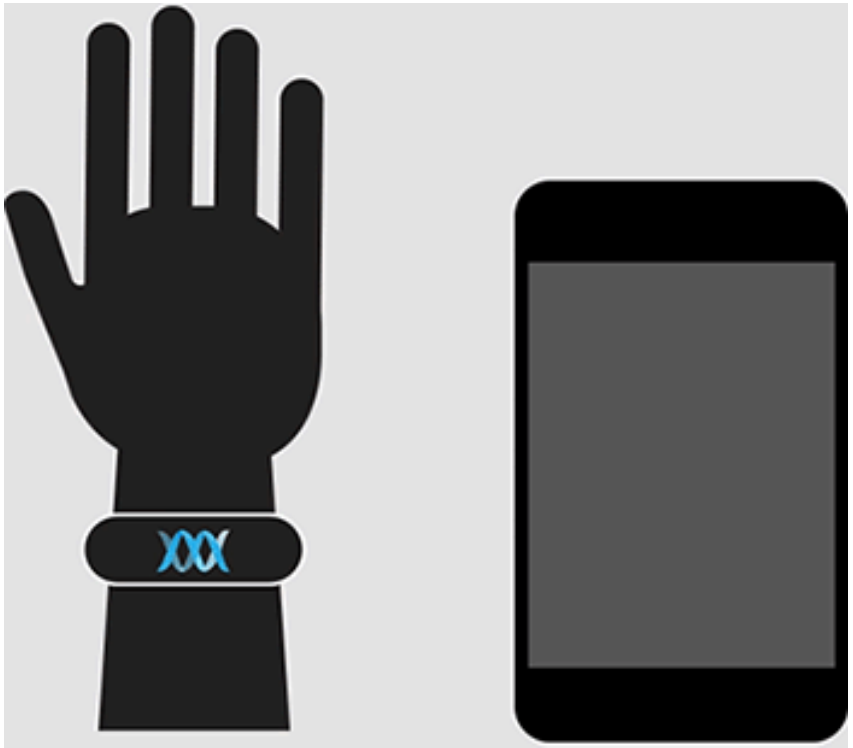
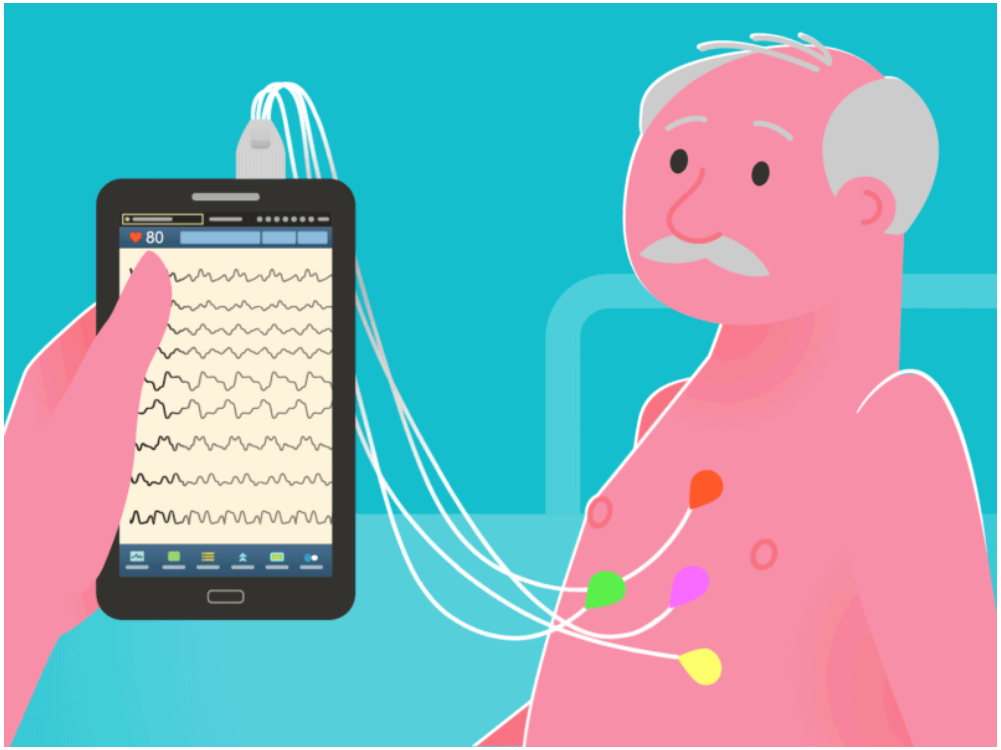
MOBILE DEVICES, APPS, AND WEARABLES FOR HEALTHCARE





COMPILED BY HOWIE BAUM

WHAT IS MOBILE HEALTH TECHNOLOGY?

