

The Essential Care for Every Baby Digital Action Plan: Design and Usability Testing of a Mobile Phone-based Newborn Care Decision Support Tool in Kenya

H4000 Joint Program: Section on Global Health and Helping Babies Survive
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90 Years of Caring for Children—1930–2020



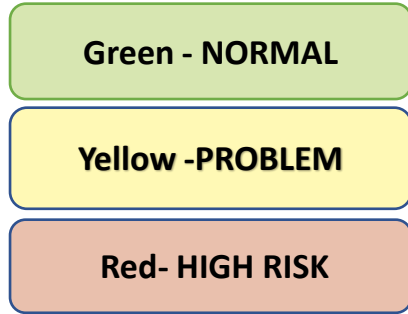
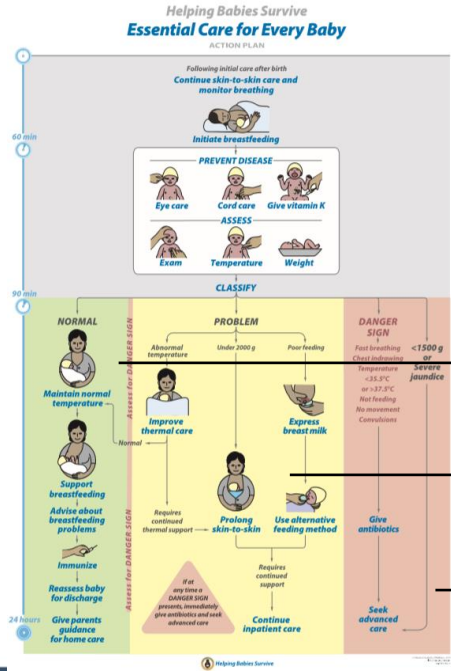
Abstract Presenter Disclosure Information

In the past 12 months, I have had no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial service(s) discussed in this CME activity.

I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation

Background

- Each year, there are **2.6 million stillbirths**, and an additional **2.5 million neonatal deaths**^{1,2}.
- Majority of these deaths occur in **low and middle-income countries (LMICs)**.
- **Two-thirds** of newborn deaths **preventable** with simple interventions, including essential newborn care.

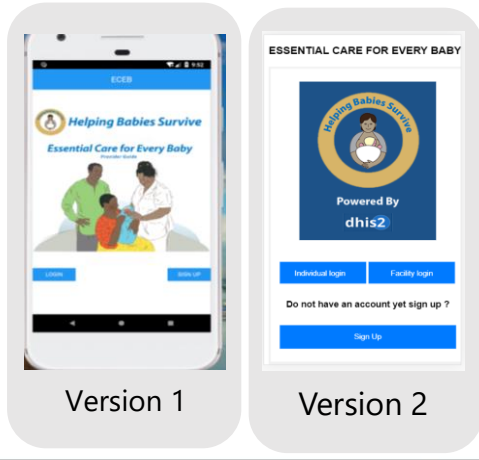


➤ **Myriad challenges in LMIC facilities:** Under-staffing + too many patients (especially high-acuity) + extremely high cognitive load = missed nursing care (Gathara, et al., 2018³).

Methods

Clinical decision support tool: Over 10 months, multidisciplinary, international team (United States & Kenya) conducted 3 phases of Android-app design, development, and evaluation

Phase 1: Design & Initial Development

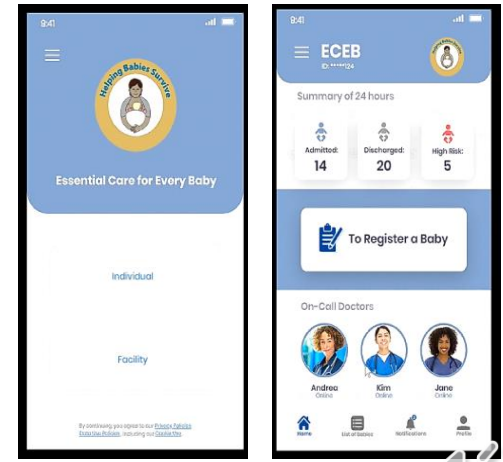


Phase 2: Participatory Design Interviews

- 40 Kenyan nurses & midwives
- 3 high-volume health facilities
- People At the Center of Mobile Application Development (PACMAD)



