Infant Mortality
Pennsylvania, 2013-2022

Pennsylvania Department of Health

Key Findings

- **The infant mortality rate in Pennsylvania decreased by 4% over the last 10 years from 6.7 deaths per 1,000 live births in 2013 to 5.7 in 2022.**
- **Preterm birth was the leading cause of infant mortality for the last 10 years.**
- **The infant mortality rate was highest among infants of mothers aged 19 years or younger and among mothers with a high school education or less.**
- **Black infants consistently had the highest rate of infant mortality every year for the last 10 years.**
- **Focusing on areas with the highest Black infant mortality rates could accelerate change and advance health equity.**

Data Brief

• What is infant mortality?

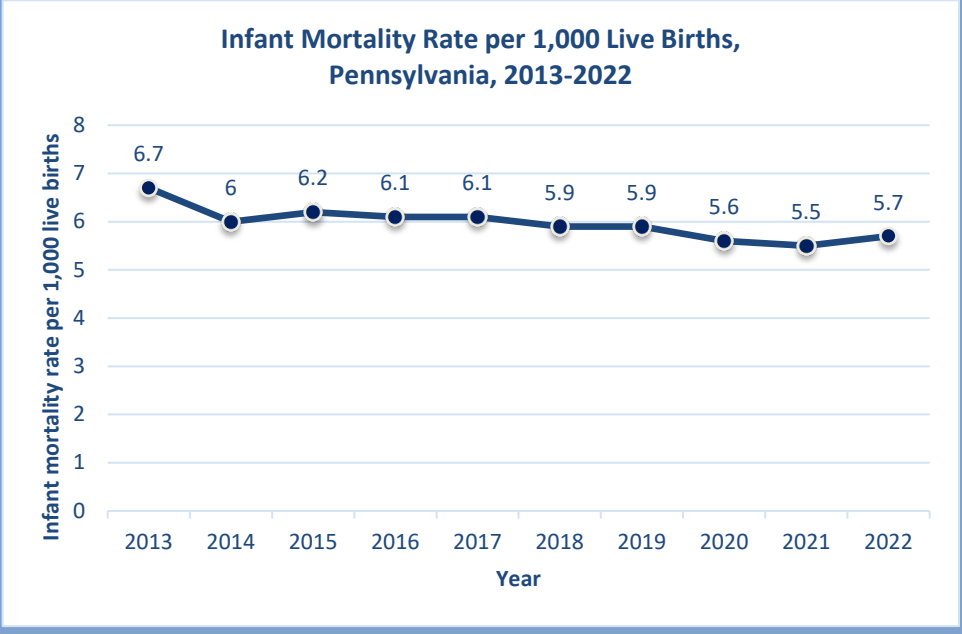
Infant mortality is death occurring among children under the age of one. The infant mortality rate is an important marker of health for a community, state, or country.

• How many infants die in Pennsylvania each year?

On average, approximately 800 infants died each year in Pennsylvania over the last 10 years from 2013 to 2022. There were 940 infant deaths in 2013 and 744 infant deaths in 2022. The number of deaths and the number of live births are used to calculate an infant mortality rate and this outcome is tracked over time. The rate is defined as the number of infant deaths divided by the number of live births multiplied by a constant, 1,000, to help with interpretation.

• How has the infant mortality rate changed over the last 10 years?

There was a gradual decrease in the infant mortality rate between 2013 and 2022 in Pennsylvania. During this period there was on average 1 fewer infant death per 10,000 live births each year.



There was a decreasing trend in infant mortality between 2013 and 2022.

In 2022 there were nearly six infant deaths for every 1,000 live births occurring in Pennsylvania.

While there was a national increase in infant mortality between 2021 and 2022, Pennsylvania did not observe a statistically significant increase in infant mortality between 2021 and 2022.

• What are the top five leading causes of infant mortality in Pennsylvania?

