U-Act: Wearable Patch to Monitor Uterine Activity to Predict Preterm Labour

Problem: Preterm labour (PTL) accounts for 43% of neonatal deaths in India, but its prediction is resource-intensive (cervical examination, biomarkers).

Solution: U-Act can monitor uterine electrical activity with Electromyography(EMG) sensor, to predict PTL between 25th-35th week, which can be used by midwives with an auto-interpretative mobile application.

Innovation: 'U-Act' is a wearable patch with surface electrodes and a processing unit that does not require abdominal skin preparation. A wireless device connected with an app, U-Act shares results with the referral doctor for critical decision-making.

Based in Evidence: Uterine electrical activity underlies contractility, and becomes more vigorous with closeness to delivery, despite irregular contractions. Thus, EMG is more accurate than the tocodynamometer (Vlemminx et al, 2017).

What is the Expected Impact: Contraction intensity and frequency over 30-minute recordings, and maternal weight at admission can predict PTL (I. Verdenik et al, 2001). Sample will be drawn from 3050 high-risk pregnancies (current project areas), over one year. Comparison with birth outcomes will generate sensitivity and specificity. Percentage of preterm babies admitted to intensive care, 'Morbidity Assessment Index for Newborns' at 7th day or discharge to evaluate the effect of obstetric intervention (Verma et al, 2005), and neonatal mortality rate will be calculated. Indicators will be compared with those in areas under routine care.

Management and Financing: U-Act has been developed by CareNX (IIT-Bombay), which specializes in point-of-care devices, working in nine states of India. Initial funding was provided by Grand Challenges Canada (GCC).

Describe Stage of Idea: Proof of concept to Prototype stage was funded by GCC.

Your "ask": We are seeking funding, and mentoring for integration of machine-learning, for auto-prediction of PTL.