

# Show Me the Data: Proving the Benefit of Remote Patient Monitoring

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# Remote patient monitoring is a rapidly growing field and is well-suited for cardiac conditions

RPM programs monitor and manage patients remotely from the physical healthcare facility

Goals include detection of clinical decompensation and actions to optimize health

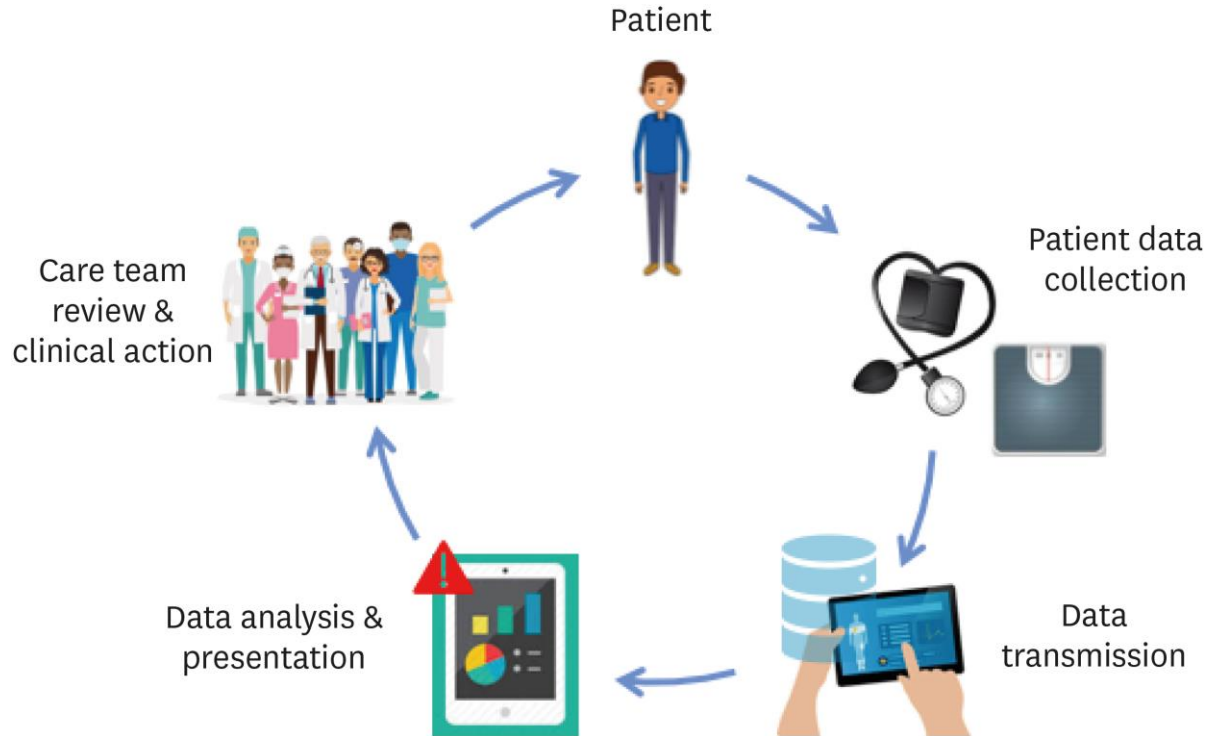
Variety of biometrics can be monitored:

HR, RR, symptoms, heart sounds, EKG, O2 sat, sleep, arrhythmia, activity, posture, impedance