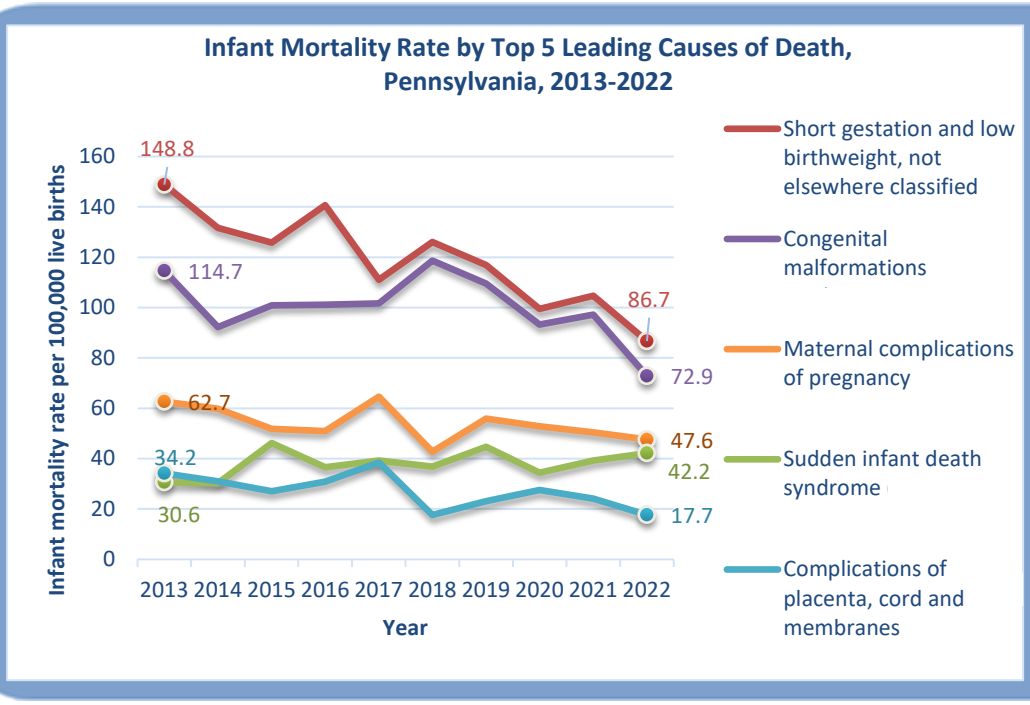
The top five leading causes of infant death from 2013 to 2022 were short gestation and low birthweight, congenital malformations, maternal complications of pregnancy, sudden infant death syndrome, and complications of placenta, cord, and membranes. Each cause is further explained in the table below.

Leading Causes of Infant Mortality, 2013-2022

1.	**Short gestation and low birthweight**	Short gestation refers to infants who are born early, before the 37th week of pregnancy, or very early, before the 28th week of pregnancy. Infants born early are called preterm, are underdeveloped, and may not survive even with intensive care.
2.	**Congenital malformations**	Congenital malformations are also called birth defects and affect the body's structure or function. While some birth defects can be treated or managed, others result in infant death.
3	**Maternal complications of pregnancy**	Health issues during pregnancy such as the pregnant person's water breaking before labor starts, or problems with their cervix can cause problems for the infant's health.
4	**Sudden infant death syndrome**	Sudden infant death syndrome is the sudden and unexplained death of a baby under the age of one that doesn't have a known cause even after a full investigation.
5.	**Complications of placenta, cord, and membranes**	During pregnancy the infant relies on the placenta and umbilical cord for blood flow and nutrition. If complications related to the placenta or cord arise before or during delivery, this can impact the infant's health.

• Has the leading cause of infant mortality changed over time?

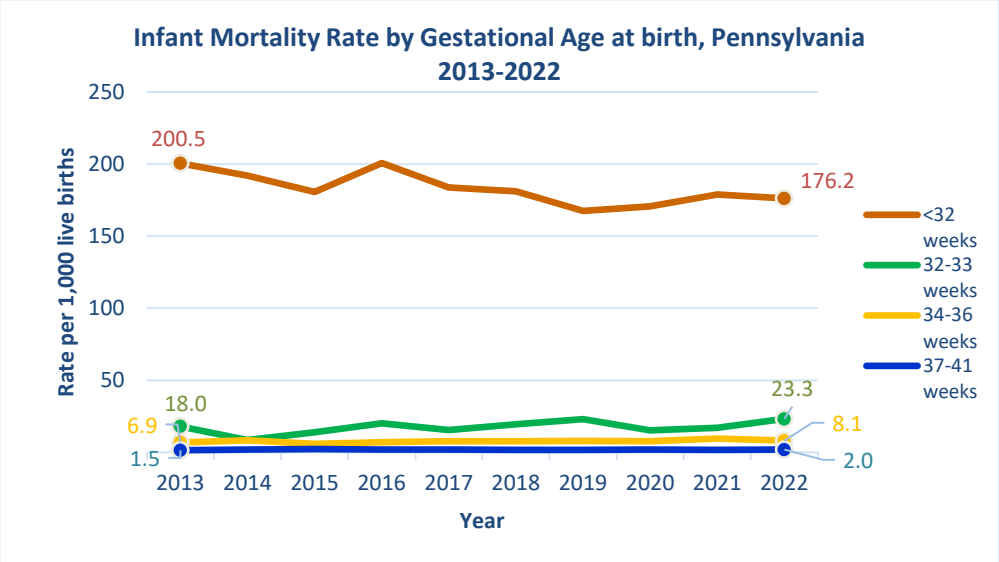
Despite some variation in the rates by cause of death, the leading cause of infant mortality has been preterm birth (short gestation and low birthweight, not elsewhere classified) for the last ten years.



