Periviable Births

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This report highlights the prevalence, risk factors, and outcomes of periviable infants born between 22 0/7 and 23 6/7 weeks' gestational age. While periviable birth rates have remained relatively stable in recent years, facilities are developing new approaches to ensure the highest possible quality of care and to reduce infant mortality. Findings in this report indicate that lower socioeconomic status is associated with an increased risk of periviable birth. Additional leading risk factors include plural births (twins or higher-order multiples), short pregnancy intervals <12 months, and pre-pregnancy obesity. Despite their extremely low birth weight, averaging just 1.2 pounds, survival rates for periviable infants have steadily improved in recent years. Virginia hospitals have demonstrated a strong interest to better understanding the causes and care practices related to periviable birth, with the goal of developing standardized models of care statewide to improve both survivability and long-term quality of life.

Background

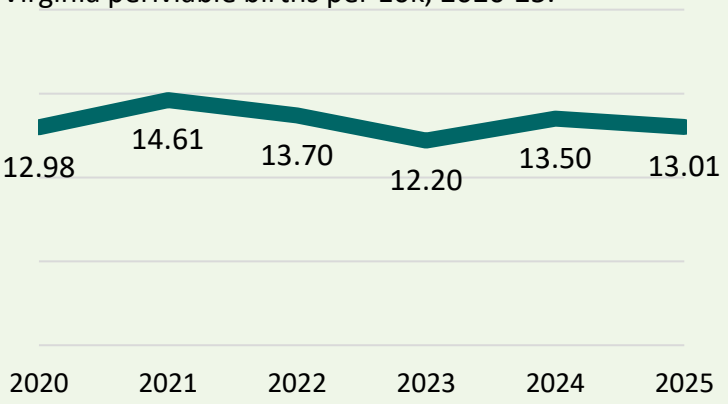
- Periviable births occur from 20 0/7 weeks to 25 6/7 weeks[2], but this project/report is focused on those born between 22 0/7 and 23 6/7 weeks gestational age where clinical practice shows the greatest variability.
  - This gestational window reflects a period of rapidly evolving care, while management at 24 weeks and beyond has become more standardized.
  - Focusing on 22–23 weeks reduces the overall population size to minimize data collection burden
- Periviable infants are born at the youngest age for viability or potential for survival outside of the womb. These infants spend extended periods in high-level facilities and NICUs[2].
  - Care for these infants requires families and teams to make complex, ethically challenging decisions
- Approximately 0.5% of births occur before third trimester (before 28 weeks) and account for 40% of infant deaths[2].
- Recent studies have shown survivability is improving with proper resources and care[5].
- The VNPC has assembled a workgroup of neonatal and maternal health leaders across the state to examine care practices for periviable infants born 22-23 weeks.

Methods

The primary data source used in this report is the CDC Wonder system[4]. This site contains publicly accessible vital records (births and deaths) data that can be stratified and extracted to support health research. The data are from the Natality and Mortality Records for the period from 2020 to 2025, as compiled from information provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Data from 2020- 2024 are finalized, while data from 2025 are preliminary and subject to future changes. Additionally, inpatient discharge data from VHHA maternal health dashboard were used to illustrate the geography of late preterm births in Virginia from 2020-2024[7].

About 1 in 750 births are born in the periviable window.

Virginia periviable births per 10k, 2020-25.



Demographics – Overview

Periviable Case Numbers by Race, 2020-2025

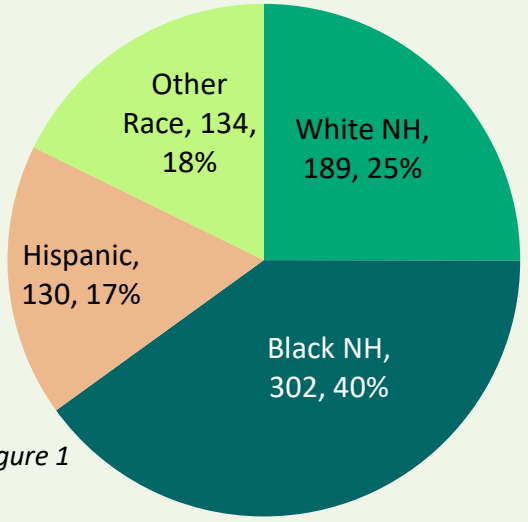


Figure 1

Shown in Figure 1, nearly half of all periviable infants born since 2020 in Virginia have been Black Non-Hispanic with 302 live births at 40%. This is followed by 25% or 189 live births are White Non-Hispanic, 17% or 130 live births were Hispanic, and 18% or 134 births were another race. It's important to note here, that black births make up a much larger portion of periviable births compared to all live births where they represent about 20%. Similarly, white deliveries represent a larger portion of all live births at 53%.

