

# Co-Designing EmBRACE, a Mobile Health Solution to Improve Mental Health Screening and Support for NICU Parents: Lessons Learned from Our Community Advisory Board

Sharon Ettinger, MA<sup>1</sup>, Caroline Hayes, MS<sup>1</sup>, Kayla Layne, BA<sup>1</sup>, Katelyn Phan<sup>1</sup>, Yasmin Kishun<sup>1</sup>, Mona Elgohail, PhD<sup>2</sup>, Tony Ma, MS<sup>2</sup>, Katie Chang, MS<sup>2</sup>, Yi Cui, MS<sup>2</sup>, Chavis A. Patterson, PhD<sup>3</sup>, Pamela A. Geller, PhD<sup>1</sup>

1. Department of Psychological and Brain Sciences, Drexel University 2. Benten Technologies 3. Children's Hospital of Philadelphia

## Introduction

- EmBRACE (Empower NICU – A Bridge to Resources for Adjusting and Coping with Emotions)* is a mobile health application that we are co-creating with a community advisory board (CAB) of parents of infants hospitalized in the neonatal intensive care unit (NICU) and NICU healthcare providers (HCPs).
- The objectives of *EmBRACE* are to:
  - Screen and monitor psychological symptoms in NICU parents
  - Allow parents to complete psychosocial assessments at a time and place of their convenience
  - Identify those at risk for depression, anxiety, posttraumatic stress disorder, and other psychopathology
  - Connect parents with appropriate services and resources
  - Provide mental health support via tailored psychoeducation and peer support within the app

## Methods

- The second and third phase of co-creation with NICU parents ( $N = 11$ ) and HCPs ( $N = 8$ ) included focus group discussions and/or in-depth interviews with:
  - Four parents with a recent NICU hospitalization at the Children's Hospital of Philadelphia at the time of data collection
  - Seven parents who experienced a child's NICU hospitalization at some point in their life
  - Eight NICU HCPs including nurses, psychologists, and neonatologists.
- Interview and focus group discussions centered around ideas relevant to the app development and feedback on the app prototype.
- Transcriptions were reviewed by the study team to identify qualitative themes to inform app revisions.

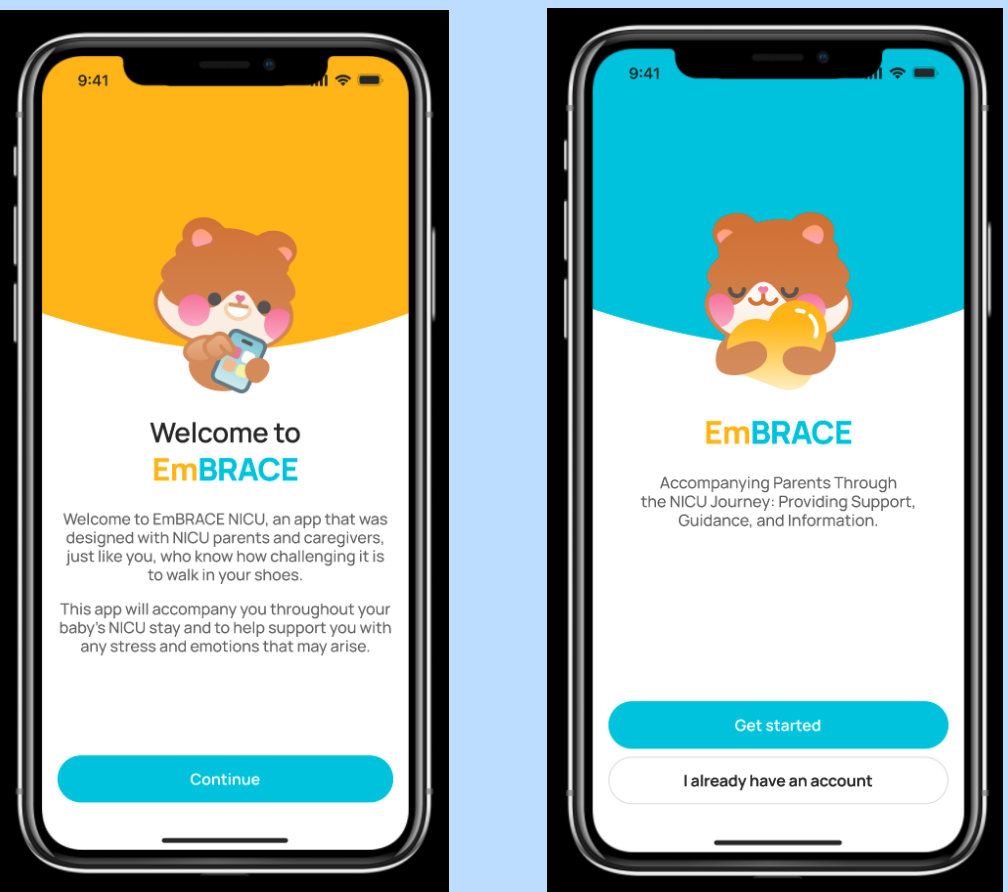


Figure 1. Screenshots from the EmBRACE app prototype presented to CAB members.

## App Topic

## CAB Perspectives

## Themes

### Content

- Include text throughout to normalize parent experiences
- Clarify use of personal information, privacy
- Allow parents to choose to release assessment results to NICU providers
- Frequency of mood check-ins and mental health assessments should minimize parent burden and consider where they are in their NICU journey
- Educational topics should include sleep information, bonding, feeding alternatives
- Motivational quotes throughout are good
- Use warm and inclusive language
- Use culturally inclusive content and assessment feedback
- Provide internal and external referrals
- Track both maternal and infant health
- Avoid unnecessarily alarming content

### Design

- Appreciate space for notes, reflections, photos
- Add visual representations of infant milestones/progress
- Calendar should support scheduling and planning for appointments
- Custom to-do list with reminders
- Colors should be soft, warm, welcoming
- Good color scheme and layout

### Usability

- Use accessible language (5<sup>th</sup> grade reading level or less)
- The app is overall user-friendly
- Make sure accessible for visually impaired
- Keep it light, simple, easy to navigate
- Allow user choice wherever possible
- Be mindful of different learning needs
- Include explanatory transitions or summaries

Empowering parents

Transparency and trust

Minimize parent burden

Health and safety

Cultural inclusivity

Personalization

Compassion and support

Diversity

Warmth

Functionality

Visualization

Clarity

Customizable

Accessibility

Guidance

User choice and autonomy

Adaptability

Simplicity

## Discussion

## Acknowledgments

- The *EmBRACE* app has the potential to fill an existing gap in mental health support for NICU parents.
- Community-identified preferences are essential to developing mobile health projects tailored to specific populations, making CAB qualitative data an indispensable resource for ensuring the app aligns with the needs and expectations of NICU parents.

The EmBRACE project is funded by the Agency for Healthcare Research and Quality, Department of Health and Human Services (Grant 1R21HS029554-01; P.A. Geller, Principal Investigator)