Preterm birth has been the leading underlying cause of infant mortality in Pennsylvania for at least ten years.

• Why is preterm birth a risk factor for infant mortality?

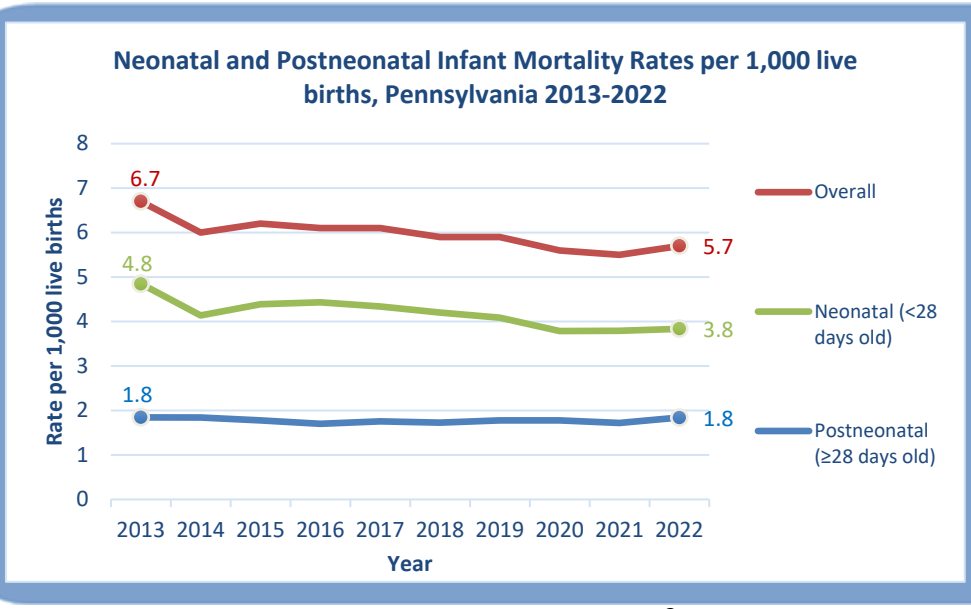
Throughout pregnancy, an infant's body and organ systems grow and develop. Infants who are born too early, before the pregnancy reaches 37 weeks, are not fully developed, and may have health complications that require intensive medical care. These complications may result in disability or death. Infant mortality rates are lower among infants who have more time to develop and are delivered after 37 weeks. From 2013 to 2022 the infant mortality rate was highest among infants born before 32 weeks.



Infants born too early are not fully developed. The mortality rate is highest among infants born before the 32nd week of pregnancy and lowest among infants born between 37 and 41 weeks of pregnancy.

• At what age are infants dying in Pennsylvania?

Most infant deaths, approximately 2 of every 3 infant deaths (67%), occur before 28 days of age. Infant deaths occurring before 28 days of age are called neonatal deaths. Infant deaths occurring at 28 days or later are called postneonatal deaths. We use the number of postneonatal and neonatal deaths to calculate infant mortality rates. Despite overall decreases in the neonatal and postneonatal mortality rates over the last ten years, neonatal mortality rates remain two times higher than postneonatal mortality rates in Pennsylvania. Infants born preterm are more likely to die during the neonatal period than full-term infants.