It is Medical and public health practice supported by mobile devices, such as smartphones, tablets and other mobile devices to deliver health care and preventive health services.

87 percent of physicians in the U.S. already use mobile health technology or mHealth to provide patient care.

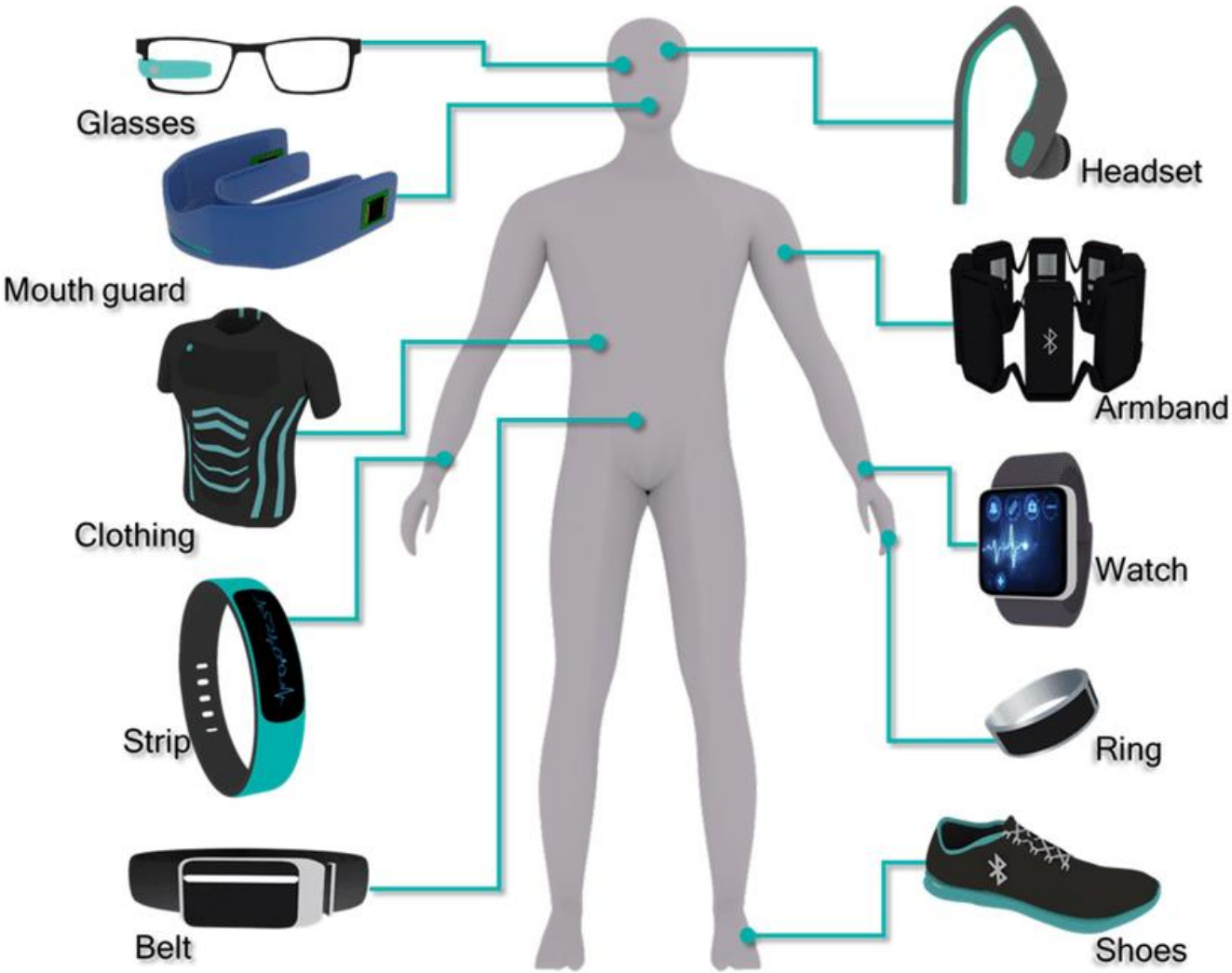
INTERESTING STATISTIC: 35% OF CONSUMERS USE MOBILE APPS ON THEIR SMART PHONES TO SCHEDULE APPOINTMENTS.

