OmH Cardiorespiratory Schema

Proposed Schema Structure

Cardiac Depolarization Events

Pulse
- Pulse Dynamics
- Rhythm

Blood Pressure
- Systolic, diastolic
- Cardiodynamics

Respiratory
- Ventilatory dynamics
- Gas Exchange
- Anomalies
Respiratory Schema

**Build - Initial Steps**

Respiratory

- Ventilatory dynamics
- PPG
- Anomalies

Informed by “use cases” across paradigms

Dependencies?

Extensibility intent?

“Measure twice, cut once”

Atomicity

80/20 Rule

Modeling of Time

… and all the other schema design principals

Respiratory Sub-schema Writing Subgroup
Cardiorespiratory Schema

Proposed Structure

Electrical Systoles

Pulse
  - Pulse Dynamics
    - Rhythm

Blood Pressure
  - Systolic, diastolic
  - Cardiodynamics

Respiratory
  - Ventilatory dynamics
  - Gas Exchange
  - Anomalies
Blood Pressure Measurement: **Conventional**

a) Intra-arterial (*direct*)

b) Auscultation **

c) Cuff Pressure w/ Oscillimetry **

d) Volume Clamping w/ Oscillimetry

e) Tonometry
Blood Pressure Measurement: Cuffless Methods

- Photoplethysmography
- Ballistocardiography
- Seismocardiography
- Electrical bioimpedance/impedance cardiography
- Ultrasound
# Blood Pressure Measurement: Cuffless Methods

<table>
<thead>
<tr>
<th>Category</th>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibrated</td>
<td>PTT</td>
<td>Continuous or passive</td>
<td>Supporting theory</td>
<td>Periodic cuff calibrations or demographics calibration</td>
</tr>
<tr>
<td></td>
<td>PWA (PPG)</td>
<td>Seamless</td>
<td>Single sensor</td>
<td>Two measurement sites</td>
</tr>
<tr>
<td></td>
<td>Facial video processing</td>
<td>Ubiquitous device</td>
<td>Ubiquitous device</td>
<td>Little theory</td>
</tr>
<tr>
<td>Uncalibrated</td>
<td>Cuffless oscillometry (finger pressing)</td>
<td>Calibration-free</td>
<td>Potentially ubiquitous device</td>
<td>User activity</td>
</tr>
<tr>
<td></td>
<td>Ultrasound (area-blood velocity)</td>
<td>Solid theory</td>
<td>Central PP measurement</td>
<td>Difficult probe placement</td>
</tr>
<tr>
<td></td>
<td>Volume control</td>
<td>Continuous</td>
<td>Disruptive (finger numbness)</td>
<td></td>
</tr>
</tbody>
</table>
Blood Pressure Schema

**Build - Initial Steps**

**Blood Pressure**
- **Systolic, diastolic**
- **Cardiodynamics**

Informed by “use cases” across paradigms

**Dependencies?**
- Extensibility intent?
- “Measure twice, cut once”

**Atomicity**
- **80/20 Rule**
- **Modeling of Time**

… and all the other schema design principals

**Modalities:**
- Conventional blood pressure measurements
- Cuffless blood pressure measurements

**Related Content Possibilities?**
- Perfusion state
- Hemodynamics
Blood Pressure Schema

**Build - Initial Steps**

### Blood Pressure
- **Systolic, diastolic**
- **Cardiodynamics**

Informed by “use cases” across paradigms

### Dependencies?
- Extensibility
- intent?

“Measure twice, cut once”

### Atomicity
- 80/20 Rule
- Modeling of Time

... and all the other schema design principals

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**Participants for Blood Pressure Schema Writing Subgroup?**

**NHLBI Workshop** (March 29, 2023):
*Transforming Hypertension Diagnosis and Management in the Era of AI*

**IEEE EMBS** (May 3-5, 2023):
*Second Annual Cardiovascular Health Tech Conference*
Respiratory Schema

Proposed Structure - 3

Electrical Systoles

Pulse

Blood Pressure

- Systolic, diastolic
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Respiratory

- Ventilatory dynamics
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Pulse Dynamics

Rhythm