v1: 3 April 2024

Research Article

Analyzing Policy to Address Infant Mortality in High-Risk Populations

Peer-approved: 3 April 2024

Qeios, Vol. 6 (2024)
ISSN: 2632-3834

Chelsa Fore[1]

1. Jacksonville University, United States

The United States faced a 3% increase in infant mortality rates in 2022, positioning it 33rd among OECD nations. Despite national efforts, racial and rural disparities persist, with Southern states exhibiting high rates. This paper analyzes policy criteria to reduce infant mortality, focusing on disparities, social determinants, existing initiatives, and necessary components for effective policy development. Research methods involved an extensive search for evidence-based articles and data related to infant mortality and related initiatives, focusing on systematic reviews, research studies, practice guidelines, and relevant articles
Addressing this challenge requires targeted interventions, particularly in regions with heightened prevalence, necessitating further research to inform policies and improve maternal and infant health outcomes.

Correspondence: papers@team.qeios.com — Qeios will forward to the authors

Analyzing Policy to Address Infant Mortality in High-Risk Populations

In 2022, the United States faced a staggering 3% increase in infant deaths before the age of one (Centers for Disease Control and Prevention [CDC], 2023). With a national infant mortality rate of 5.6, the U.S. found itself positioned at the 33rd spot out of 36 OECD (Organization for Economic Co-operation and Development) nations in terms of infant mortality, indicating that only three OECD countries had higher rates (America's Health Ranking, 2024). The state with the highest infant mortality rate is Mississippi, with its bordering neighbor state Arkansas, coming in at the third highest state in the US with a rate of 7.67 in 2022 (CDC, 2023). Despite ongoing efforts to reduce this toll, the U.S. has experienced its first rise in infant mortality in 20 years (CDC, 2023).

While there had been a gradual decline in infant mortality rates over previous decades, 60% of U.S. states still reported rates exceeding 5.0 per 1000 births. Geographically, states in the southern region continues to exhibit the highest infant mortality rates in 2021 (CDC, 2023). To address these concerning trends, the 2030 Healthy People initiative set a target goal of reducing infant mortality to 5.0 deaths per 1000 births or less (Health.gov, 2024). This goal was carried over from the Healthy People 2020 objectives, as the initial goal had not been achieved. As of the most recent data, 31 out of 50 states still report rates surpassing the Healthy People 2030 target (Health.gov, 2024).

However, the infant mortality rate in the U.S. is not evenly distributed among the population. There is a significant racial disparity in infant mortality rates. In 2018, non-Hispanic Black women were 2.4 times more likely to experience the loss of their infants compared to White women (Jang, 2022), with no significant decline in the infant mortality rate among Black women.

While rates in some states have declined, rates in several Southern states continue to increase. Mississippi has the highest rate at 9.39/1000, followed by Arkansas 8.59/1000, and a close third exists in Alabama with rates at 7.56/1000 (CDC, 2024). Louisiana, another bordering southern state, reflects comparable data, with 7.24/1000, reflecting a slight decrease. The only two U.S. states identified as meeting the OECD average of 3.9/1000 live birth were New Hampshire and Vermont (America's Health Ranking, 2024).

These racial disparities are closely related to rural health disparities, which represent variations between sparsely populated areas or rural areas and heavily populated metropolitan areas with a large urban core (U.S. Census Bureau, 2020a). For infants of Black mothers, the infant mortality rate in 2014 was 16% higher in rural areas than in urban areas (CDC, 2023). This relationship can be seen in individual states with both high risk populations In Mississippi, which at 51.2% rural is the state with 4th highest percentage of rural population, also has the largest percentage of Black residents at 37.8% (U.S. Census Bureau, 2020b; World Population Review, 2020). Alabama reflects similar data, at 41% rural, and 26.8% Black residents, and Louisiana is slightly more densely populated, at 28.5% rural and 32.2% Black residents.

Purpose

Although infant mortality has experienced recent declines, the U.S. demonstrates the highest rates amongst developed countries. Based on Healthy People (2010, 2020), there has been very little change over the last decade, causing infant mortality to remain a key focus for Healthy People 2030. One key factor is the significant disparity is the infant mortality rates affecting states with greater percentages of Black and rural populations.

This paper aims to examine policy criteria associated with programs to reduce infant mortality. The purpose of this analysis is to evaluate characteristics of effective and sustainable programs. This health policy analysis is guided by the following questions:

1. What disparities are associated with infant mortality?
2. What are the social determinants of health associated with infant mortality?
3. What initiatives and programs have been implemented to address the problem, and what were the outcomes?
4. What components should be included in the policy to assure designated funding for the development and implementation of pilot programs to reduce infant mortality amongst high-risk populations?