Phase 3: Functional Prototype



Results: Time stamp births to generate an ENC intervention clock for each baby on list

Helping Babies Survive Essential Care for Every Baby ACTION PLAN

Following initial care after birth

Continue skin-to-skin care and monitor breathing



Initiate breastfeeding

PREVENT DISEASE



CLASSIFY

NORMAL

Abnormal temperature
Under 2000 g
Poor feeding

PROBLEM

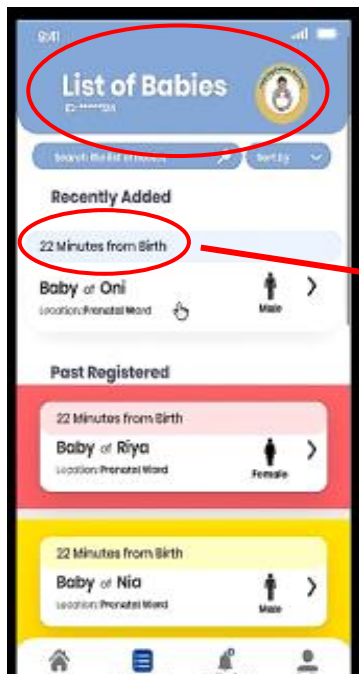
Fast breathing
Chest indrawing
Temperature <35.5°C or >37.5°C
Not feeding
No movement
Convulsions

DANGER SIGN

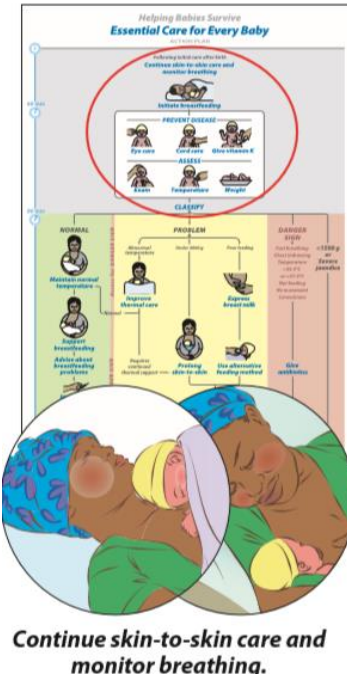
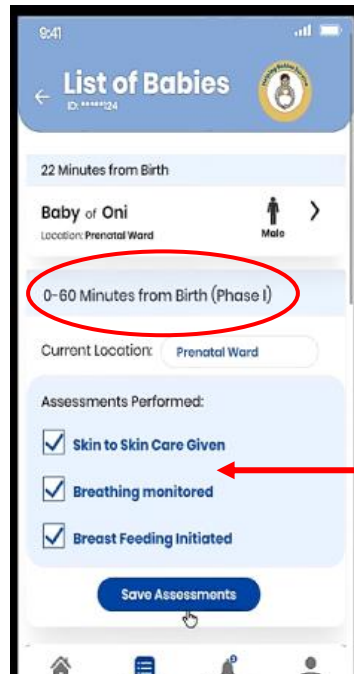
<1500 g or Severe jaundice



ECEB Action Plan (wall chart)



ECEB Digital Action Plan (mobile app)