Periviable Case Numbers by Payer 2020-2025

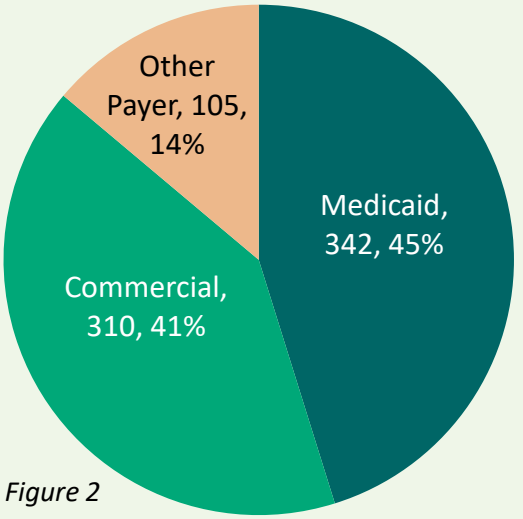


Figure 2

Figure 2 is showing periviable case numbers broken down by payment source categories. These are the payment sources at the time of delivery that paid for the live births in Virginia from 2020-2025. Medicaid represents the larger category of payment sources at 45% of periviable births, followed by commercial at 41%, and other payers at 14%. This is a larger proportion of Medicaid births compared to all live births where 33% are supported by Medicaid.

Periviable Birth Numbers by Sex at Birth, 2020-2025

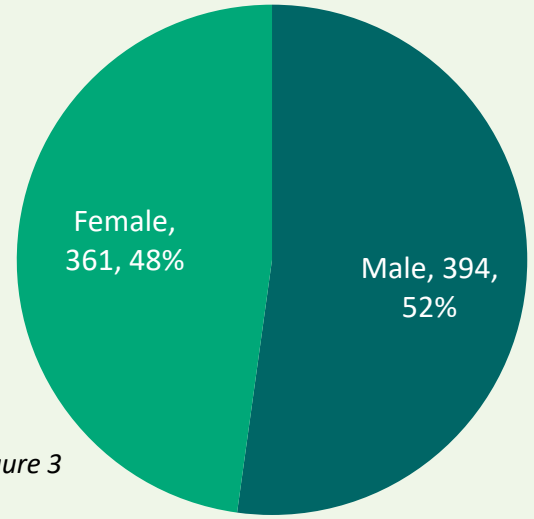


Figure 3

Sex at birth is an important consideration in periviable infants, as it is associated with differences in survival and clinical outcomes in the NICU.[9] These populations are nearly evenly split with males (52%) being slightly higher than females (48%).This is an important consideration for providers and nurses caring or periviable infants as the understanding of risk factors associated with underperformance in the hospital is imperative.

Demographics – Race/Ethnicity

Black Non-Hispanic births are the only racial group with an increased risk for periviable births.

Relative risk for periviable birth by race/ethnicity, 2020 - 2025.

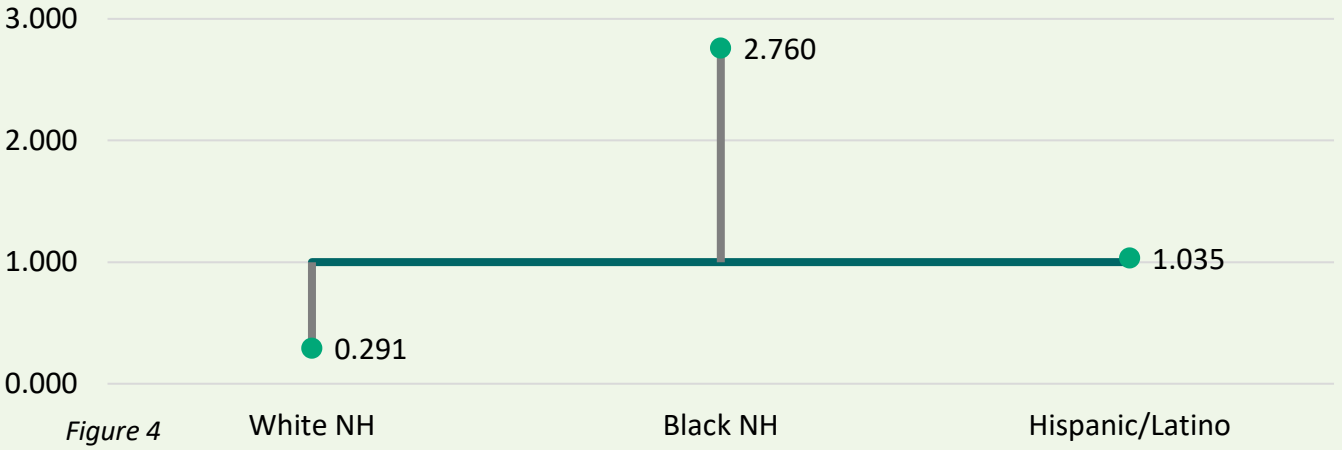


Figure 4

In figure 4, a relative risk analysis is shown to display the increased/decreased risk for periviable birth across racial and ethnic demographics. For relative risk, a neutral risk is assessed at 1 meaning no increased or decreased risk for a particular group, a relative risk over 1 demonstrates an increased risk, and decreased risk when below 1.

In Virginia, periviable births are notably higher among the Black Non-Hispanic population with a significantly increased risk. The Black Non-Hispanic population observed 2.76 times higher risk to have a periviable birth. For white deliveries, there is an observed lower risk for periviable births about 71% less than the non-white population. The juxtaposition of risk between racial and ethnic groups highlights the difference of social and health system factors that are not equitably experienced by all groups. These patterns are consistent with known differences in socioeconomic conditions, health status, and access to care across populations.

Figure 5 is showing the incidence of periviable births across racial and ethnic groups from 2020 to 2022. This figure shows incidence rate of periviable births in the Black NH population is over three times as high as the rate in the White NH population. Between these, the incidence across all live births and Hispanic/Latino births is in the middle. This further emphasized the socioeconomic and health factor differences between racial and ethnic groups in Virginia.