Methods

An initial search was conducted to obtain data and evidence-based articles related to infant mortality and initiatives related to infant mortality. An additional search was conducted to capture the scope of public health campaigns and awareness initiatives. The search strategy and process focused on identifying systematic reviews, individual research studies, practice guidelines, and articles that provided the best available evidence related to the effectiveness of those campaigns. Keywords used for the search included: *infant mortality, fetal mortality, preterm births, SIDS, SUIDS, maternal complications, infant mortality rates, social determinants, infant mortality initiatives, healthcare policy, awareness campaigns, pilot programs.*

Analysis Plan

The policy analysis was based on a national legislative policy to address infant mortality in standard metropolitan statistical areas with high infant mortality rates. Using the data-driven analysis framework, the policy analysis disaggregates the components of a policy and examined policy options to address the concerns of the policy (Jones et al., 2016). The framework consists of four stages: (1) define priorities; (2) identify and examine available data, (3) analyze data, and (4) act on policy options supported by data findings. First, it was important to identify and explain key terms and explicitly articulate the problem of infant mortality as well as identifying the targeted population, potential underlying causes, social determinants, and health care disparities. Next, data was gathered including leading causes of infant mortality, the incidence of risk factors, infant mortality rates, and regional quality indicators. For assessment, it was important to identify the trends in the infant mortality rates in the U.S. over past several decades. It was also necessary to analyze data showing demographics most impacted by infant

mortality. The final step of action included an evaluation of policy goals related to the need to develop and implement pilot programs to address infant mortality and conduct additional research.

Data Sources

The analysis drew data from multiple sources, encompassing the 2020 U.S. Census, the CDC, and America's Health Ranking. Additionally, the Organization for Economic Cooperation and Development was consulted for comparing global infant mortality rates.

Ethical Considerations

The policy analysis was approved by the Jacksonville University Institutional Review Board as non-human secondary data analysis.

Results

A policy analysis utilizing secondary data was undertaken to explore the ramifications of regional policies on infant mortality rates in the United States. This involved examining existing data on policies implemented at the regional level across various states or geographic areas within the U.S. The analysis considered factors such as healthcare policies, socioeconomic initiatives, public health programs, and other relevant interventions aimed at improving maternal and child health outcomes.

Specific Aim 1

To address the first specific aim, the rate of infant mortality in U.S. states was examined (CDC, 2023). In 2022, there were 20,538 infant deaths reported before the age of one. Infant death per 1,000 by ethnicity was: Asian 3.5; White 4.52; Hispanic 4.88; Indigenous People 8.5; Pacific Islander 9.06; and Black 10.86.

The figures in 2022 also found that the infant mortality rate per 1,000 ranged from 3.32 in Massachusetts to 9.11 in Mississippi, with its neighbor Arkansas at 7.67, and Louisiana at 7.37. This indicated states with the highest infant mortality rate to be located primarily in the Southeast U.S., representing states with high Black populations and geographically rural areas.

Specific Aim 2

To investigate the social determinants of health associated with infant mortality, qualitative and quantitative literature was examined. Iterative searches were performed using the keywords, with an emphasis on publications from the past five years. Additionally, recent work citing these sources was also examined. Commonly recurring themes regarding the social determinants of health and infant mortality included access to education and healthcare, economic stability, the quality of neighborhoods where women reside, and the support provided by their surrounding communities (Wells, 2021).

Further research is necessary for identifying solutions to address the social determinants associated with infant mortality. A need for greater coalitions that include hospital systems but do not rely on them exclusively should be at the forefront in tackling social determinants (Well, 2021). A limited level of attention is given by policymakers which could explain the decrease of educational programs provided.

Addressing social determinants can be challenging. Over the years, public health educational programs has been identified as an integral way of bringing knowledge to the people. The WHO commission suggested that helping individuals make informed decisions about their health when there is a problem can provide increased understanding (Reading, 2009). Additionally, programs that address social determinants such as access to food and economic stability have shown promise in improving health outcomes for those experiencing obesity and diabetes (Caffrey et al., 2018).

