

PATTERNS OF HEALTHCARE UTILIZATION OF TWO HIGH-RISK INFANT GROUPS IN KENTUCKY

Summary Prepared by the Office of Data Analytics Division of Analytics

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What is Known on This Topic?

Preterm infants and infants who are exposed to addictive substances in utero are at high risk of health difficulties and disease in early life, which may lead to chronic conditions and lifetime socioeconomic, medical, and other costs. These risks are of particular concern in Kentucky, where neonatal mortality and incidence of preterm birth are higher than the national average.

What Did this Project Do?

This project examined healthcare utilization information for preterm and drug-exposed infants within the Kentucky Medicaid database to identify statewide trends in healthcare utilization and Medicaid costs.

What Could Medicaid Do with These Conclusions?

Results from this investigation highlight the need to enhance access to and quality of care for high-risk infant populations and address evident regional disparities. Kentucky Medicaid services could leverage these findings to promote coordination between specialized neonatal care providers and academic institutions and to organize strategies to address preterm birth and NAS in Kentucky.

Introduction

Preterm infants and infants who are exposed to addictive substances in utero are at high risk for at-birth hospitalization, high medical costs, and long-term disability, requiring chronic specialized and intermittent care. Concern for these high-risk groups is particularly warranted in Kentucky, where neonatal

mortality and incidence of preterm birth are higher than the national average. In 2018, the March of Dimes Organization assigned Kentucky a 'D' grade with respect to premature birth and birth disparity index. As of 2022, this grade was escalated to an 'F', corresponding to a reported preterm birth rate of 12% and infant mortality rate of 6.2 per 1,000 live births, both of which exceed the national average.¹ Investigation of healthcare utilization in these two groups of high-risk infants could provide valuable insights for improvements in care and services while reducing overall costs to the state.

Project Methods & Results

The goal of this project was to develop a better understanding of patterns of healthcare utilization for two specific high-risk patient groups across Kentucky, and to establish processes for utilizing available data and resources to define opportunities for improvements in care.

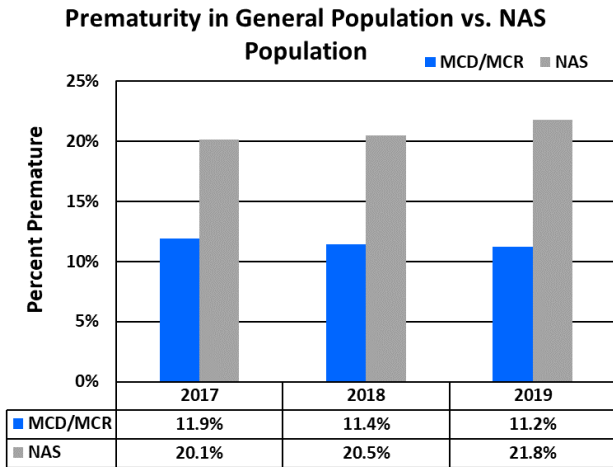
The three primary aims included in the final report were:

- 1) To identify and collect all healthcare utilization information and relevant demographic data up to two years of age for preterm and/or prenatal drug exposed infants in the Kentucky Medicaid database from 2017-2019.
- 2) To investigate trends in at-birth hospitalization and post-discharge healthcare utilization (up to two years of age) of these two high-risk infant populations in relation to residential site, treatment/care facilities, and other patient related variables.
- 3) To investigate regional trends over time in healthcare utilization aggregated over the first two years of life for these two high-risk infant populations to identify any opportunities for improvement within subgroups of the population.

Within the 104,000 Medicaid-supported births in Kentucky during 2017-2019, the total incidence of substance-exposed (neonatal abstinence syndrome; NAS) and preterm births was found to be 4.1% and 11.5% respectively. An important finding from this investigation was that the incidence of prematurity in NAS infants was found to be double that of the general population of Medicaid-supported infants (Figure 1; NAS, 20.7%; MCD, 11.5%; odds ratio, 2.087). This novel finding was not previously well-recognized within Kentucky perinatal and neonatal medical specialist communities. While the incidence of prematurity trended downward across 2017-2019, the opposite trend was observed in the percentage of NAS born prematurely during the same period.

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Figure 1. Incidence of prematurity in general Medicaid (MCD) population and NAS infants (2017-2019)



Note: Reproduced from final report Figure 2E, p. 5.

