BREAKOUT SESSION 8
Patient-Facing Cardiovascular Digital Technologies in Patients with Cancer
Chair: Giuseppe Boriani
Rapporteur: Joerg Herrmann

1.Identify **key barriers to individual-level deployment of digital cardiovascular tools**, including interoperability, cost, usability and regulatory constraints.

2.**Map digital solutions** with the greatest potential to enhance monitoring, data capture and patient engagement across the cardio-oncology continuum.

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The digital resosultion

Patient-Facing Cardiovascular Digital Technologies

- Smart glasses

- Smart shirt

- Smart belt

- Smart bracelet

- Smart watch

- Smart ring

- Smart pants

- Smart socks

- Smart shoes

Is that smart?
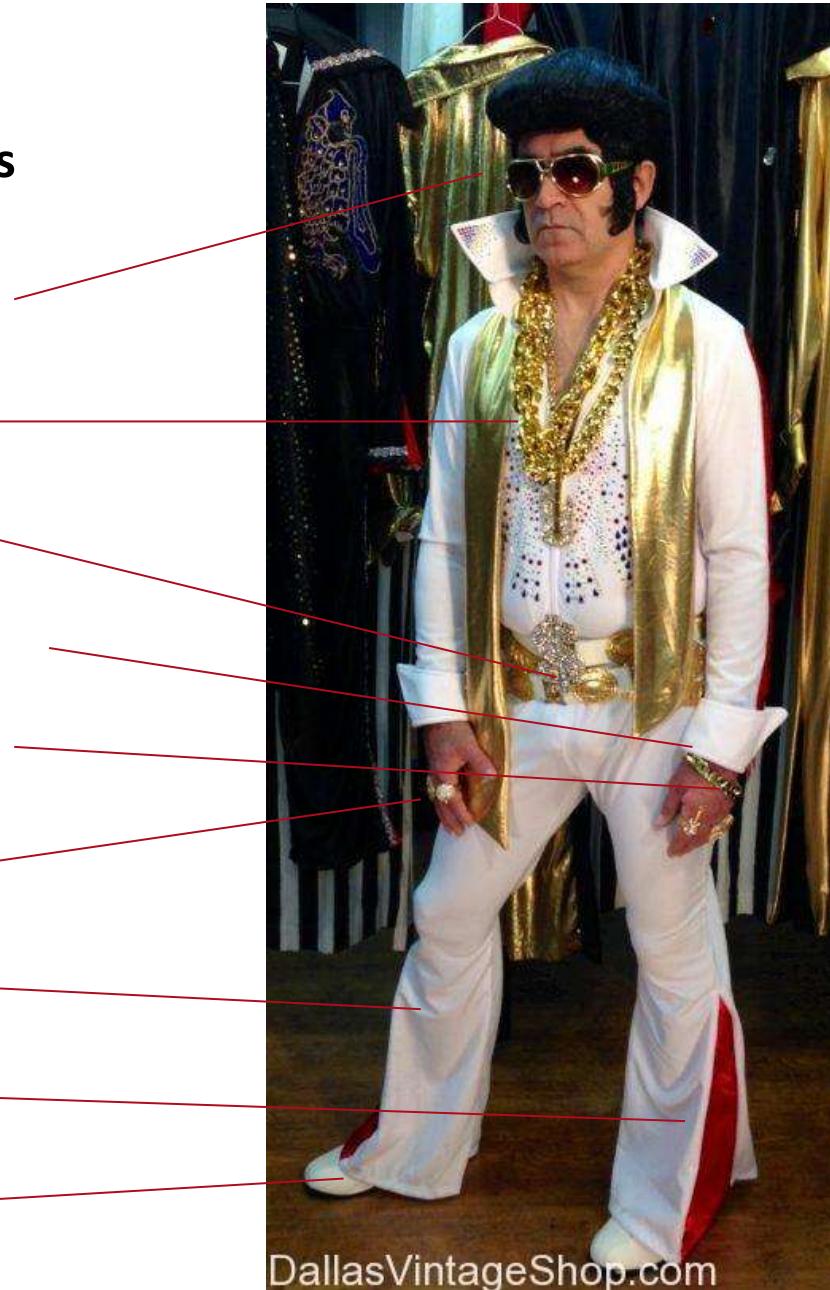
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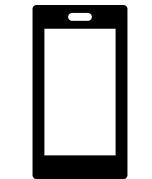
Device

Face analyzer

Breath analyzer (artificial nose)