Specific Aim 3

Addressing infant mortality by providing pilot programs in rural areas could promote primary preventive strategies and decrease adverse outcomes. Providing this funding for program development could be impactful to the U.S infant mortality rate. It would also be recommended to extend pilot programs in Metropolitan areas to encompass rural surrounding areas with less available data on infant mortality rates. Also, programs to promote the implementation of the utilization of prenatal and newborn risk screenings are imperative. Systematic reviews assessing the impacts of interventions implemented to enhance outcomes in maternal and child health have primarily been universal as opposed to targeted (Yuan et al,2014). Targeted interventions can be effective in improving maternal and infant health. Without screening patients during the prenatal period, many risk factors associated with infant mortality could be missed. Some providers are unaware of the benefits for their patients related to completing and submitting prenatal risk screenings, and many patients are unaware that a risk screening is recommended on their first prenatal visit. Patients should be made aware of the purpose of the screening and the inclusive benefits and services of positive screening. Patients should be given the opportunity to accept or decline screening and services without coercion and also have the option to self-refer (Healthy Start, 2019; Montoya-Williams et al., 2020).

To address infant mortality in the U.S., it is fundamental for policymakers to identify causes and risk factors using evidenced based research when formulating interventions. In the past, evidence has shown the successes of programs and campaigns that targeted specific areas of infant mortality (Yuan et al, 2014). By providing specified guidelines for targeted populations where greater impact may be needed more effective and sustainable programs can be produced. It is important to use evidence to inform policy so programs with the greatest impact in addressing infant mortality can be prioritized for implementation at both the national and state level. In the future, research on related policy mechanisms from other geographic areas or nations may help inform policy development and educational initiatives (Pollack Porter et al., 2018).

Specific Aim 4

Tracking data and outcomes will be a critical component of program evaluation. Despite sporadic and often inadequate financial support, community-based organizations have assumed responsibility for many aspects of sustainable development, including residential weatherization, energy conservation, transportation, and the provision of housing and shelter to urban and rural communities (Wright & Reames, 2020). Having a plan for sustainability could impact on community standards and provide support and guidance in order to move programs forward (Ceptureanu et al., 2018). Providing a sustainable funding source would be feasible and primal in the development of pilot programs related to infant mortality. Funding is a necessary component in addressing infant mortality. The federal government allocates hundreds of billions of dollars to individual states to further the wellbeing of its citizens (McLaughlin & Rank, 2018). The infant mortality rates in various states directly correlate with the socioeconomic status of marginalized communities (Rubin et al., 2016). Entities seeking to utilize funding sources, such as Healthy Start and March of dimes, should strategically aim to develop programs around underlying causes. An estimation of one infant death could be avoided for every $1,600 (about $20,400 in 2010 dollars) spent on home nurse visits and public education programs (Moehling & Thomasson, 2014). Nonprofit hospitals depend on more resources that should be spent on prevention methods such as addressing food access and economic stability.

Additionally, appropriateness of policy oversight should be ensured. It is important to identify entities and organizations that can provide long-term oversight to determine whether any new policy continues to be relevant and whether it has unintended results. Infant mortality is a century-long problem, and it will require long-term rectification. Without a plan for sustainability post-grant period, infant mortality rates could again plateau or cease to decline to desired outcomes of programs.

Discussion

The policy analysis delineates and advocates for the importance of addressing the ongoing problem of infant mortality and the need for dedicated programs. The national data indicated that the infant mortality rate persists at significantly high rates compared to other developed countries (Muennig et al., 2018). In addition, the infant mortality rate is particularly higher in the Southern region of the United States.

Strength and Limitations

Strengths and limitations were identified throughout the policy analysis. One strength is its use of the data driven policy analysis framework (Jones et al., 2016). Another overall strength of this project are recommendations derived from its basis in evidence-based literature and data, which demonstrate the

success of public health programs that have addressed infant mortality. Other OECD countries have implemented public programs that have drastically affected their infant mortality rate. Based on what has been implemented by Australia and Finland, targeting policies toward less advantaged groups during the post-neonatal period could prove fruitful in diminishing infant mortality rates in the U.S. (Chen et al., 2024) An illustrative policy approach is home nurse visiting programs, demonstrated through randomized trials to lower post-neonatal mortality rates.

Limitations can be found in the allotted time for program development and implementation. Further research is needed to determine which type of program would be most impactful. A community needs assessment could identify focal points for pilot program development, with sufficient time allocated to the challenging task of translating the results to practice (Gruber et al., 2019).

