



Cradle Alabama – An integrated application to decrease infant mortality

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Description of problem: Alabama ranks 50 of 51 states (including DC) in infant mortality and 49 of 51 in preterm births prompting our designation as “the worst state in which to have a baby”. Preterm birth-related deaths and sleep-related infant deaths are the largest obstacles preventing Alabama children from reaching their first birthday and are significantly higher among those born to mothers with low incomes, low education, and limited or no prenatal care. Efforts thus far to reduce infant mortality in Alabama have not resulted in any improvement in the infant mortality rate in Alabama over the past decade and the rate actually increased in 2016. Alabama’s disparities in health care access and socioeconomic status-driven health outcomes demand further community-based innovations.

In a broader context, infant mortality rates in the US remain significantly higher than those of other developed nations, and the overall US infant mortality rate is not improving. The infant mortality rate is twice as high among black infants compared with white infants. Cradle Alabama is designed to be immediately scalable in Alabama as well as to other states across the US and many countries across the globe. Prematurity is now the leading cause of infant mortality in Alabama and worldwide. The global burden of sleep-related deaths is universally high among developed nations. Infectious diseases remain a major cause of infant mortality particularly in developing nations. Mortality from infection can similarly be improved through the use of targeted health education for issues such as prenatal infectious disease testing, vaccination, early and exclusive breastfeeding, umbilical cord care, and recognition of danger signs of infection. Cradle Alabama is designed to provide important health information, education, and improve access to life-saving health care to reduce the burden of preventable infant mortality.

Desired Outcomes: We aim to see every Alabama child celebrate the first birthday through a program of enhanced community-based centrally coordinated care for at risk mothers and infants, alongside an emerging statewide collaborative promoting the importance of early and adequate prenatal care, reducing preterm births, safe infant sleep environment, healthy intrapartum spacing, enhanced inter-conception care for high risk mothers, health education and tobacco reduction and enhanced post-discharge home care for high risk infants.

While providing directed higher vigilance health care for individual Alabamian mothers and infants, simultaneous statewide education and public health campaigns will integrate providers in tertiary health, community health, health education, communities of faith, and the media around the “4 S” focus; Safe pregnancy, Smoking cessation, Safe sleep, and Spacing. Cradle Alabama’s major outcomes goals are designed to be measureable as the data are already collected by the ADPH and Medicaid. Outcomes will include infant mortality rate; neonatal mortality rate; perinatal mortality rate; preterm delivery < 37 weeks; preterm delivery < 32 weeks; preterm delivery < 28 weeks; low birth weight; very low birth weight; extremely low birth weight; stillbirth; birth asphyxia; number of NICU days; proportion of deliveries with prenatal care in the



first trimester or within 42 days of Medicaid enrollment; smoking during pregnancy; proportion of infants with diagnosis of neonatal abstinence syndrome; percentage of women who attend post-partum appointment; postnatal contraceptive use; proportion of women with birth interval \geq 2 years; breastfeeding rates; percentage of infants readmitted to hospital.

Intervention: We will use an innovative smart phone-based application alongside a comprehensive multimedia connected service to tackle the complex issues that result in poor perinatal outcomes in our State. We will use established partnerships across existing stakeholders including government branches, health departments, non-profit organizations, hospitals/health care providers, businesses, representatives from the diverse academic communities at UAB, community groups, and philanthropists to achieve early adoption and statewide support for this initiative. An organization of representatives of these groups will provide vision and leadership.

Plan of Work: The Cradle Alabama smartphone application will be free to download and use. Women will use this application to access health care starting before conception and early during the first trimester and track their antenatal and postnatal care. In addition, the application will provide important health related education and feedback to women of reproductive age.

All women of reproductive age will be eligible for early enhanced pre-pregnancy and prenatal care which will be initially coordinated centrally through the Cradle Alabama. Women will inform Cradle Alabama of their pregnancy through the App's patient portal. Cradle Alabama staff will promptly contact these women to set up their first prenatal care appointment and arrange Medicaid enrollment if needed. Enhanced care will include; prenatal vitamins; early pregnancy identification; first trimester prenatal visit; ongoing pregnancy health education; targeted smoking cessation and substance use care; and psychosocial support. Mothers with chronic health or mental health conditions will be eligible for enhanced postnatal care coordinated centrally through Cradle Alabama. Enhanced postnatal care will include improved care coordination for the mother and baby with primary care and access to specialist services; postnatal contraceptive education; and improved inter-conception care. Infants who are admitted to the neonatal intensive care unit and selected at risk term infants will be eligible for enhanced medical home care coordinated centrally through Cradle Alabama. Enhanced medical home care will include improved coordination with primary care; newborn follow up; and access to specialist services. Quality improvement methodology with rapid cycle PDSA will be used to introduce each intervention. The Cradle Alabama Advisory Board will evaluate the program's benefits using monthly real-time run-chart data of important markers of maternal and child health to determine areas for targeted improvement.

Sustainability and Scale-up: An ultimate goal will be to develop program sustainability for this population-based intervention to reduce adverse maternal and infant outcomes. This may be primarily achieved through the use of advertising space on the application and website for approved selected mother and infant related products. National scale-up will follow a similar model to the initial launch of Cradle Alabama under the broader Cradle America title. Smart phone technology is currently global and ubiquitous even in the most resource limited parts of the world and it is estimated that over 6 billion people will use a smartphone in 2020. Several Cradle Alabama team members are experienced global health researchers.



Team Members and Potential Collaborators:

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State Perinatal Advisory Committee (SPAC)

Regional Perinatal Advisory Committees (RPACs)

Collaborative Improvement & Innovation Network Alabama Safe Sleep Coalition (COIIN)



Dr. Carole Lannon, MD, MPH, Improvement Lead for the Ohio Perinatal Quality Collaborative

AWHONN

Infant Sleep in Alabama

Southern Poverty Law Center

United Way

Aletheia House

Businesses: Alabama Power Company, Regions Bank, Protective Life Corporation, Vulcan Materials Company, Drummond Company

March of Dimes

Bill and Melinda Gates

Kellogg Foundation