THE LESSONS FOR WEARABLE COMPUTING:

The physical wearability will be determined by:

- **Fashion**
- **Comfort**
- **Human anatomy**

Their use will gradually become simplified as people become more acquainted with computers.



WEARABLE HEALTH CARE DEVICES BY THE NUMBERS:

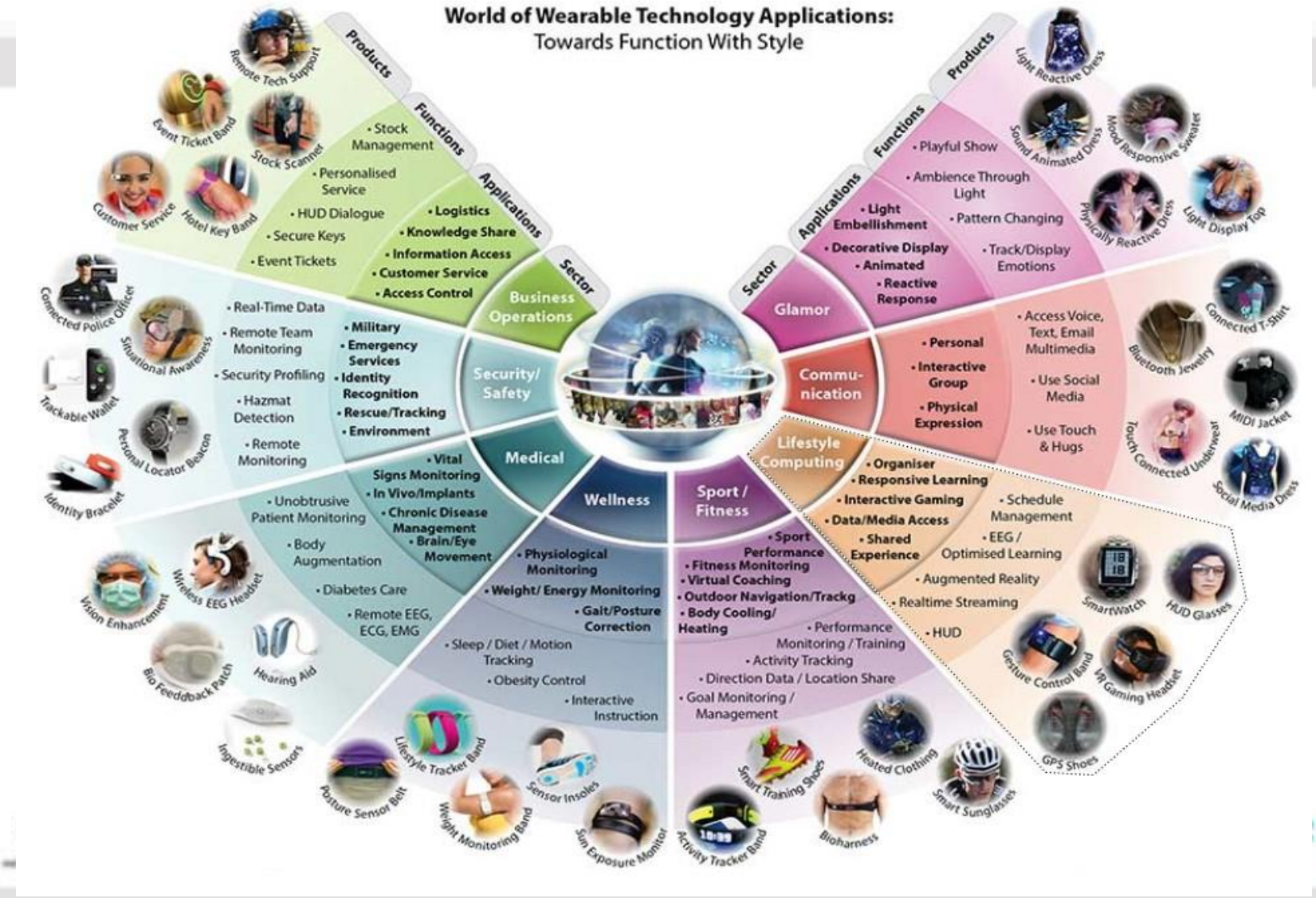
1.3 million lives saved by wearables by 2020 — Swiss firm Soreon Research

$200 billion — Estimated global health cost savings from wearable tech over the next 25 years — Deloitte.