Voice analyzer

Wearable chest patch

Smart watch

Smart ring

Smart socks
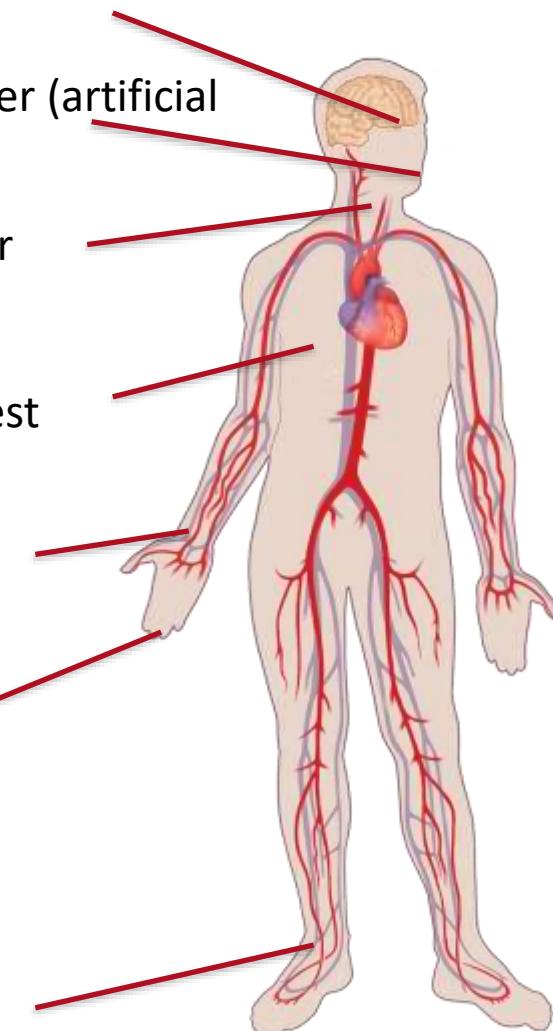
Detection

- Disease states (e.g. CAD, HF, cancer)

- Heart rhythm (e.g. atrial fibrillation)
- Respiratory rate
- Oxygen saturation
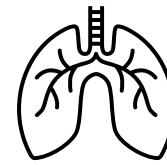
- Temperature
- Blood pressure
- Blood glucose
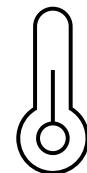
- Physical activity

- Lower extremity edema
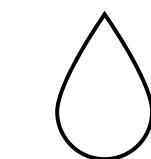
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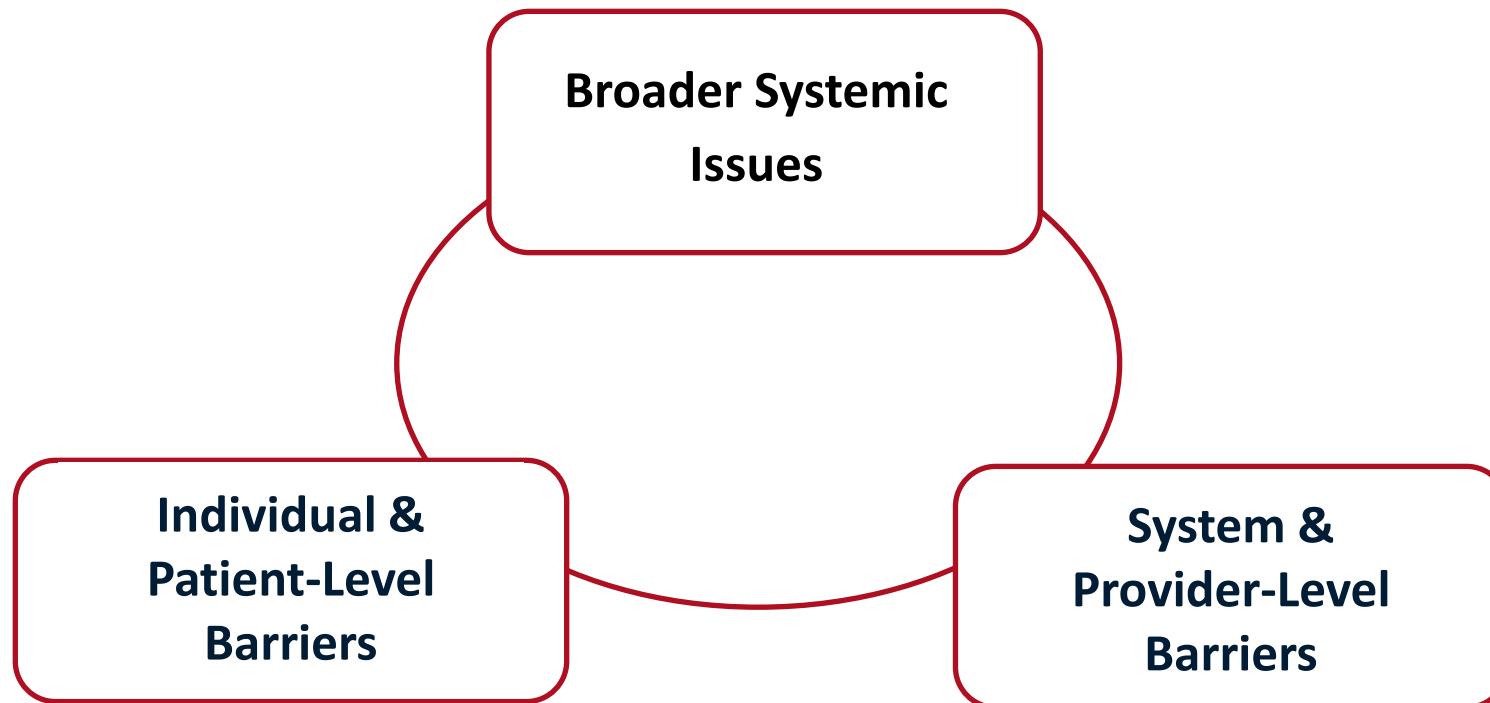
1.Identify **key barriers to individual-level deployment of digital cardiovascular tools**, including interoperability, cost, usability and regulatory constraints.

