Common HRV Time-Domain Measures

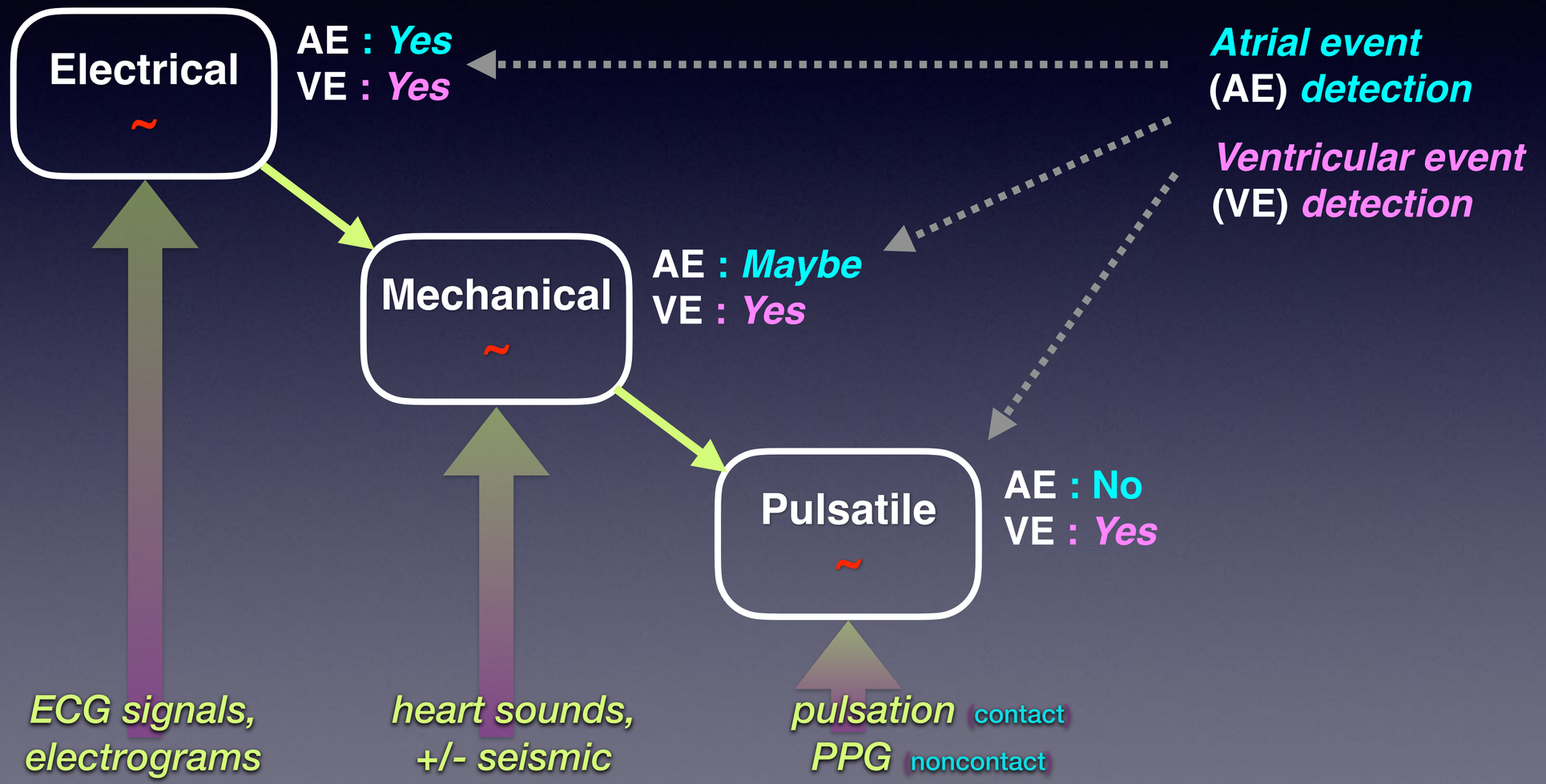
Parameter	Unit	Description
SDNN	ms	Standard deviation of NN intervals
SDRR	ms	Standard deviation of RR intervals
SDANN	ms	Standard deviation of the average NN intervals for each 5 min segment of a 24 h HRV recording
SDNN index (SDNNI)	ms	Mean of the standard deviations of all the NN intervals for each 5 min segment of a 24 h HRV recording
pNN50	%	Percentage of successive RR intervals that differ by more than 50 ms
HR Max − HR Min	bpm	Average difference between the highest and lowest heart rates during each respiratory cycle
RMSSD	ms	Root mean square of successive RR interval differences
HRV triangular index		Integral of the density of the RR interval histogram divided by its height
TINN	ms	Baseline width of the RR interval histogram

