

Telemedicine Technology

Remote Patient Monitoring (RPM)

Topics we'll try to cover today:

(7)

- What is Telemedicine?
- The current state of telemedicine.
- Remote Patient Monitoring (RPM) is a technology that's here to stay.
- The integrated data ecosystem / sensor fusion
- Sensor systems that BT-connect to smartphones for data collection.
- Various medical sensing systems have become affordable to most people.
- People have become accustomed to telepresence interactions.

There are several options for telehealth care:

(3)

- Talk to your health care provider live over the phone or video chat.
- Send and receive messages from your health care provider using secure messaging, email, secure messaging, and secure file exchange.
- Remote monitoring allows your health care provider to check on you at home. A device can gather vital signs to help your health care provider stay informed on your progress.

Care you can get with telehealth:

(10)

- Lab test or x-ray results
- Mental health treatment, including online therapy, counseling, med. mngmnt
- Recurring conditions like migraines or urinary tract infections
- Skin conditions
- Prescription management
- Urgent care issues like colds, coughs, and stomach aches
- Post-surgical follow-up
- Treatment and follow-up appointments for attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD)
- Physical therapy and occupational therapy
- Remote monitoring services that help you track your health goals and manage chronic conditions like diabetes, high blood pressure, and high cholesterol

The practice of telemedicine largely breaks down into three solutions: (4)

- Store-and-forward - data collection and analysis
- Remote patient monitoring (RPM) - near-live monitoring
- Remote patient monitoring (RPM) - non-live monitoring
- Real-time encounters - live interaction

Questions about telehealth care:

(4)

- What do you think about the current state and application of remote medical monitoring?
- What do you think are the issues with big health data? Are these things being addressed adequately?
- What experiences have you had meeting virtually with doctors?
- Does it work for you NOT to see a doctor in person? Why or why not?

Many vital body signs can be self-obtained:

(10)

- Close-up Examination Camera - [Video Otoscope](#)
- [Electrodermal activity monitor](#)
- Fitness tracker - [Smart Watches](#)
- Glucose monitoring - [BG Meters](#)
- Pin-prick blood sampling - [Livongo](#)
- [Dexcom](#) (non-prick) blood glucose monitoring
- [GPS-based Fitness Tracking](#)
- Grip Strength - [Digital Hand Dynamometer](#)
- Heart rhythm monitoring - [Electrocardiogram EKG/ECG](#)
- Metabolism tracking - [breath testing](#) (CO₂ + flowmeter)

Many vital body signs can be self-obtained:

(10)

- Blood Pressure & Pulse
- [Blood Pressure Cuff](#)
- [Arterial line transducer](#) [YouTube video](#)
- [Body / Limb Motion](#) - Multi-Axis Accelerometer + Recorder
- Body temperature - [Non-Contact Digital Thermometer](#)
- [Racial Differences in Detection of Fever Using Temporal vs Oral Temperature](#)
- Body weight & Composition
- [Digital Weigh Scale](#)
- With Body Composition Analyzer

Your Personal Telehealth Tools:

(4)

- What kind of devices do you have in your virtual medical tool boxes?
- How often do you use them? Which ones are the most useful?
- Does anyone feel apprehensive about the lack of security in some of these devices?
- What are the risks and dangers of this?

Has anyone else heard of this?

- There have been some interesting discoveries regarding the accuracy of certain medical measurement technologies on non-white patients. For example, blood pulse oximeters were designed in the 70's and tested on caucasians. For this, they have proven to be accurate and reliable, but in the last few years, BPO's have been used as screening devices for patients seeking treatment for COVID-19 symptoms. It seems that non-white patients generally register a higher blood oxygen concentration than is accurate. This causes them to be excluded from treatment that they may actually need. This has contributed to statistically higher non-white COVID deaths.

More vital body signs can be self-obtained:

(8)

- Motion / Movement Tracking - [Gyroscope](#)
- Pulse & O2 - [Blood Pulse Oximeter](#)
[Don't work well on people with dark skin pigment](#)
- Smart Watches - [Activity \(Fitness\) Trackers](#)
- Stress Monitor - [ElectroDermal Activity \(EDA\) Sensor systems](#)
- [Ultrasound on smartphones and Tablets](#)
- [Biomedical Sensors](#) (general search)
- Heart & respiratory diagnosis
- [Electronic Stethoscope](#)

Even more vital body signs can be self-obtained:

(11)

- Remote examination
- [Smartphone with Macro Lens for Closeup Examination](#)
- Other electronic sensors that link to smartphone
- Internal diagnosis - [Ingestible capsule cameras](#)
- Leg movements - Electrodes on muscles
- [Brain activity monitoring](#) - Electrodes on scalp connected to amplifiers
- Breathing - Belt around chest
- [Nasal air flow system](#)
- [Sleep Apnea](#) - Connected (Cellular) CPAP machines
- Audio recorder for snoring
- [Electronic Patches or Tattoos](#)

Conclusion:

(4)

- Any parting thoughts?
 - Any questions?
 - Any answers?
 - Anything else?