Keeping Labor Safe LLC
The Fetal Reserve Index- Obelisk Fall 2022
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The Need:

Childbirth should be a time of great joy, but it can also be perilous. Electronic fetal monitoring (EFM) has been used for >50 years to predict and prevent compromised babies who can have neurodevelopmental delays including cerebral palsy. Unfortunately, EFM has performed poorly – missing as much as 50% of problematic cases. As a result, medical liability costs around labor have reached $40 Billion per year in the USA. Outcomes have been worse in minority populations. We have developed a very disruptive technology called the Fetal Reserve Index (FRI) to provide improved and earlier assessment of clinical risk to prevent damage rather than react to it. We need to move the FRI into a deployable platform for clinical introduction, refinement, and world-wide implementation. We need help to create the app for clinical implementation.

Company Background:

Keeping Labor Safe, LLC (KLS), is a start- up medical technology company, developing technology and software that will make labor and delivery (L&D) and immediate postpartum care (L&D/PC) safer for mother and newborn infant. Our team is primarily comprised of medical professionals who have spent our careers working in maternity hospitals in Detroit, Chicago, Augusta, Dayton, Ohio, Philadelphia and New York City where we have seen firsthand the need to make childbirth safer for all parties involved. We have developed the Fetal Reserve Index (FRI) to identify distressed fetuses earlier in the course of developing compromise and to allow for earlier intervention to help produce better medical outcomes for mother, fetus, and baby. We have multiple papers and patents and have developed the computer algorithm to "read" the tracing and produce a quantitative score.

The Project: Obelisk Creation

With this project we are ultimately looking for electronic download of fetal monitoring data and risk factor data collected from current models of Electronic Fetal Monitors (EFM's) and Electronic Health Record platforms (EPIC, Cerner), these data are input through your custom-built API into the FRI Algorithm (ideally this task will be completed with another project during the fall 2022 semester). Once data are input, the diagnostic output will be returned to the user's device and displayed in an easy-to-read visual format. This easy-to-read visual format we are looking to have you create is called the "Obelisk Graphical Display", a preliminary drawing is included in this document. The goal with the Obelisk is to allow the attending medical personnel to have a comprehensive yet simple visual guide as to the current condition of their patient reducing the likelihood of missing medically urgent data. It will be color coded to match the colors of the Fetal Reserve Index and needs to be embedded with the bedside web app created by the CS Mines summer 2022 field session.
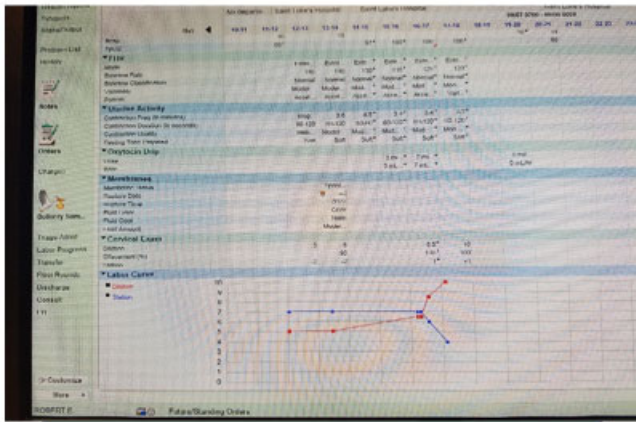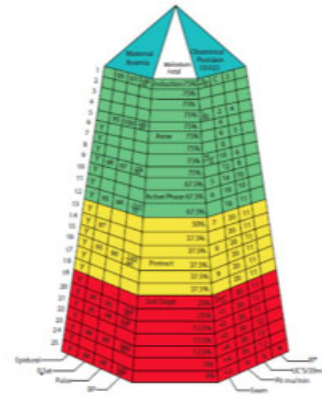
Labor and Delivery Room Technology Timeline:
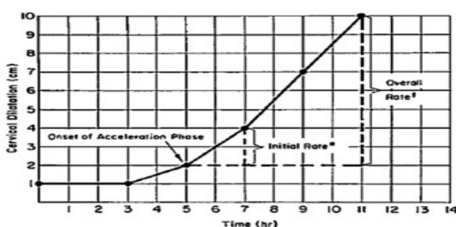
1950's+ Classic Friedman Curve
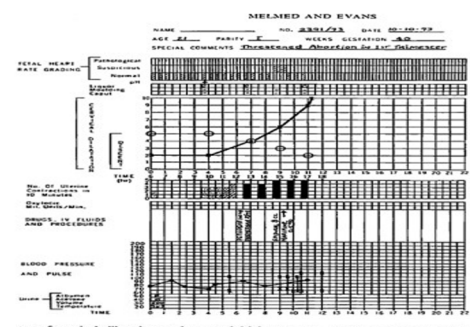
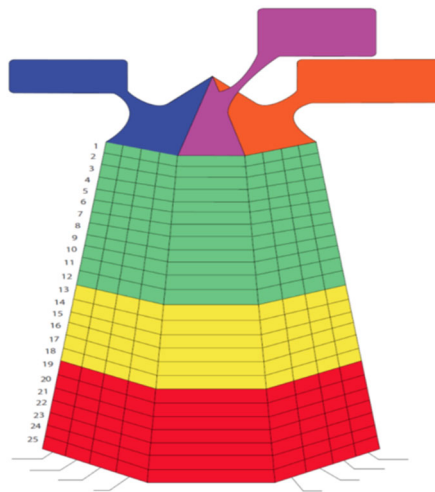1970's Partogram with all vital information in one place

2000's move to the computer screen

Today: Obstetrical Obelisk:
complete and easy to read

- **Obelisk Creation**

- **Application Requirements:**
    - Improve the design
    - Should become the main viewing screen once the progression of labor starts

- Dynamically update on-screen view as data is received from the web application
- Dynamically update FRI Score as data is received from the web application.
- Multiple Concurrent viewing capabilities: Real Time Sharing of Data
- HIPAA compliant

Technologies and Desired Skills:

- Python (Python Flask, Micro framework)
- General Front End Development: React
- WebSocket
- REST API

- SQL Database
- JavaScript, TypeScript
- HTML/CSS
- Others as appropriate
- C++
- Cloud Architecture

Preferred Team Size: 4-5 Students

Preferred Work Location: Remote
- Meeting regularly via Zoom

Intellectual Property: All intellectual property developed as part of this project will be owned by Keeping Labor Safe, LLC.
NDA: Signed NDA will be required