Periviable births occur more frequently in the Black population.

Incidence of periviable births per 10k live births, 2020-2025.

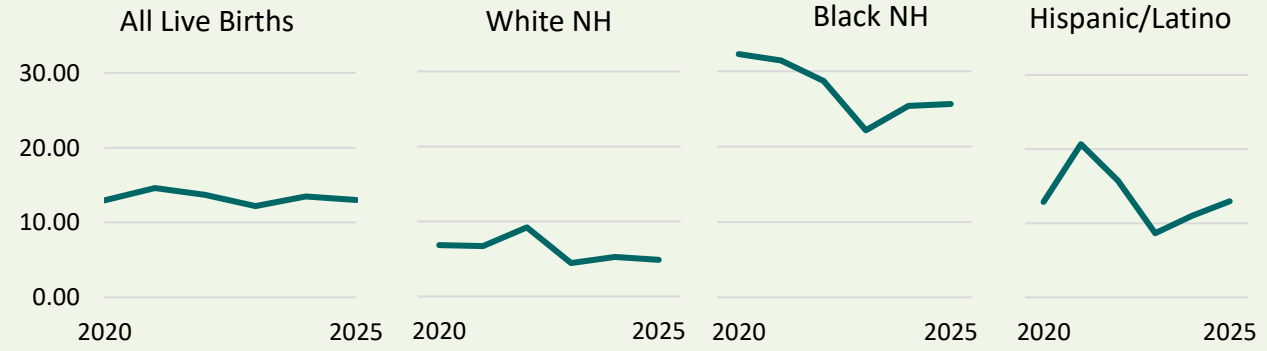


Figure 5

Demographics – Payer Source

Medicaid supported births have a higher increased risk over other sources.

Relative risk for periviable birth by payment source, 2020-2025.

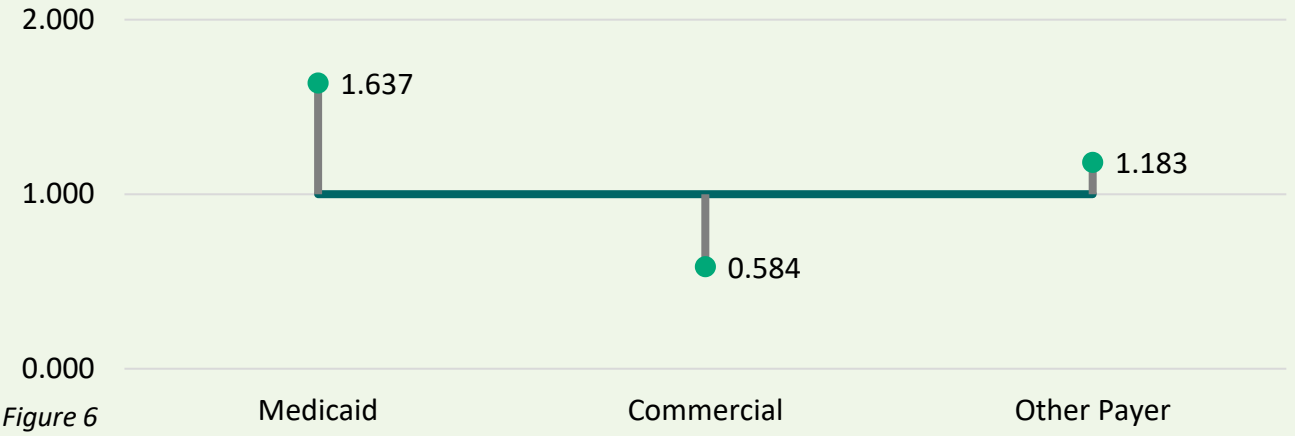


Figure 6

In figure 6, a relative risk analysis is shown to display the increased/decreased risk for periviable birth across payment source categories. Again, for relative risk, a neutral risk is assessed at 1 meaning no increased or decreased risk for a particular group, a relative risk over 1 demonstrates an increased risk, and decreased risk when below 1.

The data show periviable births are notably higher in the population where Medicaid is the largest payment source. Medicaid is a health payer program supported by state and federal governments to help cover medical costs for people with limited income and resources[8]. It is a vital resources for those with lower socioeconomic status to ensure availability and access to healthcare. Medicaid is the payment source for about 33% of all live births in Virginia, yet over 45% of periviable births. The data in figure 3 show live births supported by Medicaid are 1.6 times more likely to be periviable. Alternatively, live births with a commercial or private payment source show a little over half the risk compared to those without private insurance. It important to note this analysis is not showing that Medicaid is a direct cause of periviable births, but it highlights a vulnerable population with risk factors and increased risk for periviable birth.

Below, figure 7 is showing the rate of periviable births disaggregated by different payment sources. Similar to relative risk, periviable births are more incident in the Medicaid population, and lower in the commercial population. Both are showing a decreased periviable rate in recent years.

Periviable births occur more frequently in the Medicaid population.

Incidence of periviable births per 10k live births, 2020-2025.