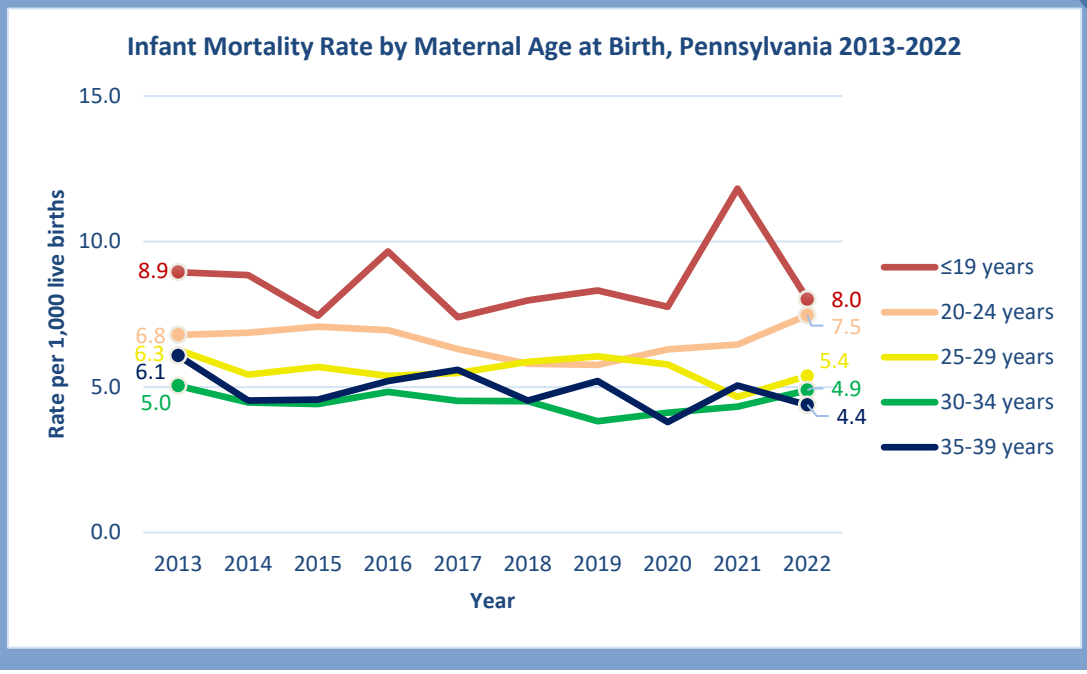


Most infant deaths occur before 28 days of age.

The rate of neonatal death (death occurring before 28 days of age) is two times higher than the postneonatal death rate (death occurring at or after 28 days of age).

• How do infant mortality rates differ by maternal age at birth?

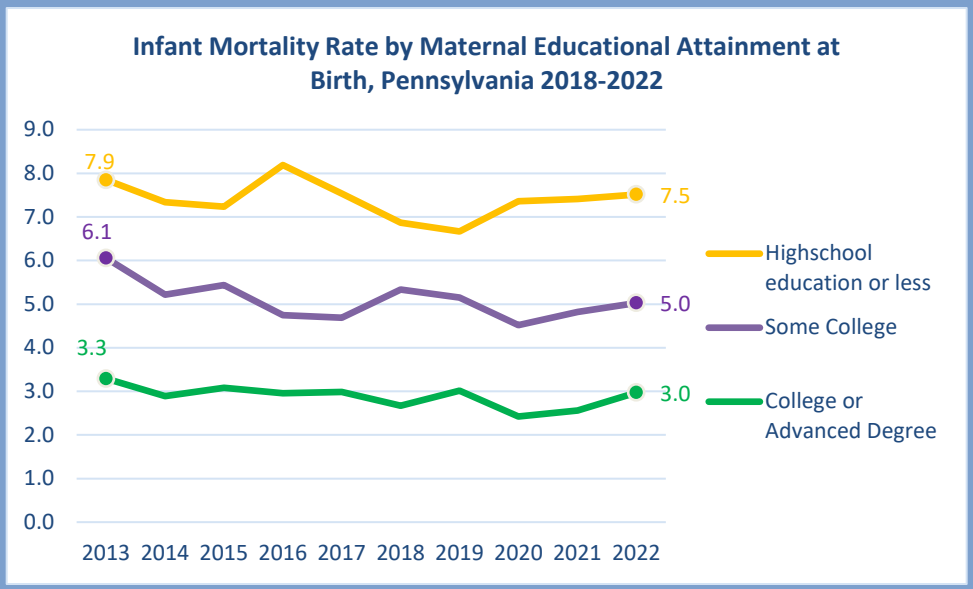
From 2013 to 2022, the mortality rate was highest among infants of women aged 19 years or younger. This has been a consistent trend for the last decade. Despite some changes from year to year, infant mortality rates were lowest among women between the ages of 30 and 39 at birth.