Recommendations

The evidence from this policy analysis may be useful in guiding policymakers in the distribution and appropriation of funding to pilot programs to address infant mortality. It is vitally important to develop and implement programs to address infant mortality effectively. State legislators can play a leadership role in ensuring that public investments and policies support data-driven, coordinated strategies (Bellazaire & Skinner, 2019). Historically, programs focusing on infant mortality have targeted primarily single topics of the five leading causes: birth defects, preterm deliveries, sudden unexplained infant death, and maternal complications (Bellazaire & Skinner, 2019). Findings from this analysis suggests research focusing on specific racial groups is vital to address disparities in infant mortality that persist in the U.S. To narrow this gap, it will be necessary to address health inequalities by developing programs that target populations with higher infant mortality rates and risk factors prevalent in these specific groups. Several strategies should be implemented in program implementation. First, it is necessary to incorporate best practices from research when building programs. Additionally, focus should be directed on underlying factors that contribute to social determinants of health that significantly contribute to infant mortality. And furthermore, it is essential to build coalitions and formal partnerships between research and policy stakeholders who together can focus on evidenced-based policies (Pollack Porter et al., 2018). Formal research-policy translation models can address multiple barriers to enactment and implementation of evidence-based policy. These models can be used to identify gaps in public health policy issues and inform the development of policy-relevant research to fill those gaps.

Conclusion

Given the persistent challenge of infant mortality, it is crucial that we direct our attention and resources towards mitigating this issue, particularly in regions where it is more prevalent, such as the southern states. This imperative arises from the disproportionate burden of infant mortality borne by these areas, which can be attributed to a myriad of factors including socio-economic disparities, limited access to healthcare, and inadequate support systems for expectant mothers and newborns.

Additional research is warranted to delve deeper into the intricacies and interconnections between the expansion of Medicaid and marginalized communities, particularly in terms of their impact on infant mortality rates. This requires exploring various factors such as access to healthcare services, socioeconomic disparities, and systemic inequalities that may influence outcomes within these communities. By expanding our understanding of these patterns and correlations, we can better identify potential interventions and policies to address disparities and improve maternal and infant health outcomes for vulnerable populations.