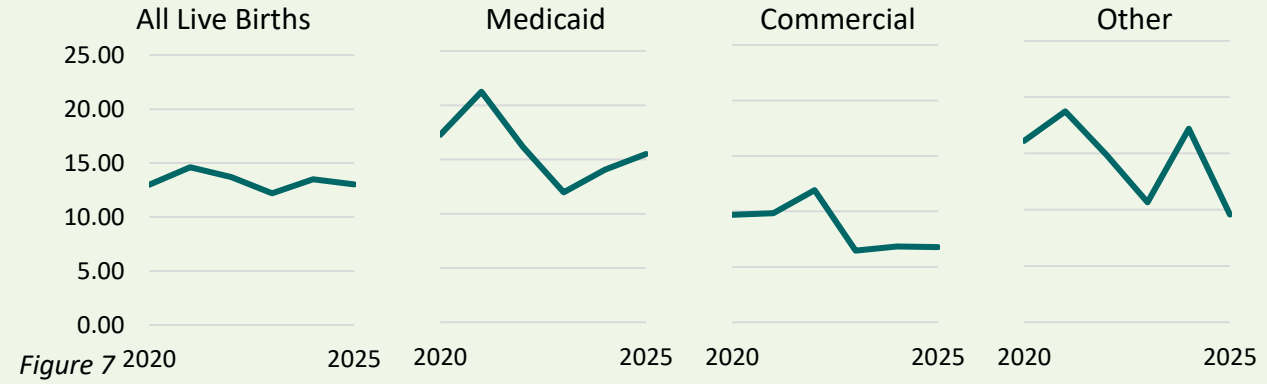


Figure 7

Geography[7]

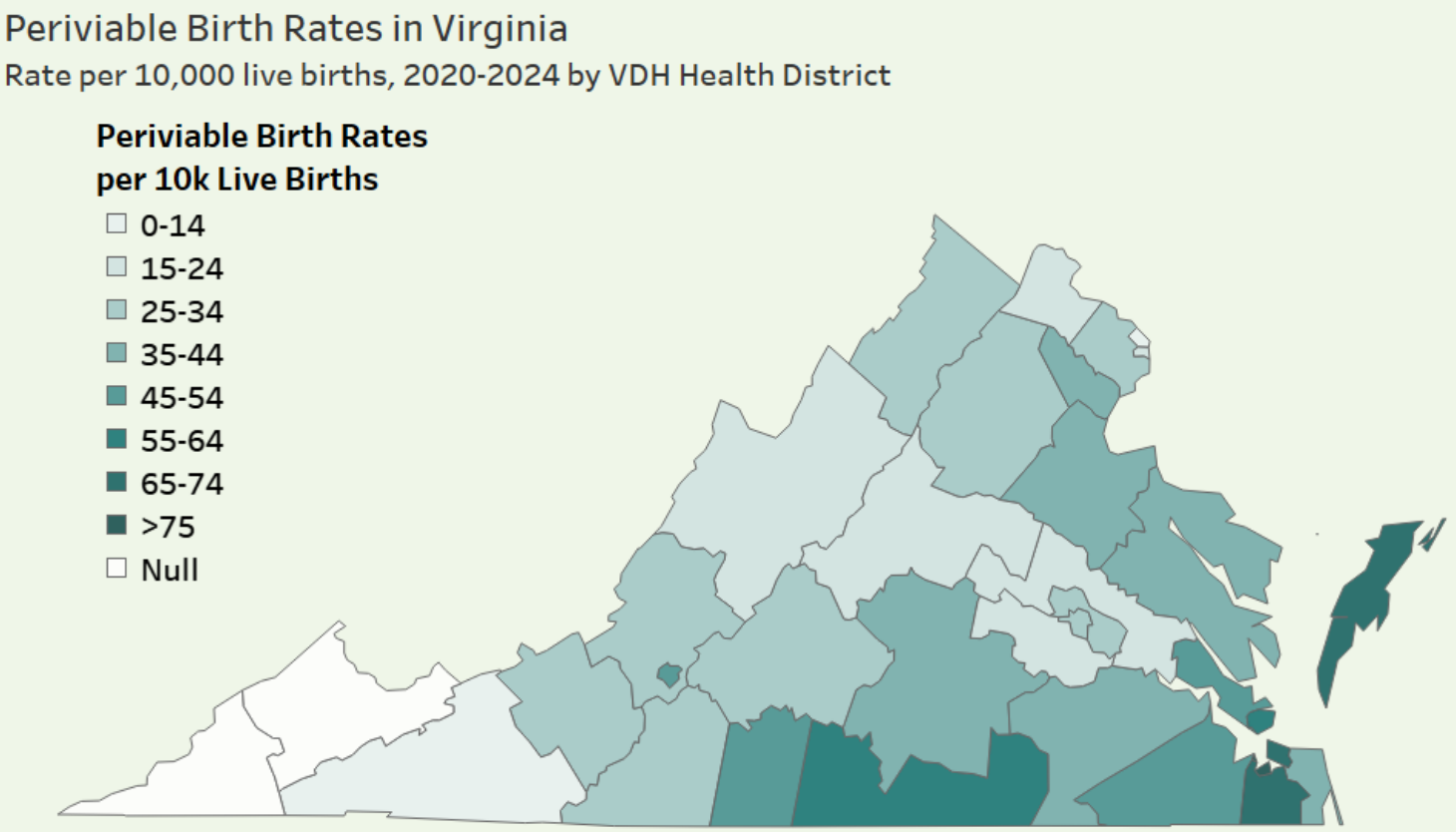


Figure 8

The occurrence of periviable births is variable across the state showing clear geographic and socioeconomic differences in different regions. As seen previously in this report, periviable birth rates change according to socioeconomic status with race and payer adding to this variability. Similar trends are seen when geography is isolated as different populations have different needs and availability of resources as visualized in figure 8, above.