Mortality rates were consistently higher among infants of women aged 19 years or younger at birth.

• How do infant mortality rates differ by maternal education?

The infant mortality rate was higher among infants of women who had a high school education or less for the last decade from 2013 to 2022. The rate of infant mortality was lower among infants of women with higher levels of education.

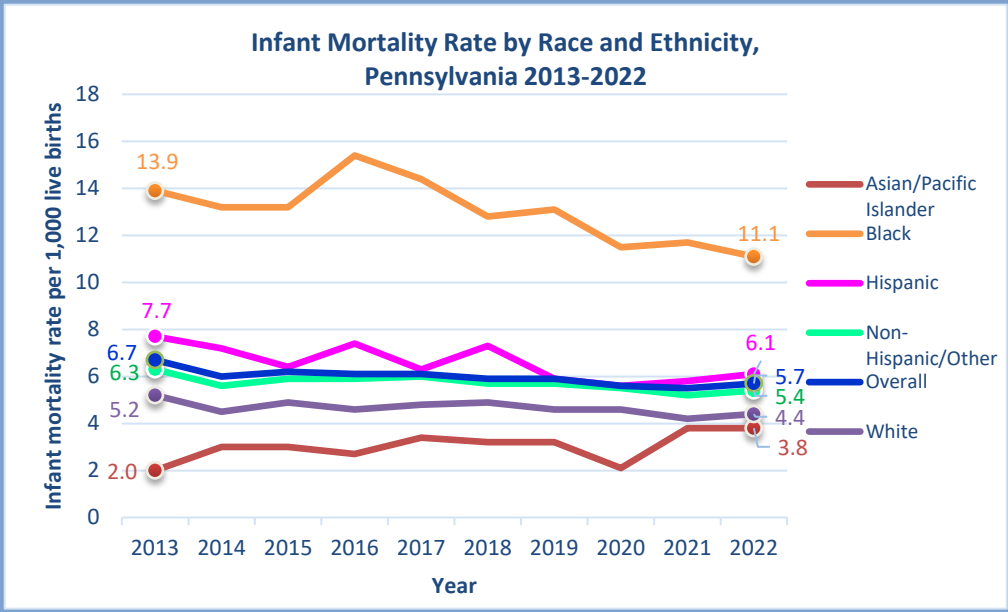


Infants of women with a high school education or less had the highest infant mortality rates.

Maternal education was a protective factor. Infant mortality rates were lower among women with higher education.

• How do infant mortality rates differ by race?

Despite the decrease in the overall infant mortality rate observed over the last decade, Black infants remain two to five times more likely to die before their first birthday than infants of other races or ethnicity. This racial disparity has persisted for decades, including over the last ten years.



Black infants were two to five times more likely to die before their first birthday than infants of other race or ethnicity.

Race and ethnicity are social constructs, not biological. Differences by race and ethnicity are the result of systemic social inequities.

• What factors contribute to differing infant health outcomes?

The conditions in the environments where people are born, live, learn, work, play, worship, and age impact quality-of-life and overall health for infants and their families.[6] Social, environmental, and economic inequities, including exposure to systemic racism and other forms of oppression, have a greater impact on health than individual choices or behaviors.

These factors and experiences impact a person's health throughout life and can result in trauma that impacts health across generations.

Communities and groups that have experienced historic and ongoing discrimination often experience a higher burden of poor health outcomes as compared to others. These differences are the result of systematic, unfair, and unjust circumstances which must be identified and addressed for all to attain wellness.

• Why are infant mortality rates higher among Black infants?

