

OmH Cardiorespiratory Schema

Proposed Schema Structure

*Cardiac
Depolarization
Events*



Pulse



**Pulse
Dynamics**



Rhythm

Blood Pressure

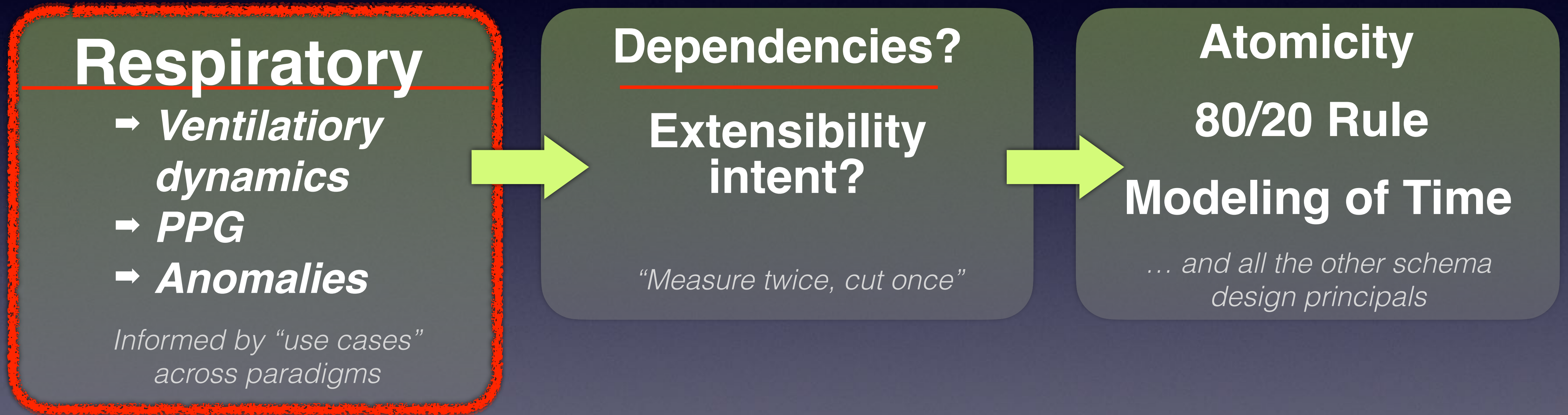
- *Systolic, diastolic*
- *Cardiodynamics*

Respiratory

- *Ventilatory dynamics*
- *Gas Exchange*
- *Anomalies*

Respiratory Schema

Build - Initial Steps



Respiratory Sub-Schema Writing Subgroup

Cardiorespiratory Schema

Proposed Structure

*Electrical
Systoles*



Pulse



**Pulse
Dynamics**



Rhythm

Blood Pressure

- *Systolic, diastolic*
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Respiratory

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dynamics*
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Blood Pressure Measurement : *Conventional*