References

- America's Health Ranking. (2024). America's Health Rankings United Health Foundation. https://www.americashealthrankings.org/search?q=Infant%20mortality
- Bellazaire, A., & Skinner, E. (2019). Preventing infant and maternal mortality: State policy options. *National Conference State Legislatures*. https://www.ncsl.org/research/health/preventing-infant-and-maternal-mortality-statehttps://www.ncsl.org/research/health/preventing-infant-and-maternal-mortality-state-policy-options.aspxpolicy-options.aspx
- Caffrey, A., Pointer, C., Steward, D., & Vohra, S. (2018). The role of community health needs assessments in medicalizing poverty. *Journal of Law, Medicine & Ethics*, *46*(3), 615– 621. https://doi.org/10.1177/1073110518804212
- CDC. (2023, December 29). *Infant health*. https://www.cdc.gov/nchs/fastats/infant-health.htm
- CDC. (2023, October 24). *Preterm births.* https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pretermbirth
- CDC. (2023a). *Reproductive health*. Center of Disease Control and Prevention. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortal
- CDC. (2023, October 4). *Spina bifida*. Center of Disease Control and Prevention. Retrieved March 26, 2024, from https://www.cdc.gov/ncbddd/spinabifida/data.html
- CDC. (2023, June 28). *What are birth defects?* https://www.cdc.gov/ncbddd/birthdefects/index.html
- Ceptureanu, S., Ceptureanu, E., Luchian, C., & Luchian, I. (2018). Community-based programs sustainability. A multidimensional analysis of sustainability factors. *Sustainability*, *10*(3), 870. https://doi.org/10.3390/su10030870
- Chen, A., Oster, E., & Williams, H. (2024). Why is infant mortality higher in the U.S. than in Europe? *National Bureau of Economic Research.* Working Paper 20525. http://www.nber.org/papers/w20525
- Gruber, J. B., Wang, W., Quittner, A., Salyakina, D., & McCafferty-Fernandez, J. (2019). Utilizing community health needs assessments (CHNAS) in nonprofit hospitals to guide population-centered outcomes research for pediatric patients: New recommendations for CHNAS reporting. *Population Health Management*, *22*(1), 25–31. https://doi.org/10.1089/pop.2018.0049
- Health.gov. (2020a). *Reduce the rate of infant deaths — MICH-02: Data methodology and measurement*. Retrieved March 8, 2021, from https://health.gov/healthypeople/objectives-and-data/browse-objectives/infants/reducehttps://health.gov/healthypeople/objectives-and-data/browse-objectives/infants/reduce-rate-infant-deaths-mich-02/datarate-infant-deaths-mich-02/data
- Health.gov. (2020b, October 8). *Reduce the rate of Infant death*. Healthy People 2030. https://health.gov/healthypeople/objectives-and-data/browse-objectives/infants/reducehttps://health.gov/healthypeople/objectives-and-data/browse-objectives/infants/reduce-rate-infant-deaths-mich-02rate-infant-deaths-mich-02
- Jang, C. J., & Lee, H. C. (2022). A review of racial disparities in infant mortality in the US. *Children, 9*(2), 257. https://doi.org/10.3390/children9020257
- Jones, J., Lee, D., & Bayhi, L. (2016). The data-driven policy analysis framework as a template for healthcare policy analysis. *Annals of Nursing Research and Practice*. https://doi.org/austinpublishinggroup.com/nursing-research-practice/fulltext/anrp-v1https://doi.org/austinpublishinggroup.com/nursing-research-practice/fulltext/anrp-v1-id1005.phpid1005.php
- McLaughlin, M., & Rank, M. R. (2018). Impact of federal transfers upon us infant mortality rates: A secondary analysis using a fixed-effects regression approach. *BMJ Open*, *8*(9), e021533. https://doi.org/10.1136/bmjopen-2018-021533
- Moehling, C., & Thomasson, M. (2014). Saving babies: The impact of public education programs on infant mortality. *Demography*, (51), 367–386. https://link.springer.com/article/10.1007/s13524-013-0274-5
- Montoya-Williams, D., Bright, M., Martinez, S., Echavarria, M., Mercado, R., Lorch, S., & Thompson, L. (2020). Associations between a healthy start program prenatal risk screening tool and adverse birth outcomes: A study using the mother/infant dyad screening cohort. *Journal of Women's Health*, *29*(5), 647–655. https://doi.org/10.1089/jwh.2019.7712
- Muennig, P., Reynolds, M., Pabayo, R., & Boshen, J. (2018). Why is infant mortality in the United States so comparatively high? Some possible answers. *Journal of Health Politics, Policy and Law*, *5*(5), 877–895. https://doi.org/10.1215/03616878-6951223
- National Healthy Start Association. (2021). *Healthy Start initiative*. http://www.nationalhealthystart.org/healthy_start_initiative
- Organisation for Economic Co-operation and Development [OECD]. (2024). Infant mortality rates (indicator). doi: 10.1787/83dea506-en Accessed on 05 March 2024
- Pollack Porter, K. M., Rutkow, L., & McGinty, E. E. (2018). The importance of policy change for addressing public health problems. *Public Health Reports*,

133(1_suppl), 9S–14S. https://doi.org/10.1177/0033354918788880
- Reading, R. (2009). Closing the gap in a generation: Health equity through action on the social determinants of health. *Child: Care, Health and Development*, *35*(2), 285–286. https://doi.org/10.1111/j.1365-2214.2008.00935_10.x
- Rubin, J., Jireka Taylor, J., Sutherland, A., Jodi, L., & Rohn, C. (2016). *Are better health outcomes related to social expenditure? A cross-national empirical analysis of social expenditure and population health measures*. RAND Corporation. https://www.rand.org/content/dam/rand/pubs/research_reports/RR1200/RR1252/RAND_RR1252.pdf
- U.S. Census Bureau. (2020a). *Metropolitan and micropolitan*. The United States Census Bureau. https://www.census.gov/programs-surveys/metro-micro/about.html
- United States Census Bureau. (2020b). *Quick facts*. https://www.census.gov/quickfacts
- Wells S. Helping Mothers Have Healthy Babies. Dela J Public Health. 2021 Sep 27;7(4):152-159. doi: 10.32481/djph.2021.09.020. PMID: 34604780; PMCID: PMC8482975.
- Wright, N. S., & Reames, T. G. (2020). Unraveling the links between organizational factors and perceptions of community sustainability performance: An empirical investigation of community-based nongovernmental organizations. *Sustainability*, *12*(12), 4986. https://doi.org/10.3390/su12124986
- Yuan B, Målqvist M, Trygg N, Qian X, Ng N, Thomsen S. What interventions are effective on reducing inequalities in maternal and child health in low- and middle-income settings? A systematic review. BMC Public Health. 2014 Jun 21;14:634. doi: 10.1186/1471-2458-14-634. PMID: 24952656; PMCID: PMC4083351.

Declarations

Funding: No specific funding was received for this work.
Potential competing interests: No potential competing interests to declare.