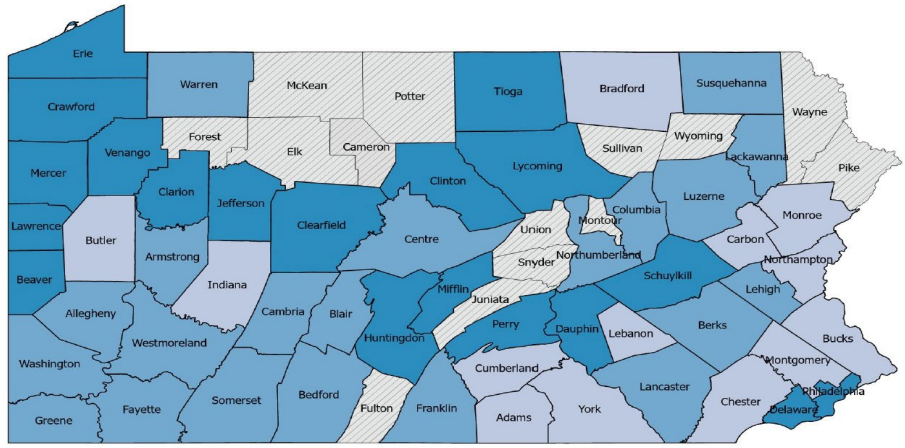
Race and ethnicity are social constructs, not biological. Differences in health outcomes by race and ethnicity are the result of systemic social inequities and disparities.

Prematurity and preterm-related causes have been identified as the largest contributor to the persistent disparity in infant mortality between Black and white infants.[1,2] Preterm birth rates are consistently higher among Black women as compared to white women.[3] Preterm birth is often the result of many interacting factors such as maternal medical history, characteristics of the pregnancy, and social and economic factors.[4] Exposure to interpersonal and structural racism as well as associated chronic stress have also been identified as risk factors for preterm birth.[5]

• How do overall infant mortality rates differ by county?

During 2018-2022 Clearfield, Crawford, Lycoming, Mifflin, and Perry counties had the highest five-year infant mortality rates. The infant mortality rate by county ranged from 1.7 deaths per 1,000 live births to 9.0 deaths per 1,000 live births.

Five-Year Infant Mortality Rates by County, Pennsylvania 2018-2022



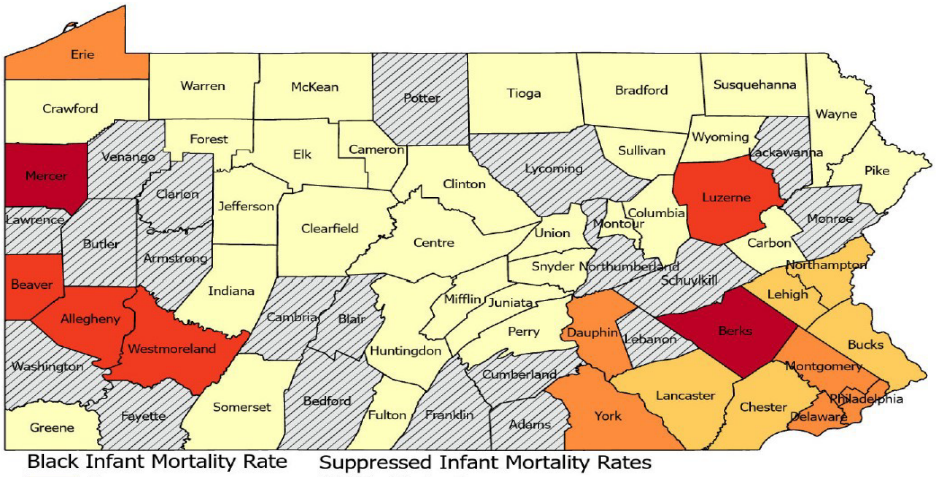
Note: Rates for counties with fewer than 10 deaths during the five-year period are not presented as the rate is considered unstable due to the small numbers.

Clearfield, Crawford, Lycoming, Mifflin, and Perry counties had the highest five-year infant mortality rates during 2018-2022.

• Where are Black infant mortality rates the highest in Pennsylvania?

Five-year estimates from 2018-2022 suggest that the Black infant mortality rates were highest in Mercer, Berks, Luzerne, Westmoreland, and Beaver counties. Focusing on areas with the highest Black infant mortality rates could make it possible to accelerate change for the populations experiencing the poorest health outcomes and advance health equity.

Five-Year Black Infant Mortality Rates by County, Pennsylvania 2018-2022



Note: Rates for counties with fewer than 10 deaths during the five-year period are not presented as the rate is considered unstable due to the small numbers.

Black infant mortality rates were highest in Mercer, Berks, Luzerne, Westmoreland, and Berks counties during 2018-2022.

Focusing on areas with the highest Black infant mortality rates could accelerate change for populations with the poorest health outcomes and advance health equity.