The Map shows higher rates of periviable births in south-central and eastern Virginia. The annual average is typically around 13 periviable deliveries per 10,000 deliveries. Some districts in eastern Virginia are over 75 periviable deliveries per 10,000 deliveries warranting the need for further examination to better understand the risk factors driving this rate increase. Unfortunately, existing data can only show a loose association with geography causing periviable births and are unable to definitively show the direct causes.

Alternatively, central, and northwest, and northern Virginia are showing lower rates for periviable births. Many districts in this region are averaging fewer than 14 periviable deliveries per 10,000 deliveries. A better understanding of these districts may illuminate successful strategies for understanding and preventing periviable births.

The demographic data visualized through pages 2-4 highlight some key associations between different groups and increased/lowered risks of periviable births. Unfortunately, with data limitations, these trends cannot be fully understood, and true root causes and treatment remain unknown. To better understand causes of periviable births in Virginia, more data will need to be collected and analyzed.

Risk Factors

NICU Admission flags account for most abnormal conditions of periviable newborns.

Incidence of abnormal conditions of newborn per 1,000 live births, 2020-2025.

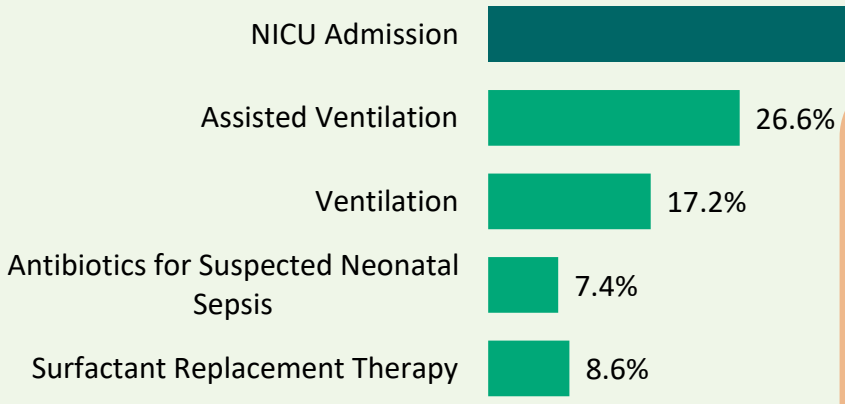


Figure 9

Working with clinical partners, these data appear inconsistent with expected NICU care. Reported NICU admission rates may be artificially elevated, and infants who are truly admitted would be expected to receive near-universal interventions such as ventilation and surfactant. These misalignments suggests limitations in data capture or classification and highlights the need for a standardized periviable birth registry.

Figure 9 is showing the abnormal conditions for periviable newborns as reported through vital records data. 66.9% of periviable infants were reported to be admitted to the NICU. While it's expected all infants born 22-23 weeks will need intensive care the care of infants at this gestational age spans a wide clinical spectrum. There may be several reasons for 33.1% of periviable infants not undergoing formal NICU admission, including spontaneous loss shortly after delivery and parental decisions for palliative or modified care at the edge of viability. Additionally, documentation or order-entry practices may influence how NICU admission is recorded potentially leading to over- or underestimation of true admission rates. Other common abnormal conditions of periviable newborns include assisted ventilation (26.6%), and ventilation (17.2%) to assist with breathing. As noted above, infants admitted to the NICU would be expected to require assisted ventilation; therefore, these rates should be closely aligned. These factors highlight the complexity of this population and the need for more granular data to better understand patterns of care and outcomes.

Maternal age as a risk factor is show below in figure 10. Like other trends in maternal and infant health, rates of periviable births are higher for moms over 40 and under 20 years old. These are typically ages shown to be most at risk for pregnancy and birth complications[3].

Incidence of periviable births is higher when the maternal age is below 20 or greater than 40.

Incidence of late preterm births vs maternal age, 2020-2025.



Figure 10

Risk Factors

Outside of Short Interval and Plural Births, Pre-Pregnancy Diabetes and Tobacco Use show a higher increased risk for periviable births.

Relative risk for periviable birth by maternal risk factors, 2020 - 2025.