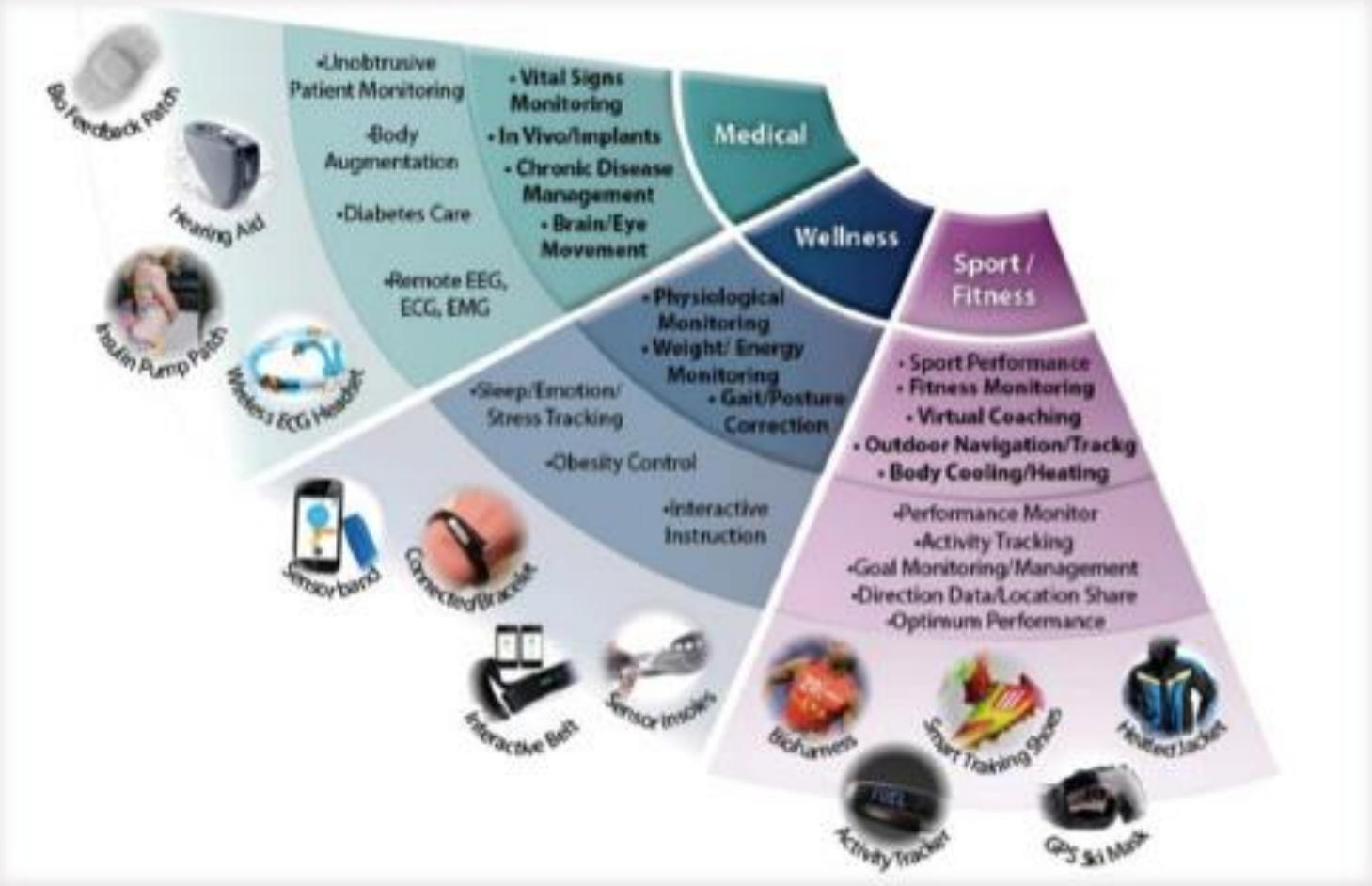
50% - Projected reduction in hospitalizations through use of home monitoring devices of chronic diseases — California Telehealth Resource Center.