Interbeat interval, time interval between successive heartbeats; NN intervals, interbeat intervals from which artifacts have been removed; RR intervals, interbeat intervals between all successive heartbeats.

Front Public Health. 2017; 5: 258.

Cardiac Systolic Event

Dependencies -> *Extensibility*



IEEE 1752 Standard for Mobile Health Data

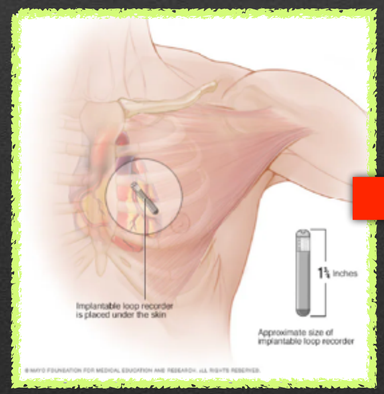
Expansion of Mobile Health Data overlapping into the Digital Biomarker Space…

Apps

Wearables & ext. detectors

Internal/implant sensors*

Wearables ⟷ ***Apps*** ⟷ ***Implantables***



- ***PHR***
- ***EHR***
- ***AI & DL***

SCHEMA DESIGN PRINCIPLES

Atomicity

- *Determine desired granularity of schema's data representations*

Balancing parsimony and complexity

- *Pragmatics and the 80/20 rule*
- *Example: OmH explicitly determined relationship of physical activity to glucose to be outside 80/20 region…*

Balancing permissiveness and constraints

- *Pragmatics for value sets units, cardinality*

Designing for data liquidity

- *Data interchange: Data's meaning same for sender and receiver*
  - Header schema: Operational context for metadata - data payload
    : *Data point creation and identification*
    : *Acquisition prevenance* (informed by M2DK mPROV ?)
  - Measurement schema: Clinical context for metadata

Alignment with clinical data standards

- *Semantic interoperability by relying on existing vocabularies* (ex. *SNOMED, LOINC*, etc) *and units of measure* (*UCUM Codes*)

Modeling of time

https://www.openmhealth.org/documentation/#/schema-docs/schema-design-principles

IEEE 1752 Data Schema

Data Point:

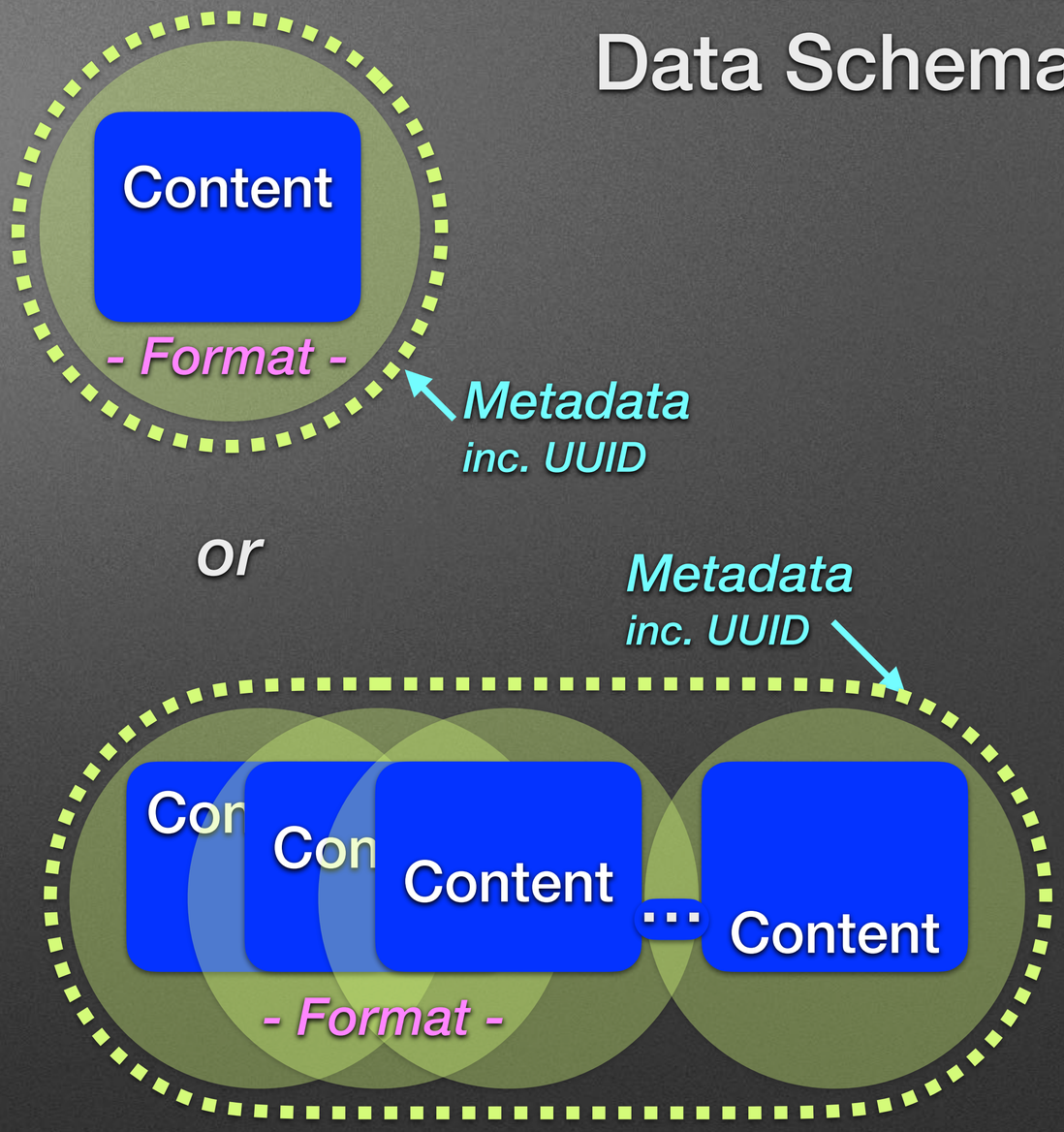
- A discrete measurement (or observation) on a *single unit of observation*
- Discrete: “distinct in time of acquisition, location, or origin/ source”
- May be multidimensional +/- directionality

Data Point Series:

- An ordered sequence of data points that share the same metadata

Content:

- An instantiation of a single unit of observation



IEEE 1752.1 Standard for Mobile Health Data

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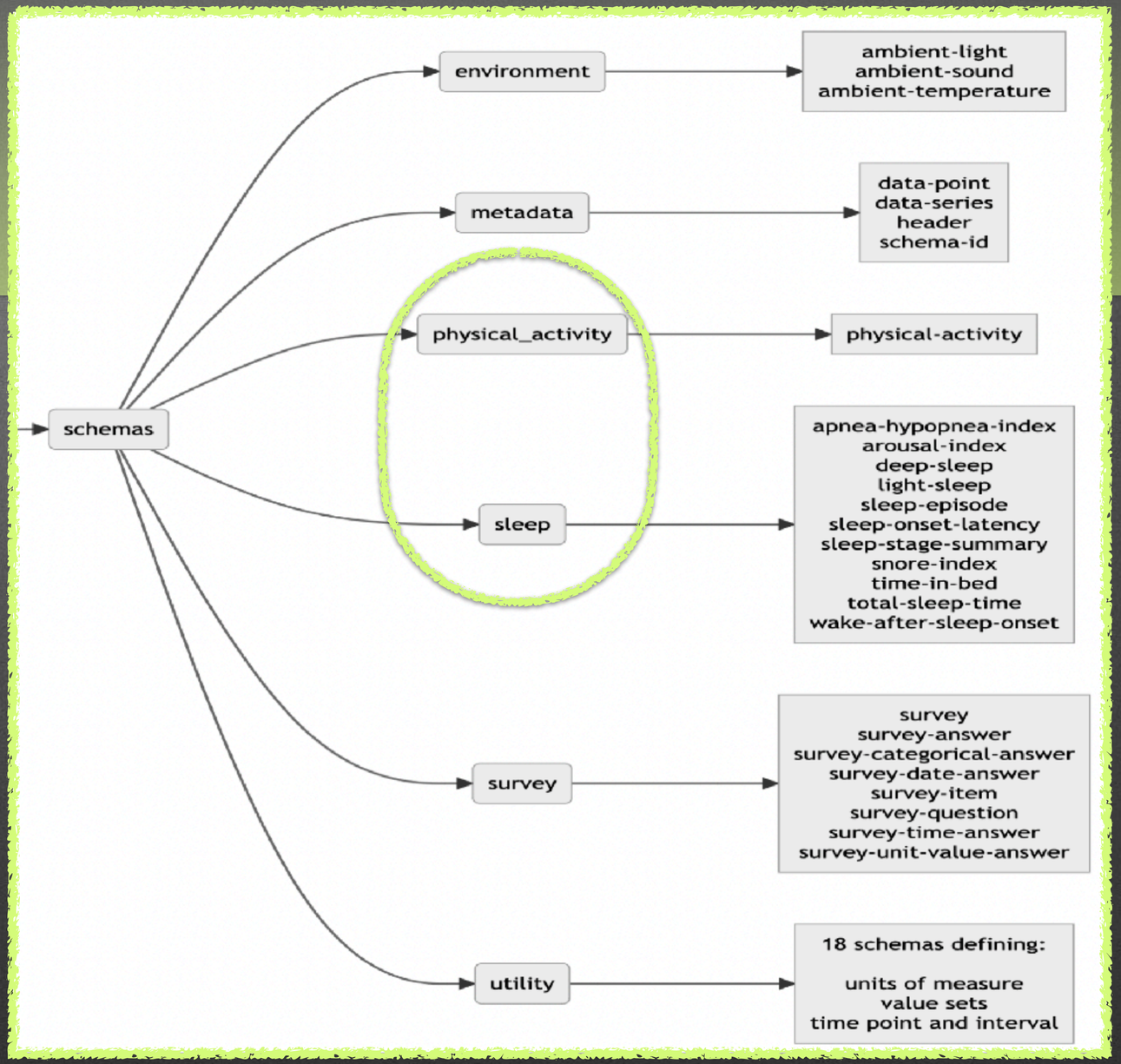
IEEE 1752.2 Standard for Mobile Health Data