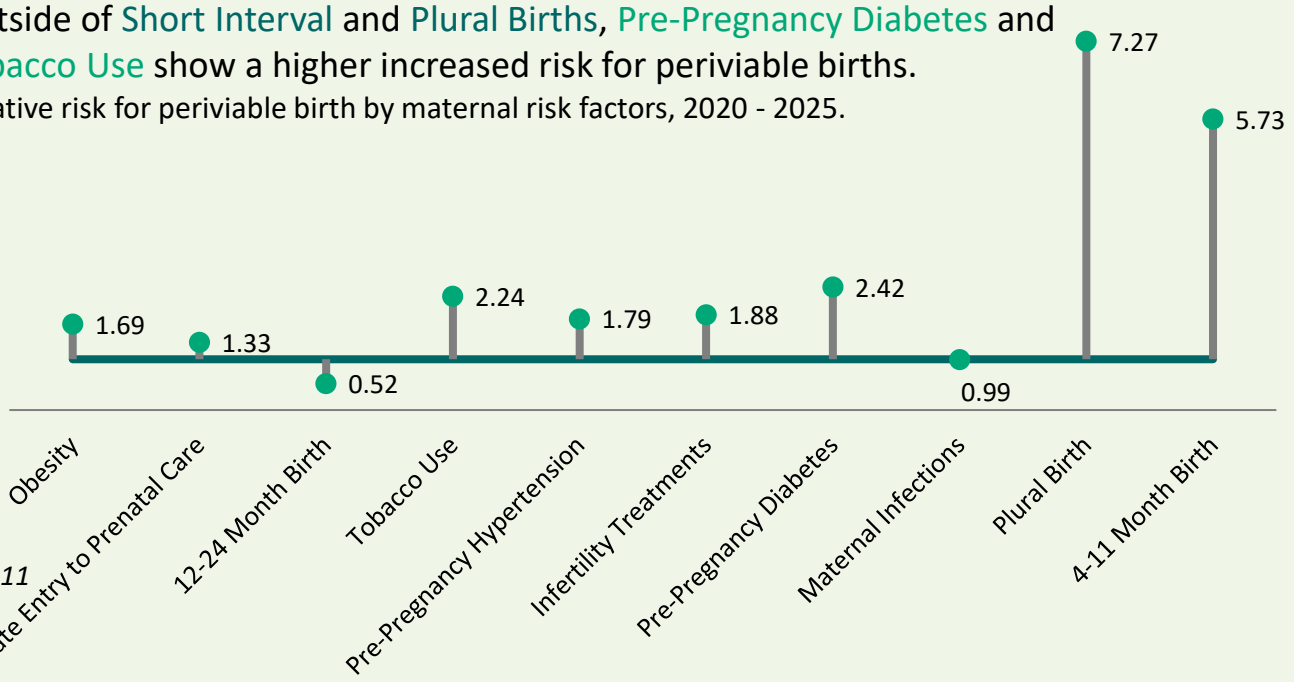


Figure 11

Maternal risk factors are important to understand and are shown in figure 11. Plural births of twins or more have the highest relative risk for periviable birth being over 7 times more likely than singular births to be born 22-23 weeks. Also, outside of the graph, short interval births (birth between 4 and 11 months) are almost 6 times more at risk to be periviable.

Additionally, in figure 11, the other leading risk factors contributing to periviable births are included. Most notably, pre-pregnancy diabetes has an increased risk about 2.5 times, and tobacco use about 2.25 times. Infertility treatments, pre-pregnancy hypertension, and obesity also present increased risk for periviable births. Interestingly, a birth 12-24 months since a previous birth is associated with a reduced risk by about half.

Risk factors are also shown in their percent of occurrence in figure 12. Obesity is the most prevalent risk factor in 42.9% of births 22-23 weeks. This is followed by late entry to prenatal care at 25.4%, and plural births at 19.2%. Remaining risk factors are prevalent at lower percentages but still pose risks maternal and neonatal health. Further study would be useful for a better understanding of these risk factors.

Obesity, Late Entry to Prenatal Care, and Plural Births are common risk factors for periviable births.

Risk factors for periviable births, percent of occurrence in periviable births.

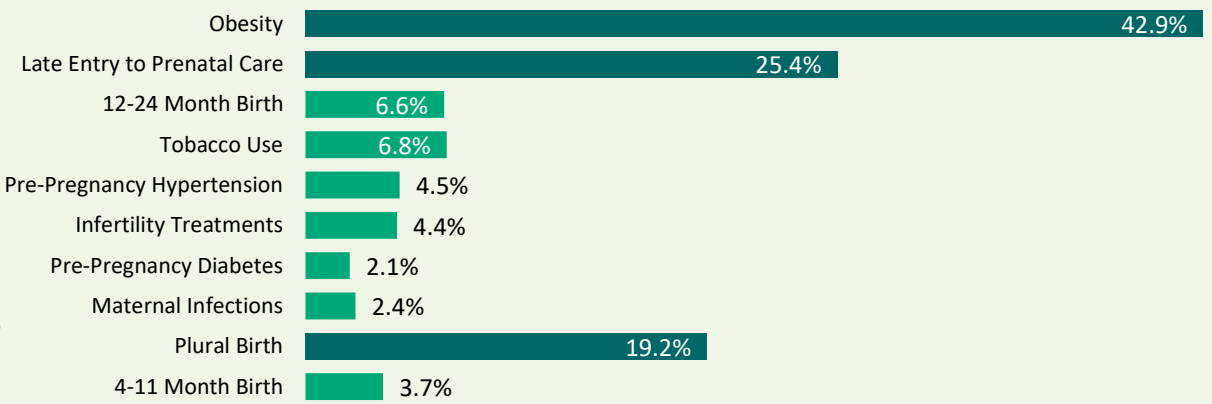


Figure 12

Labor Characteristics

Anesthesia is given during most periviable labors, and Antibiotics and Steroids are common in periviable labors.

Labor characteristics as percent of all periviable births, 2020-2025.