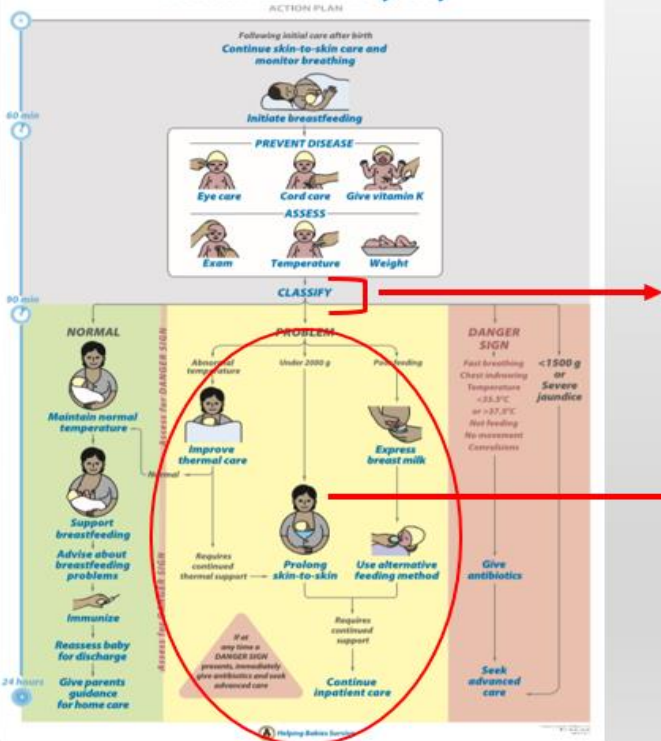


Continue skin-to-skin care and monitor breathing.

Provider's Guide

Results: Automated classification and advice on management

Helping Babies Survive Essential Care for Every Baby



ECEB Action Plan (wall chart)

22 Minutes from Birth
Baby of Oni
Location: Prenatal Ward
Male

Classified as **Problem**

94 98 98 100 102 104 106

Systemic Examinations Performed:

- Head
- Eyes
- Ears/ Nose/ Throat
- Chest
- Cardiovascular
- Abdomen
- Genitalia
- Anus
- Musculoskeletal
- Neurological
- Skin
- Overall

Assessments Saved

ECEB Digital Action Plan (mobile app)

Ears/ Nose/ Throat
 Chest
 Cardiovascular
 Abdomen

Musculoskeletal
 Neurological
 Skin
 Overall

Assessments Saved

The baby has been classified.
Following interventions to be taken:

- Prolonged skin-to-skin
- Continued inpatient care

Go back to the List of Babies

9:41

List of Babies
Ez *****2.6

Search the list of babies
Sort by

Recently Added

70 Minutes from Birth
Baby of Oni
Location: Prenatal Ward
Male

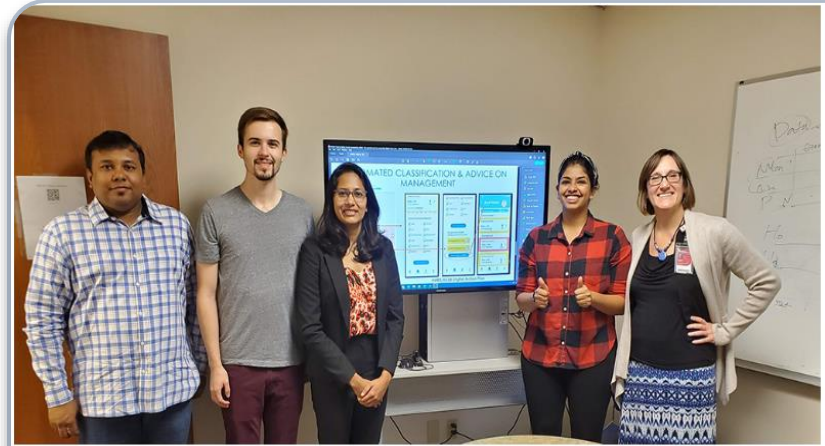
Past Registered

88 Minutes from Birth
Baby of Riya
Location: Prenatal Ward
Female

99 Minutes from Birth
Baby of Nia
Location: Prenatal Ward
Male

Conclusions

- Ability to register & track multiple babies **increases efficiency.**
- Time-stamped births, ECEB “clock,” and intervention reminders **reduce cognitive burden** by promoting recognition over recall.
- Automated classification of registered babies, color-coding, and automatically generated advice for care **improves effectiveness.**
- **Award winning design:** First Prize in the American Medical Informatics Association 2019 Student Design Challenge.



Students' “Essential Care for Every Baby” app wins at AMIA

<https://soic.iupui.edu/news/students-newborn-app-amia/>

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Thank You!

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References:

1. WHO: <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>
2. WHO: https://www.who.int/reproductivehealth/topics/maternal_perinatal/still_birth/en/
3. Gathara D, Serem G, Murphy GAV, et al. Quantifying nursing care delivered in Kenyan newborn units: protocol for a cross-sectional direct observational study. *BMJ Open*. 2018;8(7):e022020. Published 2018 Jul 23. doi:10.1136/bmjopen-2018-022020