$56.8 billion market value market projection for wearable tech by 2025 — MarketsandMarkets.

WEARABLE ELECTRONICS BY SECTOR



FOCUSING ON HEALTH CARE



TYPES OF BODY AND OTHER MEASUREMENTS

- Barometric altimeter
- Blood Oxygen Level
- Blood Pressure
- Brain Activity – Electro-encephalogram – EEG)
- Cholesterol monitoring with an optical bio-sensor
- Eye Tracking
- Glucose Measurement
- Heart Tracking – Electro-cardiogram – ECG)
- Hydration
- Ingestion (Swallowing a test capsule)
- Location – Global Positioning Satellite – GPS)
- Movement - Accelerometer
- Muscle Activity – (Electro-myography - EMG)
- Posture
- Pulse
- Respiration (Breathing)
- Skin Conduction (amount of sweating)
- Sleep quality
- Temperature

USES FOR MOBILE DEVICES AND APPS

Information Management

Write notes

Dictate notes

Record audio

Take photographs

Organize information and images

Use e-book reader

Access cloud service

Time Management

Schedule appointments

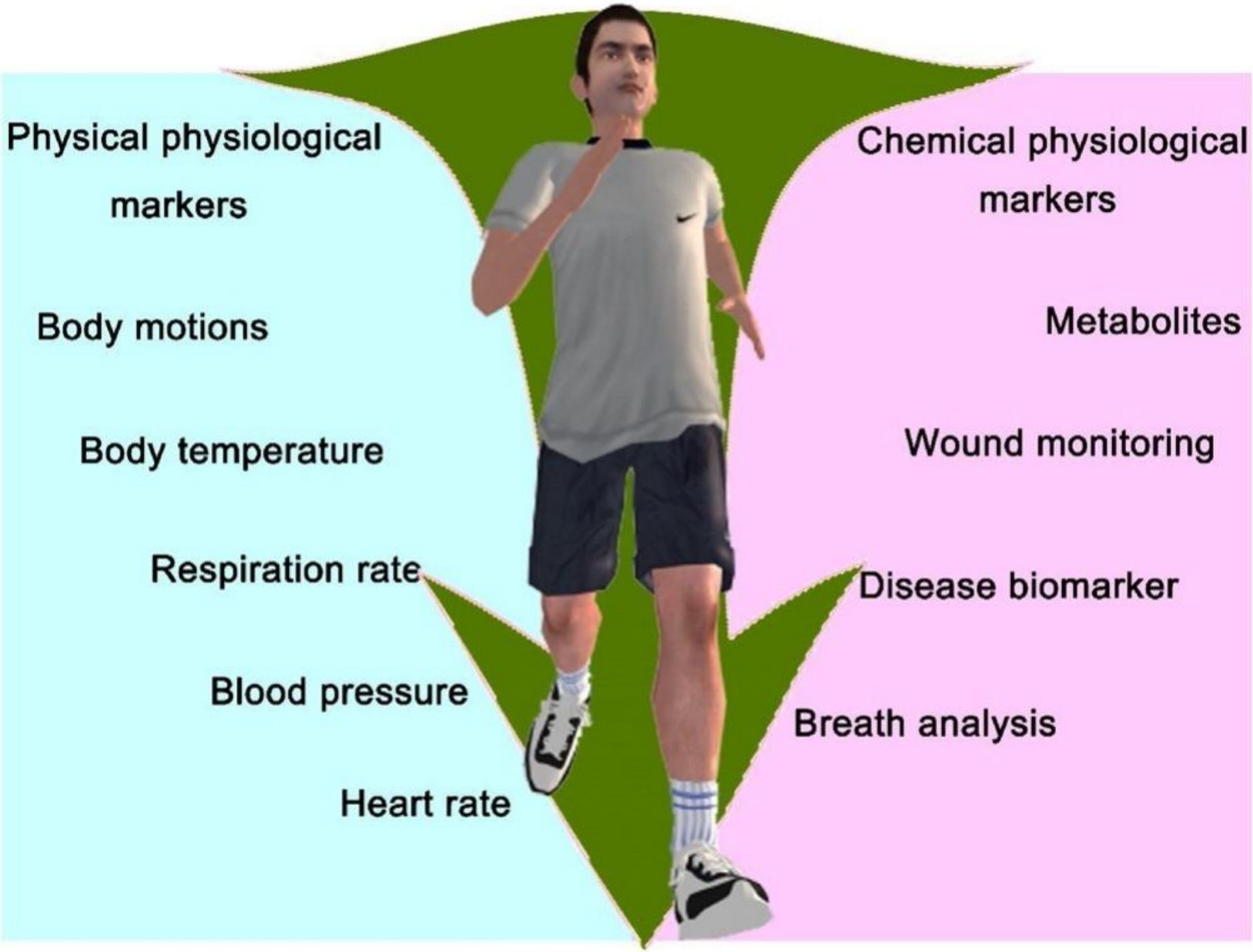
Schedule meetings

Record call schedule

- **Communications and Consulting**
- Voice calling
- Video calling
- Texting
- E-mail
- Multimedia messaging
- Video conferencing
- Social networking

- **Reference and Information Gathering**
- Medical textbooks
- Medical journals
- Medical literature
- Literature search portals
- Drug reference guides
- Medical news

Wearable Healthcare Devices



Fully Integrated
Wearable Healthcare Systems

BENEFITS OF WEARABLE TECHNOLOGY

Educate and empower patients to take control of their health

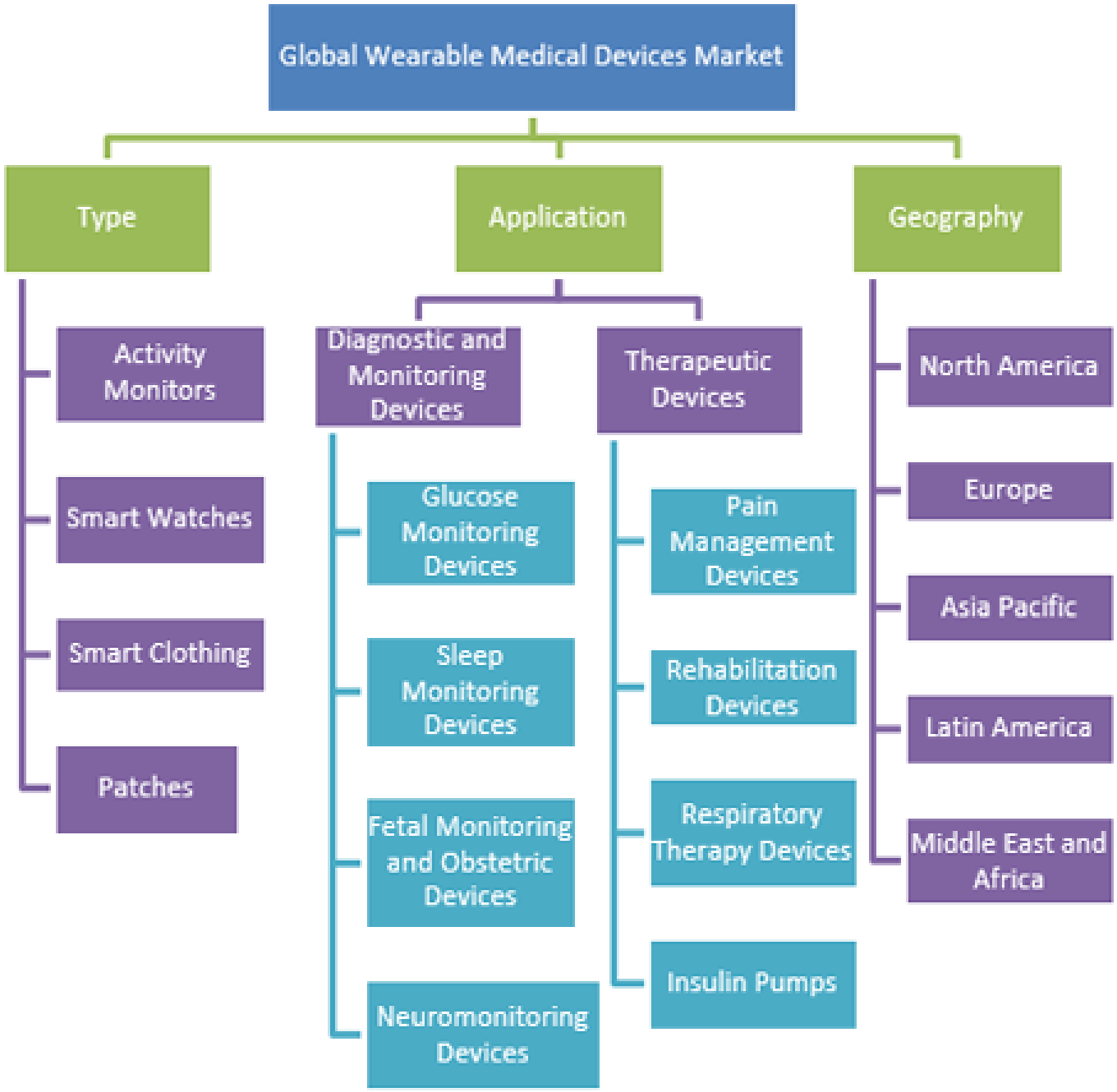
Help physicians & patients monitor & diagnose disease

