

# Technology in Healthcare

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# Abstract

Exploring some of the few ways technology is used in the healthcare field

Importance of each tech device

Challenges encountered with rising tech advances

Opportunity for growth in healthcare tech

# Fundamentals

Wearable  
health  
devices

Implants

Prosthetics

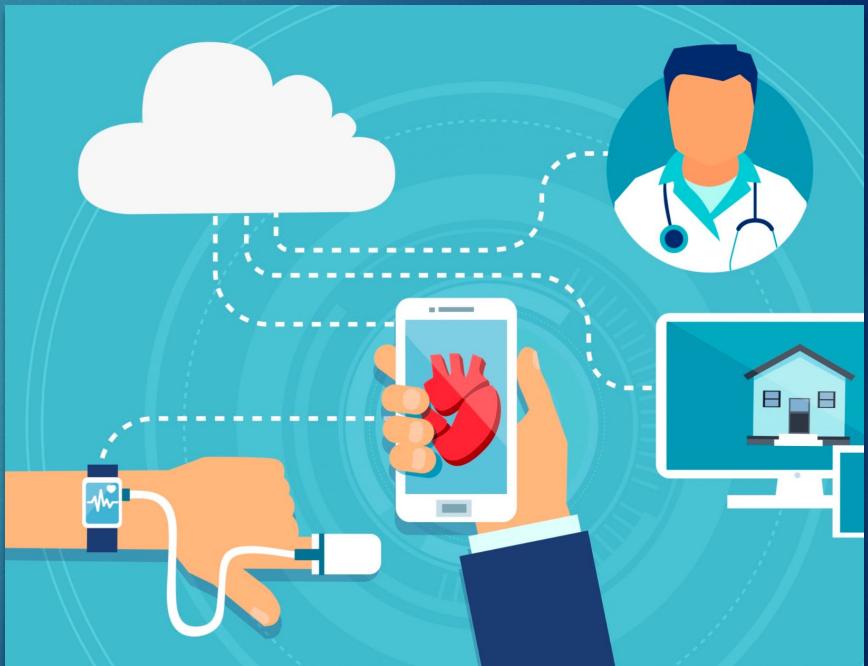
TeleHealth

Simlabs

Robotic  
Surgeries

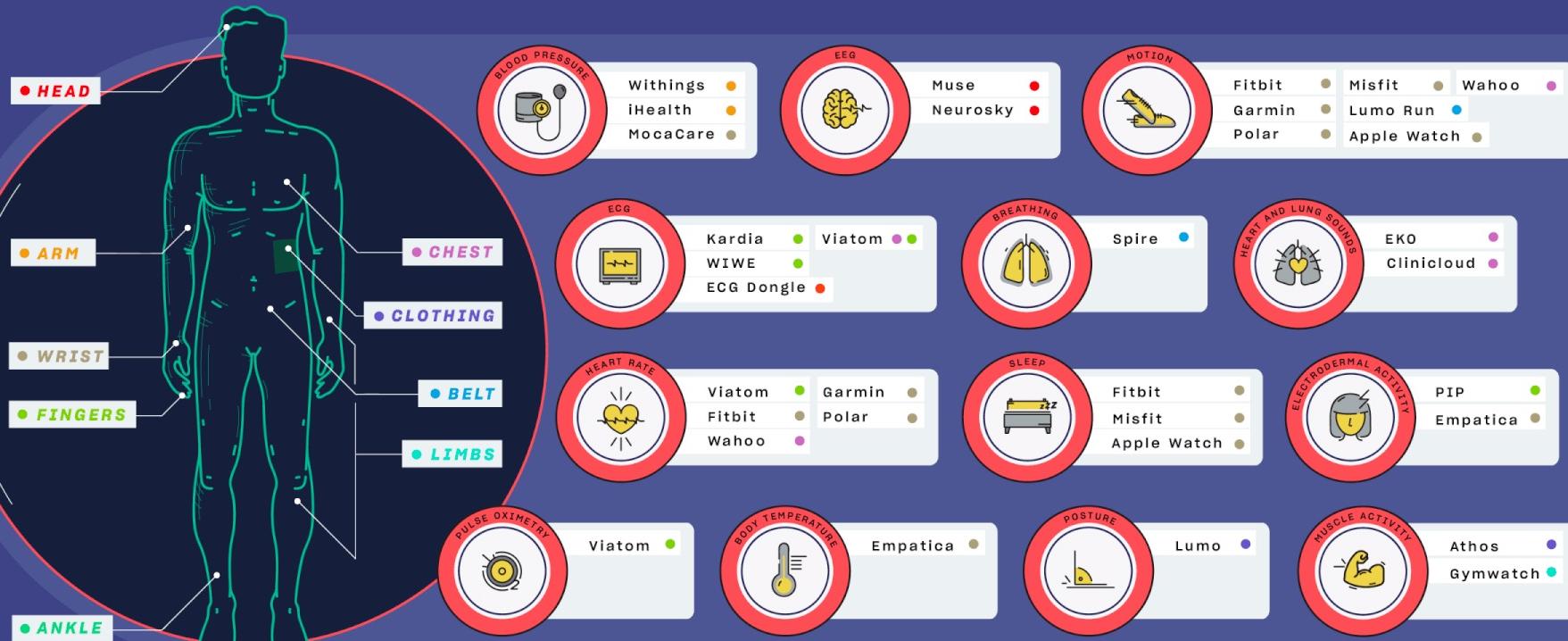
# Wearable health devices

- ▶ Helps users monitor weight, stress levels, sleep, workout sessions
- ▶ Medically prescribed wearables share results remotely with physicians
  - ▶ Withings BPM Connect
  - ▶ CardioNet's Mobile Cardiac Outpatient Telemetry
  - ▶ Phillips Wearable biosensor



