

**Wireless Heart Rate Detection Device for Neonatal Resuscitation in the Delivery Room**

**Cultural Competency at a Crossroads: The Role of Government Policies in Women's Reproductive Healthcare**

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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An examination of both the systemic need for culturally competent reproductive healthcare and the development of a neonatal heart rate detection system, revealed the importance of acknowledging and addressing the unique needs of individuals that differ from the stereotypical Eurocentric models. Especially in the context of reproductive healthcare and neonatology, where this principle has not been upheld in technological development or public policy. Both groups contain some of the most vulnerable populations in the U.S. and globally. Additionally, policy reform, government responsibility, and technological innovation play essential roles in ensuring equitable specialized care is accessible and effective for all individuals.

The technical portion of this paper focuses on developing a device that will be used to detect the heart rate of neonates in the delivery room. This device will help clinicians make more informed decisions on whether to resuscitate or not as heart rate is currently the key indicator to determine breathing. Predicate devices have not been developed to meet the unique physiological needs of preterm, newly born infants. Neonates, especially preterm or low birth newborns, are among the most vulnerable populations and require medical equipment specifically tailored to their unique needs and the emergency or low resource conditions that these patients are typically born under. This device, the IttyBeaty, seeks to improve current methodologies for obtaining an accurate and timely heart rate measurement to ultimately decrease infant mortality rates and increase access to equitable care during high-stress environments.

However, technology and engineering solutions are not enough to solve inequitable access to care. Healthcare systems need to have funds and regulations that promote the implementation of equitable and culturally appropriate tools and services. Without widespread adoption of these funds, technological innovation is at risk being unevenly distributed and not reaching the targeted demographic they are intended to serve. This underscores the need to address both technical and social aspects of healthcare delivery.

The research paper explores the role the government and other actors played in promoting or hindering culturally competent reproductive healthcare over the course of the last century. The goal is to draw upon the ongoing failures of U.S. healthcare policies, particularly for historically marginalized communities such as Indigenous, Black, immigrants, low-income, and populations with differing abilities. As a result of healthcare and government systems failing to accommodate the diverse needs of these populations, health outcomes are worse and systemic biases and stigmas continue to be perpetuated throughout history. Advocating for inclusive reproductive healthcare policies and increasing funding directed towards culturally informed care models must be developed and deployed across all states and healthcare systems.

Together, the technical and research components of this project reveal the need for interdisciplinary approaches to improve neonatal and reproductive health outcomes. For novel technologies to be successful, they need to be implemented into systems that recognize and actively address cultural and social differences. Bridging together public policy and health equity offers a holistic approach that ensures life-saving innovations reach the correct demographics.