Assist in medical procedures

Allow patients to control & manage their pain

Make personal fitness more fun

Global Wearable Medical Devices Market Segmentation



Major factors driving growth of wearable health monitoring devices market

APPS OR APPLICATIONS FOR HEALTHCARE WEARABLES

MOBILE / PORTABLE DEVICES –
A general term for any type of smaller portable computer or Smartphone that has a touch screen on it.

TABLET COMPUTERS usually come in two sizes – 7 or 10 inch, as measured on a diagonal on the screen, as shown:

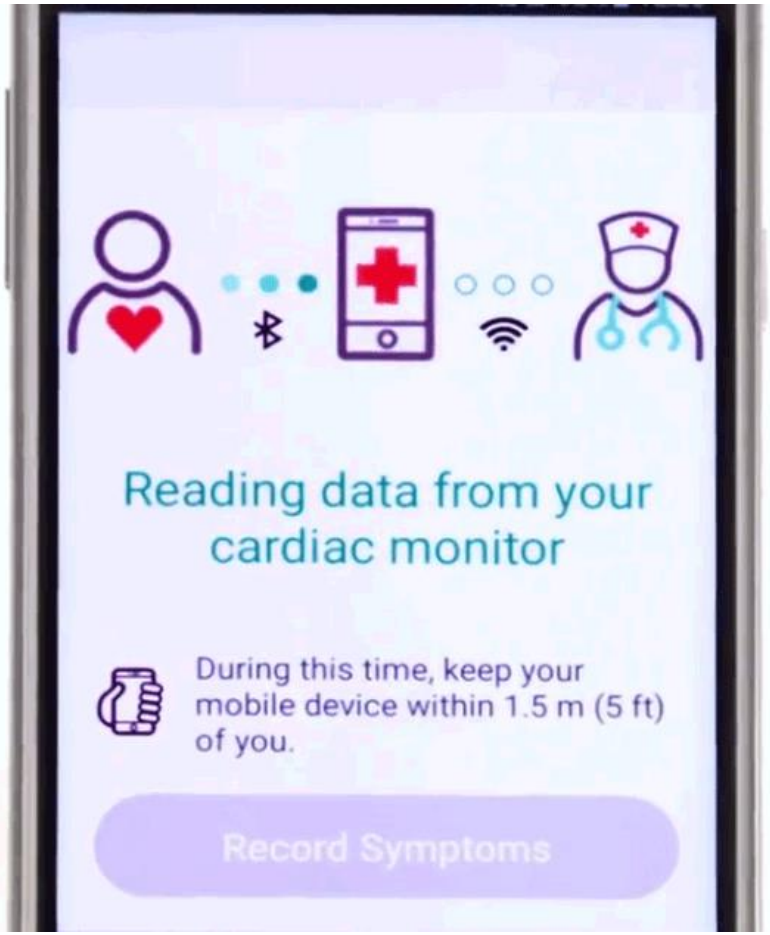
The most obvious difference is that tablet computers are touch-sensitive, have optional keyboards, but don't have a CD/DVD drive, or a touchpad.