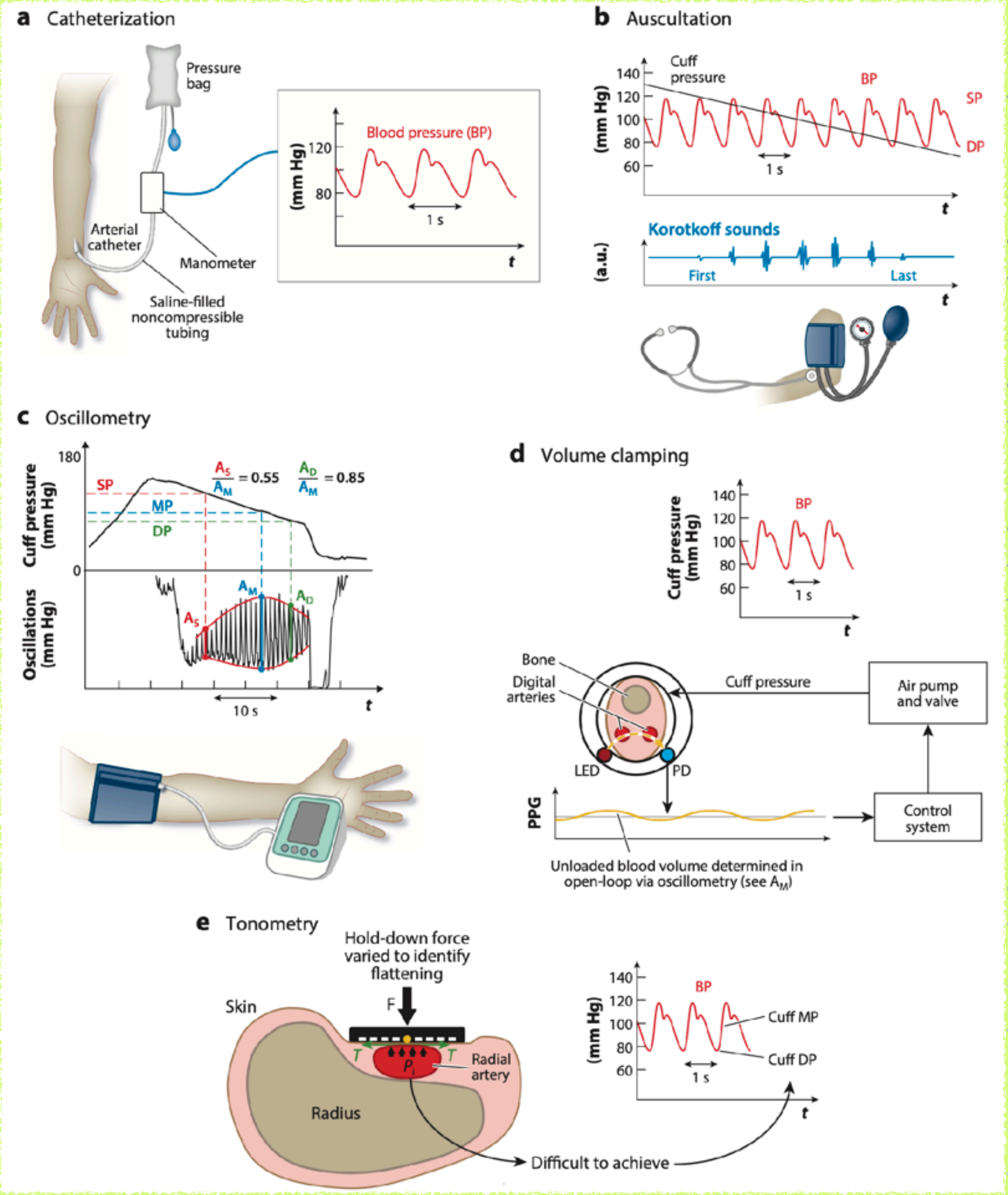
a) Intra-arterial (*direct*)