# THE BODY MAP OF DIGITAL HEALTH SENSORS

TMF+  
THE MEDICAL FUTURIST



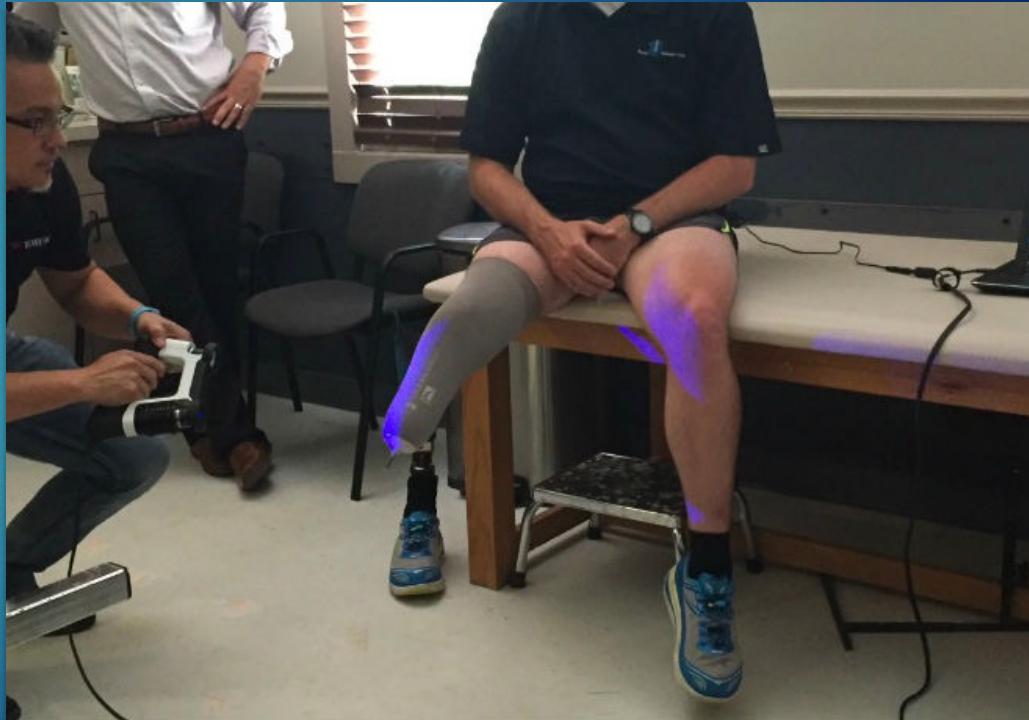
# Active Medical Implants

- ▶ Medical implants are made with synthetic materials.
- ▶ Monitor or regulate body functions.
- ▶ Some implants are inert, others are active interacting with the body.
  - ▶ Medtronic's Insertable Cardiac Monitor
  - ▶ Smart Implants
    - ▶ Pacemakers, Implantable Defibrillator, and neurostimulators



# Prosthetics

- ▶ Computer-aided design/computer-aided manufacturing (CAD/CAM) technology used to design and create models.
- ▶ Bionic limbs: microprocessors on the skin detect myoelectric signals for feeling and control.
  - ▶ Continuous transmission of wireless signals about contact, position and force to sensor.
  - ▶ Signals received by electrode within the residual limb and relayed to the brain



# Telehealth



Due to the COVID-19, telehealth use has soared to give patients more options with treatment from home.



Telehealth is use of phones, tablets, or other real-time video communicating platforms allowing patients to connect with clinicians.



# Sim Labs

- ▶ Use of manikins that mimic bodily functions and simulate symptoms of diseases
- ▶ Labs equipped with audio-video equipment, medication dispensing device, headwalls, and additional equipment.
- ▶ Manikins range in level from low-fidelity to mid-fidelity

# Robotic Assisted Surgery

- ▶ Robotic surgical systems with linear instruments and cameras used to do colon, spinal, retinal, and knee replacement surgeries.
- ▶ Results in fewer complications, less pain and blood loss, and smaller scars.



# Challenges and Opportunities



- ▶ Challenges
  - ▶ Cybersecurity
  - ▶ Interoperability
  - ▶ Ethical views
- ▶ Opportunities
  - ▶ Precision medicine
  - ▶ AI based work optimization
  - ▶ Digital therapeutics

# Resources

<https://www.businessinsider.com/5-examples-wearable-healthcare-devices-2021-5> (#5)

<https://www.himss.org/resources/endless-possibilities-wearable-technology-healthcare> (pic #5)

<https://www.embs.org/about-biomedical-engineering/our-areas-of-research/wearable-implantable-technologies/> (#7)

<https://www.nuffieldbioethics.org/assets/pdfs/Medical-implants.pdf> (#7)

<https://www.medicaldevice-network.com/analysis/audism-cochlear-implants/> (#7)

<https://livingwithamplitude.com/article/the-future-of-prosthetic-technology-amputees/> (#8)

[https://www.opcareers.org/what\\_is\\_op/technology/](https://www.opcareers.org/what_is_op/technology/) (#8)

<https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0268> (#9)

<https://www.healthysimulation.com/manikin/> (#10)

<https://www.therobotreport.com/surgical-procedures-get-robotic-assistance/> (#11)

<https://www.medicaldesignandoutsourcing.com/robotics-rise-to-healthcare-challenges/> (#11)

<https://www.managedhealthcareexecutive.com/view/biggest-growth-opportunities-healthcare> (#11)