

UNITE: Smart, Connected, and Coordinated Maternal Care for Underserved Communities

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Project Vision:

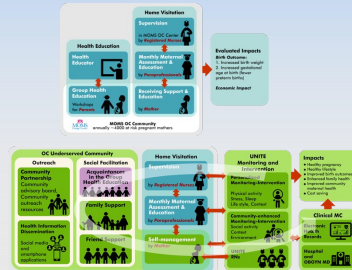
- Help underserved pregnant women achieve healthy pregnancies through IoT-enabled self-management and smart, personalized recommendations
- Enhance community engagement with mothers, families, & community-oriented agencies

Maternity Care Coordination Models

Home Visitation (HV) Model:

UNITE Model:

- *WIoT monitoring*
- *RN-in-the-loop smart intervention*
- *Community engagement*
- *Self-management*



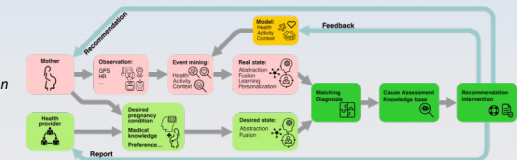
Intellectual Merits



<https://unite.ics.uci.edu/>

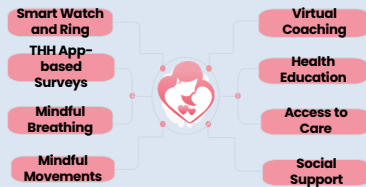
- Motivate mothers to achieve healthy pregnancies through ubiquitous health monitoring, smart interventions, personalized recommendations and community-enhanced interaction and education.

Closed-loop system for lifelogging, health monitoring and recommendation leveraging personalized models



- Build holistic digital phenotypes of the Maternal Care community using multi-modal data capture, personalized model building and dynamic recommendations (via wearable IoT devices, lifelogging, context recognition, health monitoring, and personalized, adaptive recommendation systems).

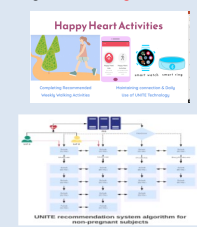
Two Happy Hearts (THH) Program



“Two Happy Hearts” (THH) Mobile App

- Mindful breathing and mindful exercise regimen
- Reduce mother’s stress level & achieve ACOG guidelines for physical activity
- Motivate/guide mothers on THH program
- Capture the emotional state of mother
- Enable personalized model building

Recommendation-Based Walking Program for **Non-Pregnant Women**



Recommendation-Based Walking Program for **Pregnant Women**



Two Happy Hearts Walking Recommendation System

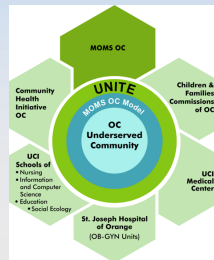


- + Interfaced with smartphone & smart watch
- + Contextual multi-arm bandit framework to deliver recommendations
- + Deployed system in every-day settings

Pilot tested 2 Happy Heart Walking with 20 healthy non-pregnant women

Broader Impacts on Society

- Reduce disproportionate risk of maternal and infant health disparities in underserved communities
- Effective delivery of healthcare and social services, leading to cost reduction
- Community building for pregnant mothers, families, care providers
- Multidisciplinary training of researchers across CS, Health Sciences, Psychological Sciences, and Engineering



Broader Impacts: Sustainability

- Virtual community building at multiple scales: pregnant mothers, families, healthcare providers, insurance providers, governmental agencies
- Scalability and portability of UNITE model to decrease preterm birth across diverse ethnic and socio-economic communities
- Improve quantity and quality of maternal care using cross-continuum care coordination.
- Reuse and exploit community-based memory of past exploratory phases via personalization and adaptive online learning
- Education and training of next-generation healthcare providers

Plans for Coming Year

- Refine RN-in-the-Loop Smart Walking Intervention Study, update the UNITE mobile app and dashboard
- Pilot RN-in-the-Loop Smart Walking Intervention Study with pregnant mothers, encourage study retention and completion
- Expand Community Engagement: liaise UNITE project with broader community collaboratives such as Orange County PMAD Steering Committee and Orange County Perinatal Council