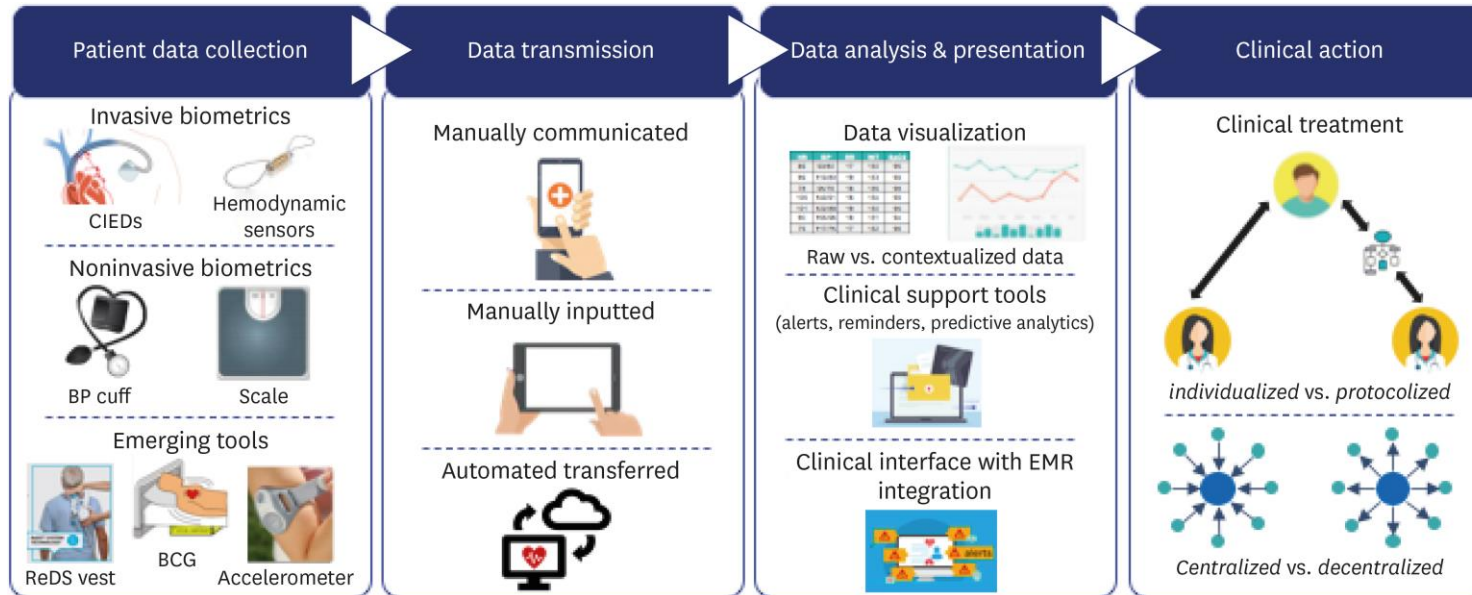
Variety of cardiac conditions can be monitored:

HF, AF, cardiac rehab, cardiac risk factors, cardiac-related lifestyle activities

# Remote patient monitoring programs are multi-faceted



# Remote patient monitoring programs require comprehensive design to be effective



# What RPM evidence exists?

## **Invasive monitoring for HF can help**

- DOT-HF, SENSE-HF tested OptimVol fluid monitoring but had low sensitivity and PPV for clinically relevant alerts and no clinical effect
- MultiSENSE multi-component alerting provided better sensitivity for alerts
- COMPASS-HF RV and Heart Pod RA pressure monitoring were ineffective
- CHAMPION and GUIDE-HF PA monitoring appeared to reduce HF hospitalizations

## **Non-invasive monitoring for HF can selectively work**

- Tele-HF and BEAT-HF IVR monitoring had low adherence and no clinical effect
- TIM-HF Bluetooth monitoring had good adherence, but no clinical effect
- TIM-HF2 enrolled a higher risk population, and reduced days lost to HF hospitalization and mortality rates

## **Wearables can detect AF, but unclear clinical benefit**

- AliveCor mobile phone recorder had high accuracy in AF detection and increased health care use, AC use, and QOL, but no impact on CVA outcomes
- Apple Heart Study had a low AF detection rate, but a high PPV among those with confirmed EKG. 50% of patients with an alert never sought care

## **Remote cardiac rehabilitation can provide clinical benefit**

- Smartphone-based CR had higher rates of uptake, adherence, and completion. The intervention improved 6MWD, weight loss, emotional state, and QOL
- Smartphone-based CR combined with center-based CR improved weight loss and a trend towards reduced CV-related hospitalization

## What have we learned about RPM?

- Adherence to monitoring is key
- Higher risk populations are most likely to benefit
- Combining biometric data sources and tailoring alerts to individual patients can improve alert accuracy
- Centralized, dedicated monitoring of alerts is important

# What do we need to understand about RPM?

- What is the optimal patient population for RPM?
- How can we ensure that RPM is equitably distributed across populations?
- What biometric information is optimal?
- How can adherence be promoted?
- Do predictive models work?
- How can alerting be personalized?
- How can RPM data be optimally integrated into clinical workflow?
- What clinical outcomes can be improved?
- Is RPM cost-effective?