In 2017, the average Medicaid cost within the first 180 days of life for non-NAS premature infants was \$55,000, over 5 times more expensive than full term infants (\$7,000). Furthermore, the average cost of both premature and full term infants increased substantially by 2019 (premature, \$77,000; full term, \$9,000). Full term and premature NAS infants were more costly than non-NAS counterparts in all years (Table 1). Gestational age at birth was found to be a significant factor influencing the total average Medicaid costs during the first 180 days of life as well as when costs were incurred. More information on the distribution of costs and when costs were incurred is available in sections 2D, 2F, and 2G of the final report.

Table 1. Average Medicaid cost incurred by Non-NAS and NAS infants within the first 180 days of life (2017-2019)

Year		Non-NAS		NAS	
		Term	Preterm	Term	Preterm
2017	Average Cost, 1st 180 Days of Life	\$7,072	\$54,744	\$32,505	\$59,325
	Number of Infants	28,062	3,651	1,277	321
2018	Average Cost, 1st 180 Days of Life	\$8,842	\$77,148	\$43,803	\$79,285
	Number of Infants	29,852	3,690	1,154	297
2019	Average Cost, 1st 180 Days of Life	\$9,173	\$77,027	\$54,130	\$82,360
	Number of Infants	30,852	3,759	925	258

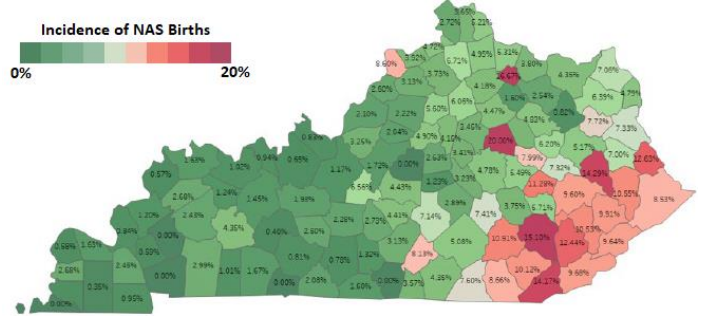
Note: Reproduced from final report Table 2G, p. 7.

There was no obvious trend in the geographical distribution of premature births across Kentucky. However, this study reported a prominent geographical pattern for NAS infants concentrated in Eastern Kentucky (Figure 2).

Despite the widespread distributions of care providers throughout the state, there are only two specific Level IV (highest acuity care level) Neonatal Intensive Care Units in the state. The geographic distribution of patients and

providers demonstrates that the majority of preterm and NAS patients receive care at these units, one located in Lexington and the other in Louisville. Due to the distance of providers in Eastern and Western Kentucky relative to specialized neonatal care centers, emergency transport may represent a significant cost to Medicaid for some patients.

Figure 2. Incidence of Medicaid supported NAS infants by county of origin (2017-2019)



Note: Reproduced from final report Figure 2C, p. 3.

Discussion and Conclusion

The incidence of preterm birth and neonatal mortality in Kentucky are higher than national rates and are of particular concern. While preterm and NAS birth populations represent a small portion of Kentucky residents, they are associated with high-risk of chronic conditions and substantial lifetime socioeconomic and medical costs. In this investigation, prematurity was found to be a significant driver of higher costs to Kentucky Medicaid services. Dedicated care groups that have optimized cost models in place may offer the best outcomes for preterm and NAS infants.

Between 2017-2019, the incidence of preterm birth in NAS infants was double that of the incidence of preterm birth in the general Medicaid population. Furthermore, this investigation demonstrated a regional concentration of the highest incidence of NAS infants in Eastern Kentucky. These two findings may highlight an opportunity to develop a network of providers or other strategies to address this specific regional problem. Specific initiatives regarding prenatal drug exposure may have the most impact in Eastern Kentucky.

Finally, it is important to note that the majority of intensive specialized infant care is provided at the two Level IV Neonatal Intensive Care Units located in Lexington and Louisville, with each unit predominantly servicing patients from different regions of the state. Academic site NICUs at the University of Kentucky and the University of Louisville represent the largest providers for premature infants in the state. The principal investigators recommend increased coordination between specialized neonatal care providers and academic institutions, alignment of vital statewide resources, and pursuit of an organized strategy to address preterm birth and NAS. The results of this investigation highlight the need to enhance access to and quality of care for high-risk infant populations and address evident regional disparities.

References

- 2022 March of Dimes Report Card. <https://www.marchofdimes.org/peristats/reports/united-states/report-card>