CardioSounds LLC
Monitoring COVID19 Disease Progression via Cardiac Vibrational Signature Analysis

Company
Name: CardioSounds LLC
Ann Arbor, MI
Founded: 2018
Stage: Seed
Device: Pre-FDA

Key Words
- Non-invasive sensors
- Signal processing
- Machine learning / AI
- Cardiac monitoring

Proposed Solution
- CardioSensors capture vibrational and electrical signals related to cardiac activity
- Signal processing and AI algorithms relate signals to indications of physiological state

Approach
- Enroll patients admitted to hospital with COVID symptoms
- Collect data (using device); observe outcomes
- Develop AI classification model to predict future outcomes using CardioSounds’ algorithms

Outcomes of Interest:
- Ventilator Utilization
- ICU Utilization
- Hemodynamic Instability
- Length-of-Stay / Mortality

Unmet Need
CardioSounds addresses an unmet clinical need for advanced, non-invasive, low-cost monitoring of disease progression outside of the ICU as manifested in the evolution of cardiovascular system function.

Preliminary Data
Methodology has demonstrated potential in prior work

- Study 1: Tracking systolic arterial line BP in a pharmacological porcine subjects (N = 6) exhibiting range of hemodynamic states
- Study 2: Classifying human subjects for cuff BP in outpatient setting using rigorous AI model

<table>
<thead>
<tr>
<th>Validation Set</th>
<th>Target Class</th>
<th>Prediction</th>
</tr>
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<tbody>
<tr>
<td>(2407 cardiac cycles from 9 patients)</td>
<td>Normal</td>
<td>High</td>
</tr>
<tr>
<td>1110</td>
<td>55</td>
<td>95.3%</td>
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Table 2: Classification Matrix

Team
CardioSounds is supported by an experienced entrepreneurial and clinical team

Kevin Wittrup, MSME,MBA
Serial entrepreneur
Technology commercialization

Dr. Steven Bolling, MD
University of Michigan
Cardiac surgeon

Kayvan Najarian, Ph.D.
University of Michigan
Machine learning / signal processing

Dr. Rob Sherwin, MD
Wayne St. University
Emergency medicine / clinical research

Dr. Joe Miller, MD, MS
Henry Ford Hospital, Detroit
Emergency medicine / clinical research

Implementation
- Technical: Validate algorithm; evolve design
- Market/Bus: Establish strategic partners; secure Series A funding
- Clinical: Identify contraindications; establish efficacy & usability
- Regulatory: Establish regulatory pathway (510K is presumed)