Individual or patient-level barriers

- **Motivation and trust:** Lack of perceived value/motivation, fear of technology, or interference with the patient-provider relationship.

- **Security/privacy concerns:** Concerns about how personal health data is collected, used, and protected.

- **Digital literacy & skills:** lessons learned, internet use decline after age 75 and with low level of education, Wearable use drops after age 50 exponentially, lack of confidence, technical knowledge, or comfort using devices and apps.

- **Usability:** Complex interfaces and navigation, small fonts, poor compatibility with assistive devices, lack of support => simplicity is needed

- **Infrastructure (gap):** Unreliable internet, lack of home support (e.g., caregiver assistance), device access

- **Cost:** Expenses for devices (smartwatches, trackers) or app subscriptions.

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System and provider-level barriers

- **Lack of clinical validation:** Insufficient evidence of effectiveness or accuracy.

- **Integration challenges:** Difficulty integrating tools with Electronic Health Records (EHRs) and clinical workflows.

- **Lack of standardization:** Inconsistent alert thresholds and management protocols for alerts

- **Provider training and support:** Insufficient training for clinicians on using and interpreting data from these tools (technology differences, sensitivity of devices, pre-test probability needed for device selection?)

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Broader Systemic Issues

*   **Health equity:** Digital divides disproportionately affect underserved communities, worsening existing health disparities.

*   **Ethical and regulatory Gaps:** Unclear governance for data use, liability, and ensuring patient safety, bypasses the traditional flow of research, testing and validation, certification, can be recommended but not be described (screening vs. diagnostic tool)

*   **Reimbursement:** Lack of clear payment models for digital health services (not the same across countries).

*   **Workflow:** Data flow, monitoring and response (key: what to do with the data?)

" We do not need a lot of data, we need good data, data that are actionable"

2. Map digital solutions with the greatest potential to enhance monitoring, data capture and patient engagement across the cardio-oncology continuum.

Digital solutions with the greatest potential to simultaneously enhance monitoring, data capture, and patient

engagement:

- **IoT-based Remote Patient Monitoring (RPM) systems**,
- integrated **Electronic Health Records (EHR) platforms**,
- **AI-driven patient engagement applications**.

=> transforming care from episodic, reactive models to continuous, proactive, and personalized experiences.

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Selectivity:

High negative predictive value!

Internet of Things (IoT) (AI)

2.Data Transmission

3.Analysis & Alerts

1.Data Collection

4.Provider Action

Remote Patient Monitoring (RPM)

Telemedicine Platforms

Differential approach:

Active therapy (toxicity monitoring)