Technical Notes

Data Sources and Method

This data brief presents infant mortality statistics based on data from Pennsylvania's 2013-2022 vital records files. Infant mortality rates are described over time, by cause of death, gestational age, infant age at death, maternal age, maternal educational attainment, race and ethnicity, and county of residence. Information from the death certificate was linked to the birth certificate for Pennsylvania resident infants under the age of one using the probabilistic linkage software, MatchPro. Records were matched based on infant first, middle, and last names, maternal maiden and/or last name, infant date of birth, infant date of death, infant sex, and zip code. Results were manually reviewed to ensure proper matching. Approximately 96% of resident infant deaths were linked to a Pennsylvania birth certificate. This linkage makes it possible to use variables on the birth certificate to further characterize infant deaths and is consistent with the analytic approach used nationally.

Leading Cause of Death

The causes of death identified in this brief were characterized using the underlying cause of death International Classification of Diseases, Tenth Revision (ICD-10) code on the death certificate. The ICD-10 is a standardized system used to code and classify causes of death.

Sudden Infant Death Syndrome (SIDS) and Sudden Unexpected Infant Death (SUID)
One of the leading causes of death identified in this brief was sudden infant death syndrome, sometimes called SIDS. Recent changes in SIDS rates have been attributed to a "diagnostic coding shift" rather than a true change in the frequency of deaths meeting the criteria for a SIDS diagnosis.[7] This variability in how SIDS deaths are identified is a limitation that should be considered when assessing SIDS data. The corresponding ICD-10 code (R95) should only be assigned when a full case investigation is completed but the cause of infant death still cannot be explained. In practice, this cause may be assigned to infant deaths that do not fit this description and are actually sleep-related deaths or another type of sudden unexpected infant death (SUID). SIDS deaths are one type of SUID. SUID is the umbrella term that characterizes infant deaths that are sudden and unexpected. Pennsylvania is engaged in a case registry with the goal of better identifying and characterizing SUIDs through detailed case review by Child Death Review teams. There are three types of SUID as defined by the National Center for Health Statistics: (1) accidental suffocation or strangulation in bed, (2) deaths with unknown and ill-defined causes, and (3) deaths attributed to sudden infant death syndrome. For more information on Pennsylvania's Child Death Review Program, please visit our website.

Rates by County

Due to the small number of vital events occurring in select Pennsylvania counties annually, data were aggregated to present five-year estimates. While the incorporated data represent a five-year period and as a result do not reflect the most recent data, this approach made it possible to present data for most of the state. However, counties with few births or deaths may still have infant mortality rates that fluctuate widely from year to year due to their relatively small population and number of vital events. This should be considered when reviewing and comparing county-level data.

Language

Where maternal is used as an adjective it should be understood to refer to the person who gave birth, without consideration of gender or gender identity. We recognize that not all people who give birth identify as women.

References

[1]Singh, G. K., & Stella, M. Y. (2019). Infant mortality in the United States, 1915-2017: large social inequalities have persisted for over a century. *International Journal of Maternal and Child Health and AIDS*, 8(1), 19.

[2]Schempf, A. H., Branum, A. M., Lukacs, S. L., & Schoendorf, K. C. (2007). The contribution of preterm birth to the black– white infant mortality gap, 1990 and 2000. *American Journal of Public Health*, 97(7), 1255-1260.

[3]Womack, L. S., Rossen, L. M., & Hirai, A. H. (2020). Urban–rural infant mortality disparities by race and ethnicity and cause of death. *American Journal of Preventive Medicine*, 58(2), 254-260.

[4]Mathews, T. J., MacDorman, M. F., & Thoma, M. E. (2015). Infant mortality statistics from the 2013 period linked birth/infant death data set.

[5]American College of Obstetricians and Gynecologists. (2021). Prediction and prevention of spontaneous preterm birth: ACOG Practice Bulletin, Number 234. *Obstetrics and Gynecology*, 138(2), e65- e90

[6]Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Retrieved [September 25, 2024], from https://health.gov/healthypeople/

[7]Shapiro-Mendoza, C. K., Palusci, V. J., Hoffman, B., Batra, E., Yester, M., Corey, T. S., ... & ABUSE, C. O. C. (2021). Half century since SIDS: a reappraisal of terminology. *Pediatrics*, 148(4).

Questions?

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