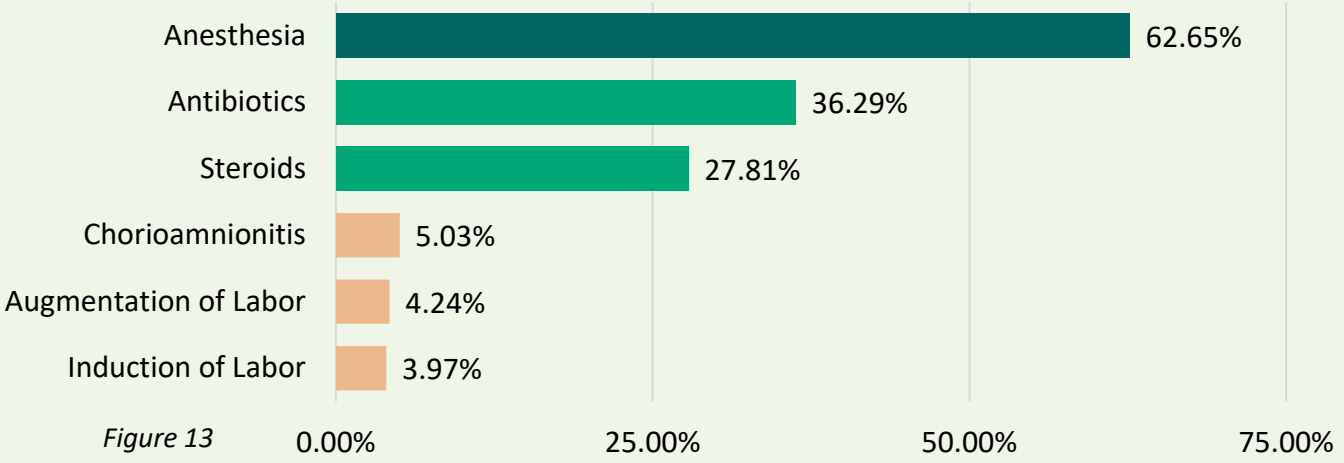


Figure 13

In addition to risk factors, labor characteristics may also illuminate factors that affect timing and strength on a periviable infant. In figure 13, labor characteristics are shown as a percent of all periviable births. Anesthesia is given in most (62.65%) of periviable births indicating that mothers received epidural or spinal anesthesia during labor. Other common labor characteristics include antibiotics for the mother during labor at 36.29% and steroids for fetal lung maturation received by the mother before delivery at 27.81%.

Other, less common, labor characteristics include clinical chorioamnionitis (or maternal temperature >= 38° C) at 5%, augmentation of labor at 4%, and induction of labor at 4%.

Another important labor characteristic, shown in figure 14, is the method of delivery being either vaginal or through Cesarean section. The data show Cesarean deliveries are 30% more incident for births occurring between 22 and 23 weeks compared to all live births. Opposingly, vaginal births have 14% fewer occurrences in periviable births.

Working with clinical partners, these data demonstrating increased cesarean section rates at periviable gestational ages are notable. At 22–23 weeks, cesarean delivery often requires a classical uterine incision due to an underdeveloped lower uterine segment. This has important implications for maternal health, as it can commit patients to repeat cesarean delivery and potentially increases the risk of uterine rupture and abnormal placentation in future pregnancies.

Cesarean deliveries make up a larger proportion of Periviable births compared to all live births.

Delivery methods for all live births and Periviable births, 2020-2025.

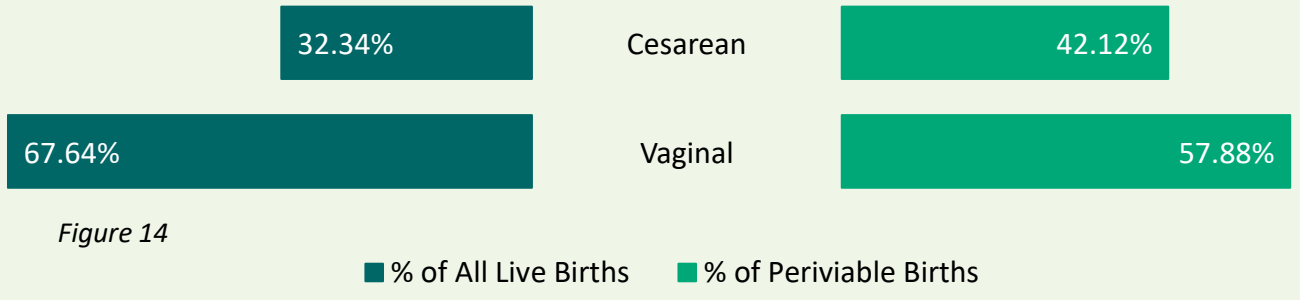


Figure 14

Birthweight

Periviable births have variable birthweights.

Average birthweight in grams for periviable infants, 2020-2025.