Long-term survivor (wellness)
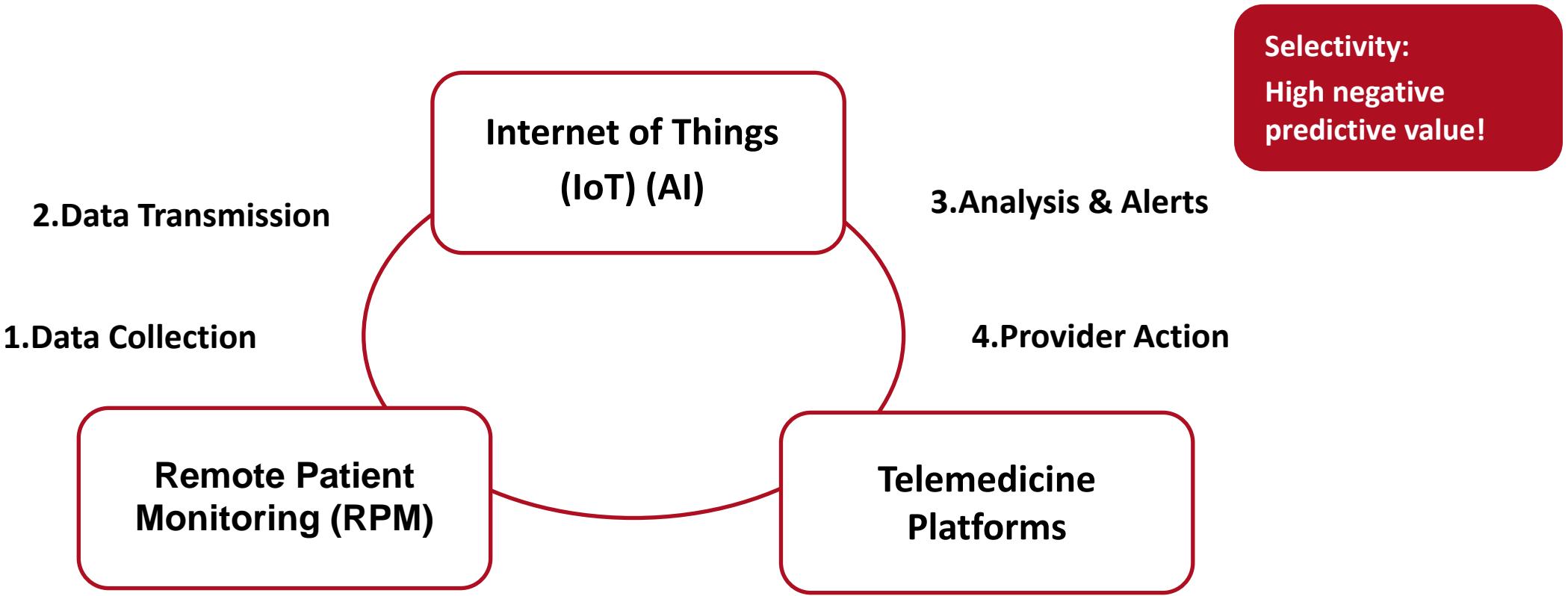
Top Digital Solutions with Highest Potential

1. **Remote Patient Monitoring (RPM):**

How they work: Uses digital devices (wearable technology & biosensors including smartwatches, fitness trackers, and implantable sensors) to collect and transmit vital signs and health metrics (incl. blood pressure, glucose, heart rate, heart rhythm, SpO2, weight, activity, sleep), often feeding into mobile health apps

Impact: considered the most effective for bridging the gap between hospital and home, provide continuous automated data, enable early detection of complications (e.g., in COPD or CHF patients), reduce hospital readmissions

Example: Medtronic CareLink

Challenge: Resources

Top Digital Solutions with Highest Potential

2. Telemedicine Platform (integrated EHR Portals & patient engagement software)

How they work: Communication tools that integrate telehealth, secure messaging, and lab results into a single interface.

Impact: They improve patient satisfaction, reduce missed appointments, and increase engagement through automated reminders and easy access to personal health records.

Example: MyChart by Epic

Challenge: Resources incl. time

Top Digital Solutions with Highest Potential

3. Internet of Things (IoT), Artificial Intelligence (AI) and Machine Learning (ML)

How it works: Connect various sensors, devices, and platforms for a comprehensive, automated system, analyzes the large volume of data collected by IoT and EHRs to make it actionable, e.g. AI-driven chatbots provide personalized communication and recommendations, based on programmed best practice advise or analytics that predict potential health issues and identify patients at risk.

Impact: Shifts patient engagement from reactive to predictive, allowing for immediate, automated, and personalized intervention rather than waiting for a scheduled visit.

Example: Ada Health (symptom checker) and Teladoc Health.

Challenge: Interface, connectivity, security

Key Trends to Watch

•**"Hospital at Home" models:** Using advanced sensors to bring acute-level monitoring to the home, reducing the burden on physical hospitals.

•**Cellular-enabled devices:** Removing the need for smartphones or Wi-Fi, making remote monitoring accessible to older or less tech-savvy populations.

•**Behavioral science integration:** Using gamification and behavioral nudges to increase user adherence to monitoring programs.