- *Metabolic*
- *Cardiorespiratory*



https://opensource.ieee.org/omh/1752

IEEE 1752.1 Standard for Mobile Health Data

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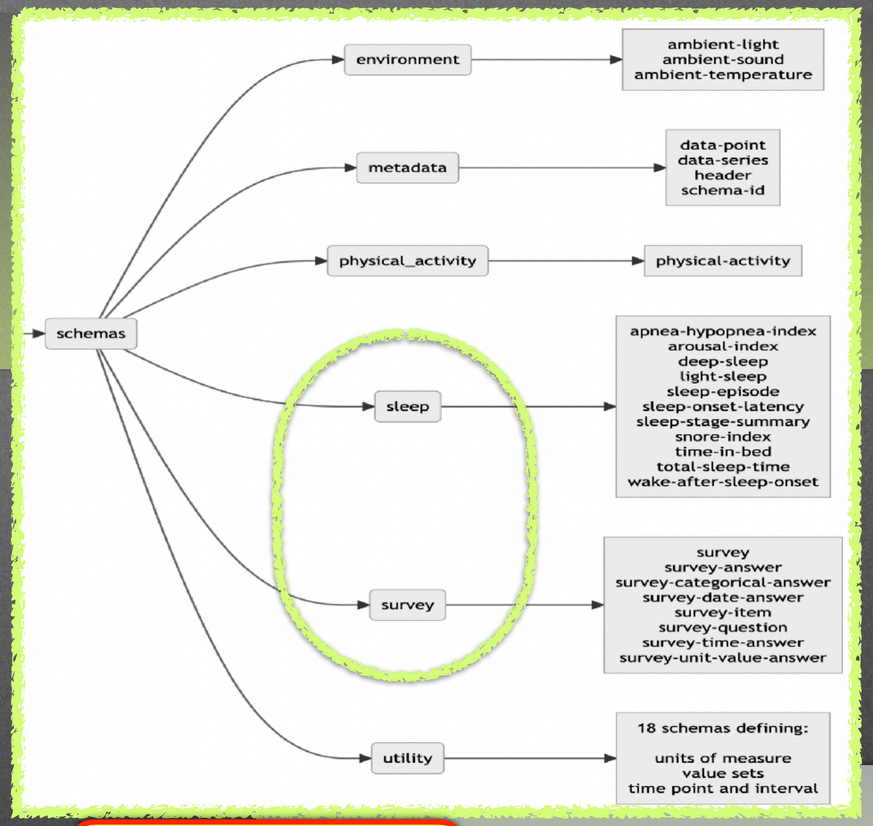
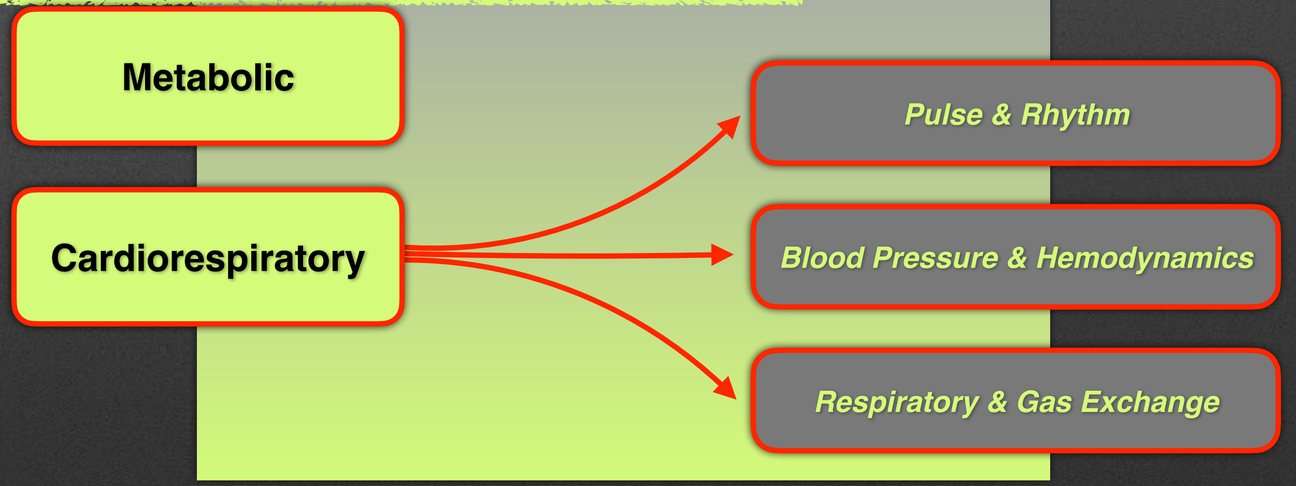
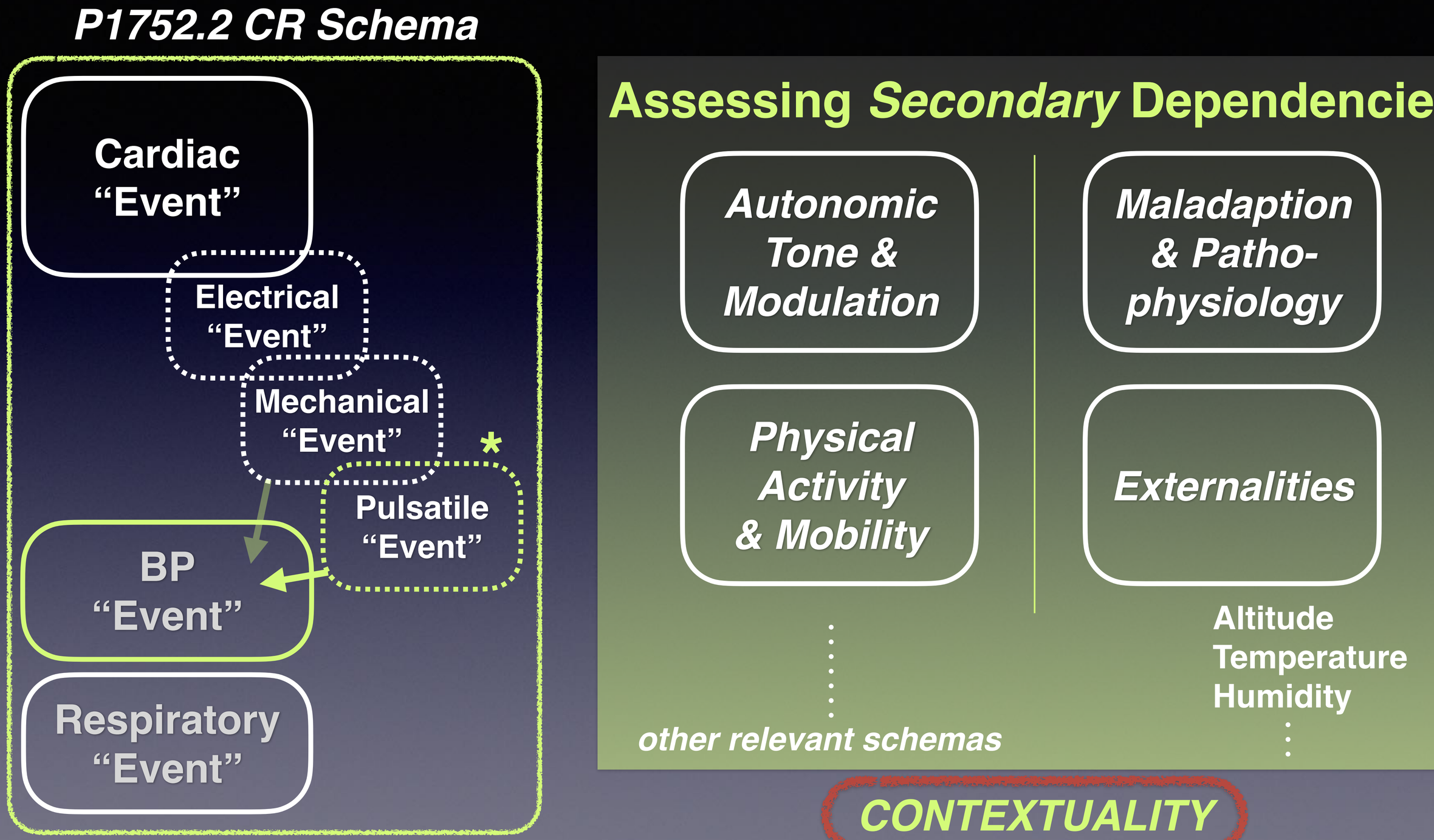
IEEE 1752.2 Standard for Mobile Health Data

- *Metabolic*
- *Cardiorespiratory*






P1752.2 CR Schema
Cardiac "Event"
Electrical "Event"
Mechanical "Event"
*
Pulsatile "Event"
BP "Event"
Respiratory "Event"
Assessing Secondary Dependencies
Autonomic Tone & Modulation
Maladaption & Patho-physiology
Physical Activity & Mobility
Externalities
Altitude
Temperature
Humidity
other relevant schemas
CONTEXTUALITY