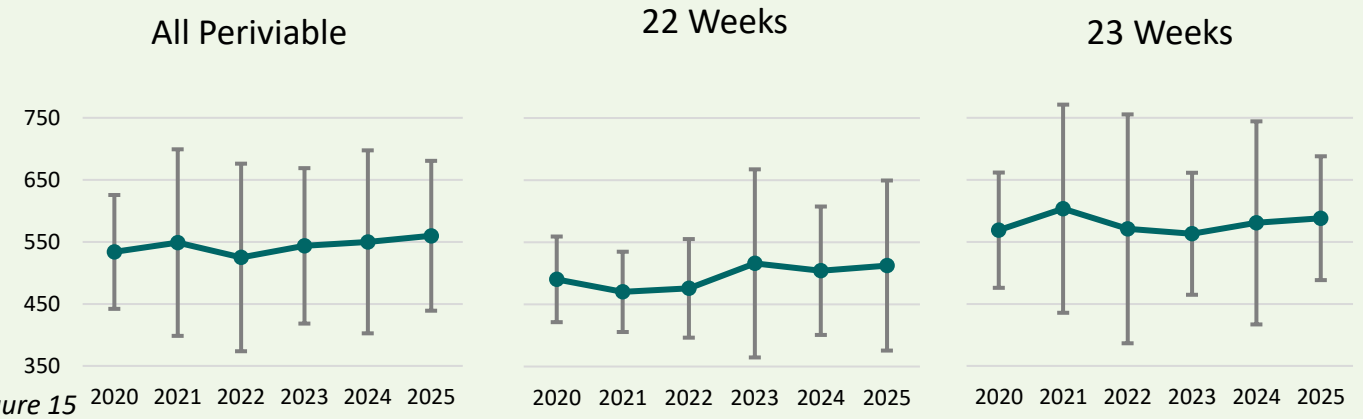


Figure 15

A key factor/struggle with infants born between 22 and 23 weeks gestational age are their birthweight signifying how much care they will need. The average for a periviable infant is 533.79 grams or about 1.2 pounds. Alternatively, a full-term infants (born 37-40 weeks) averages about 6 times as big at 3350.37 grams or 7.4 pounds. Figure 15 is visualizing periviable infant weights for all periviable infants, at 22 weeks, and at 23 week along with their standard deviations. The data show, 22-week infants are slightly smaller by about 100 grams than their 23-week counterparts. Also, in some years, standard deviation ranges over 300 grams indicating a high degree of variability in this population, emphasizing the importance of individualized care approaches.

Finally, figure 16 illustrates survival rates for Virginia periviable infants in the past 5 years. These data are gathered from vital record data for "infants living at time of report. "

This indicates that these periviable infants were alive at the time the birth certificate data was entered (within 5 days of the birth) and submitted (within 7 days of the birth)[1].

Between 2020 and 2025, reported periviable survival rates increased by approximately 30%, rising from 60.2% in 2020 to 77.7% in 2025. This trend may reflect increased investment by facilities in the resources and care required to support these infants, alongside evolving evidence demonstrating improved survival at the edge of viability. However, these data are not directly comparable to national literature, as most published studies report survival to hospital discharge, whereas these data capture survival only at the time of birth certificate reporting. To better understand these trends and enable meaningful comparisons, Virginia would benefit from a standardized program to collect data on periviable births.

Survivability

Periviable infant survivability rates have been steadily increasing.

Percent of periviable infants living at time of report, 2020-2025.

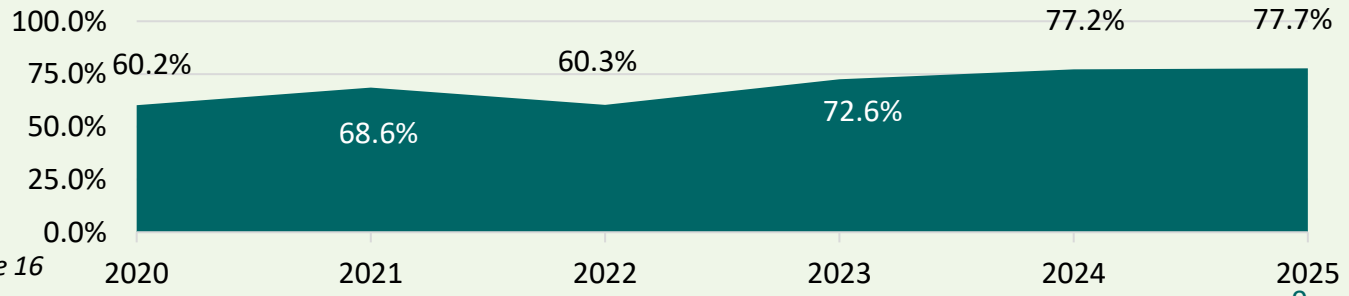


Figure 16

Discussion

This report highlights key characteristics of periviable infants born at 22–23 weeks' gestation in Virginia over the past five years. Several factors suggest improving survival trends, reflecting the state's growing capacity to provide care for infants at the edge of viability. However, more detailed data are needed to inform statewide best practices and optimize transfer protocols. Many hospitals remain in the early stages of expanding their capabilities, particularly as emerging evidence indicates that infants born at 22–23 weeks have greater survival potential than previously understood.

Many factors assessed in this report identify general associations with increased risk of periviable birth, providing a foundation for subject matter experts to guide targeted improvements. Although limited, the available demographic and risk data consistently demonstrate higher risk among populations with lower socioeconomic status and reduced access to appropriate levels of care.

Recommendations/ Focus for Quality Improvement

The Virginia Neonatal Perinatal Collaborative has already begun the process of engaging some of Virginia's top hospitals and neonatal intensive care units (NICUs) in a quality improvement initiative to improve the understanding and care of periviable infants. Leading neonatologists from NICUs across the state have collaborated to explore the development and implementation of a periviable birth registry, inspired by the global Tiny Baby Project[6]. This birth registry will engage hospitals in collecting detailed data on care processes and outcomes for periviable infants. This project ~~with~~ will provide a better understanding of facility needs to care for periviable infants, and aid in the creation of statewide standards of care and transfer protocols for periviable infants. With continued engagement and high-quality data. This project has the potential to define a clearer path forward to improve morbidity and mortality in infants for whom families opt for resuscitation.

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