b) Auscultation **

c) Cuff Pressure w/ Oscillimetry **

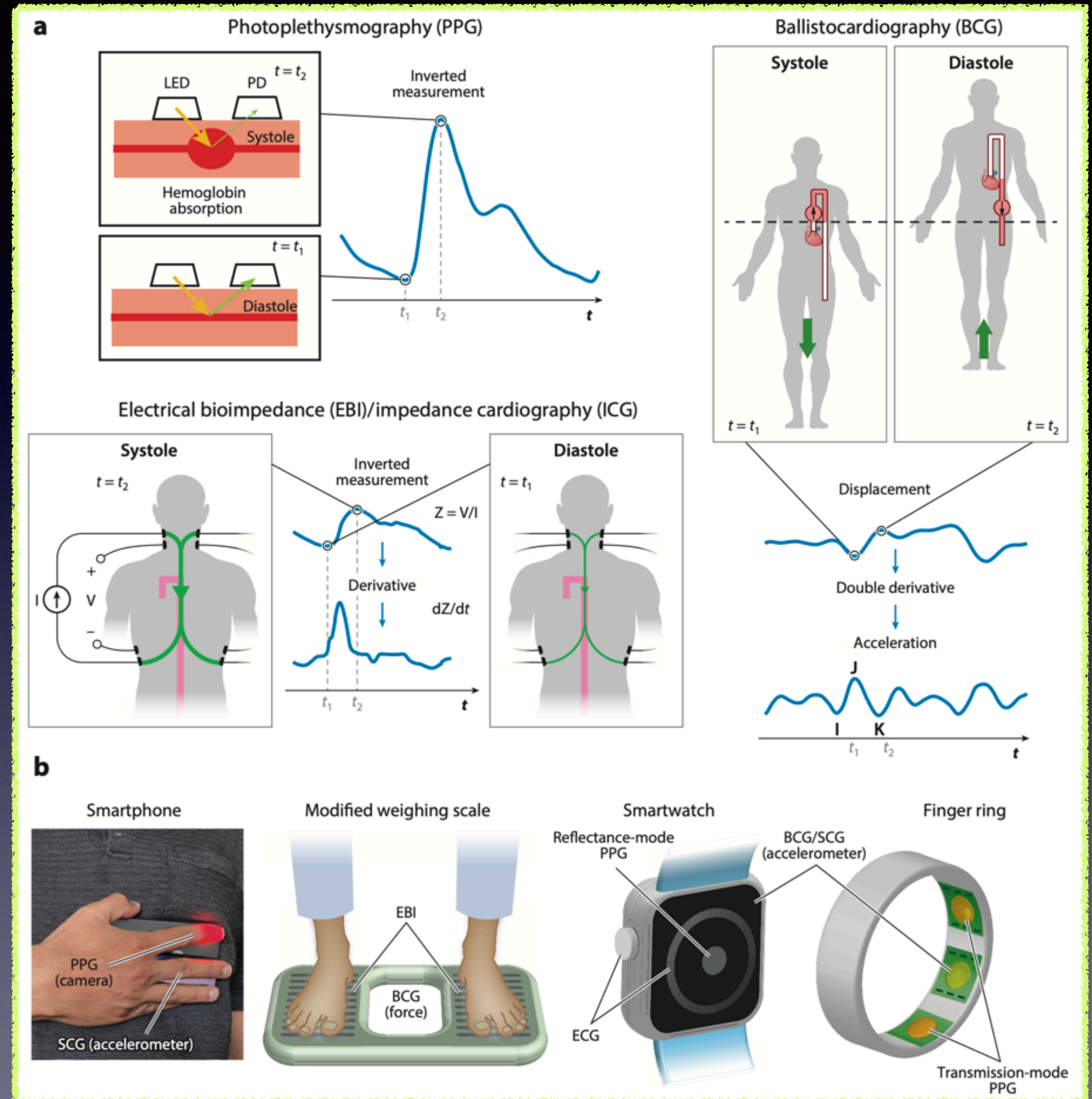
d) Volume Clamping w/ Oscillimetry

e) Tonometry



Blood Pressure Measurement : *Cuffless Methods*

- ➔ **Photoplethysmography**
- ➔ **Ballistocardiography**
- ➔ **Seismocardiography**
- ➔ **Electrical bioimpedance/impedance cardiography**
- ➔ **Ultrasound**



Mukkamala, R, Stergiou, GS, Avolio, AP; "Cuffless Blood Pressure Measurement"; Annu. Rev. Biomed. Eng. 2022. 24:203–30

Blood Pressure Measurement :

Cuffless Methods

Category	Method	Advantages		Disadvantages		Evidence
Calibrated	PTT	Continuous or passive Seamless	Supporting theory	Periodic cuff calibrations or demographics calibration	Two measurement sites	Many published studies Regulatory-approved, cuff-calibrated, contact devices Limited published data on intraindividual BP change tracking
	PWA (PPG)		Single sensor		Little theory	
	Facial video processing		Ubiquitous device		Little theory Low waveform quality	
Uncalibrated	Cuffless oscillometry (finger pressing)	Calibration-free Solid theory	Potentially ubiquitous device	User activity		Few published studies
	Ultrasound (area-blood velocity)		Central PP measurement	Difficult probe placement		
	Volume control		Continuous	Disruptive (finger numbness)		

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

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*... and all the other schema
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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



**Pulse
Dynamics**



Rhythm

Blood Pressure

- *Systolic, diastolic*
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Respiratory

- *Ventilatory
dynamics*
- *Gas Exchange*
- *Anomalies*