1.1%	6.7%

Births with unknown values are excluded from percentages.

Early preterm is less than 34 completed weeks of gestation. Preterm is less than 37 completed weeks of gestation. Includes early preterm.

Very low birthweight is less than 1,500 grams. Low birthweight is less than 2,500 grams. Includes VLBW.

Births with unknown values are excluded from percentages.

Source: Minnesota Center for Health Statistics

Conclusion

Olmsted County has seen a steady decline in the number of births and GFR over the past ten years. The average age of first-time mothers has increased, meaning women are waiting to have their first child until later in their lives. A combination of these factors, as well as an aging population and increase in deaths, has shrunk the rate of natural population increase. Olmsted County's population is increasing, but movement into the county is outpacing births.

The percentage of mothers with adequate PNC also declined between 2011-2015 and 2016-2020. Access to healthcare was impacted for many mothers during the COVID-19 pandemic in 2020. However, values were already declining. So, the COVID-19 pandemic does not fully explain the decrease in adequate prenatal care. Negative infant health indicators (premature and low birthweight) increased in the same time frame. This may be a result of fewer mothers accessing adequate PNC.

On a population level, differences in natality are a result of social factors, not biological or genetic. Social determinants of health largely contribute to disparities between demographic groups.

Birth data is an important measure of community health. Overall birth indicators can effectively measure changes by year. However, Olmsted County is mostly White, non-Hispanic. Most births were observed in that population, so overall birth indicators do not tell the full story. Identifying populations can help educate and promote health the community.

Action Plan

This report will be shared with the community on the Olmsted County Public Health Services website. Additional ways of presenting data, such as an interactive dashboard, will be considered for future publications. Trends in mortality will be shared and discussed with internal and external partners. Examples of partners include the Health Promotion team, Adult and Family Services, Child and Family Services, Sherriff's office, Medical Examiner's office, Mayo Clinic, Olmsted Medical Center, and United Way. Some data in this report will be provided for the Community Health Needs Assessment.

References

1. National Center for Health Statistics. Bridged-Race Population Estimates, United States July 1st resident population by state, county, age, sex, bridged-race, and Hispanic Origin. Hyattsville, MD. 2021. Available from: <https://wonder.cdc.gov/bridged-race-v2020.html>.
2. Kotelchuck M. An evaluation of the Kessner adequacy of prenatal care index and a proposed adequacy of prenatal care utilization index. *American Journal of Public Health*. 1994;84(9):1414-1420.

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