THE TERM APP STANDS FOR AN APPLICATION

AN APP IS A COMPUTER SOFTWARE PACKAGE OR PROGRAM THAT PERFORMS A SPECIFIC FUNCTION DIRECTLY FOR AN END USER

Health and medical apps are application programs that offer health-related services for smartphones, tablet PCs, Wearable watches, etc.

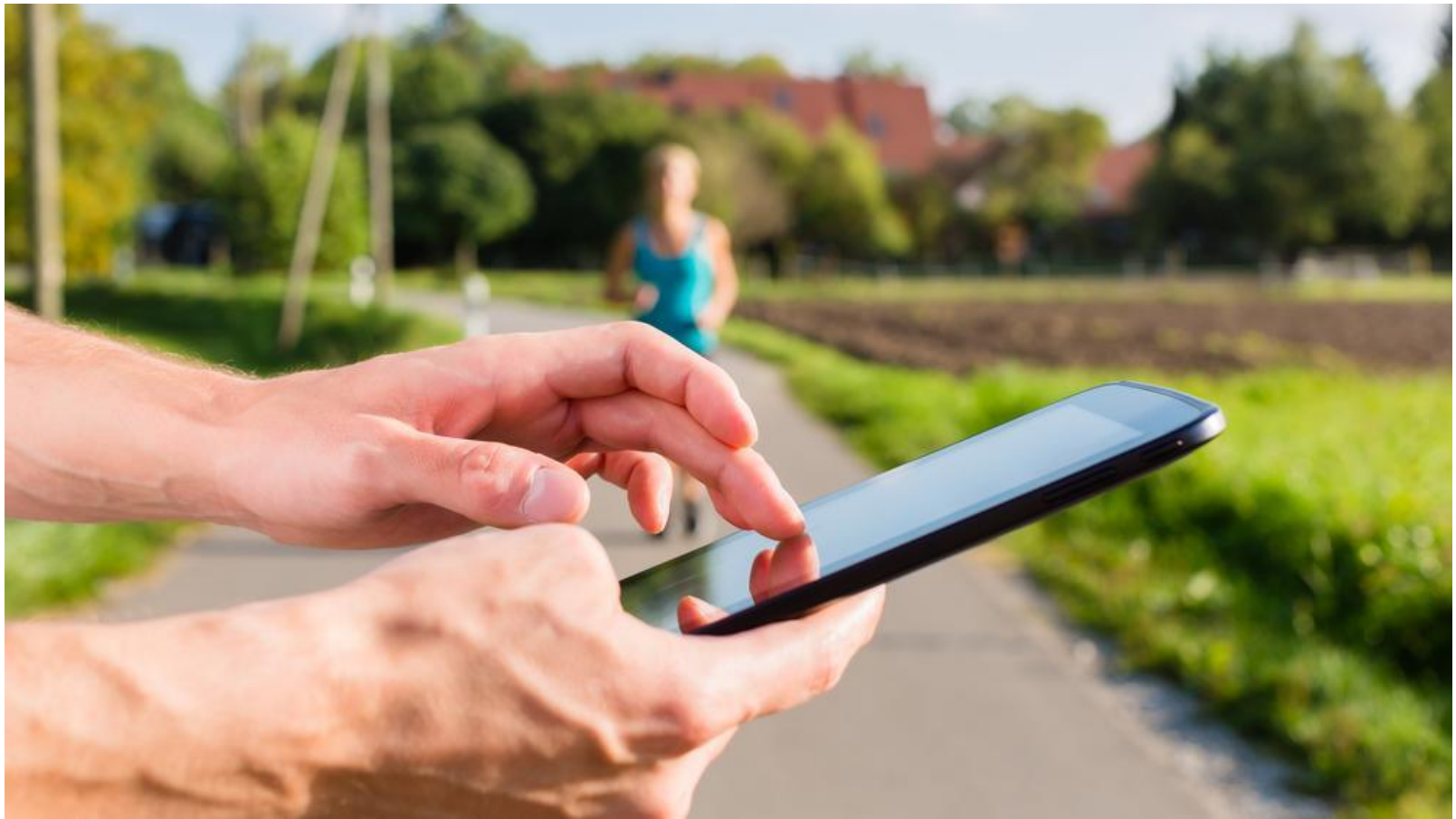
Because they're accessible to patients both at home and on-the-go, health apps are a part of the movement towards **mobile health (mHealth)** programs in health care.



General Health and Fitness Apps:

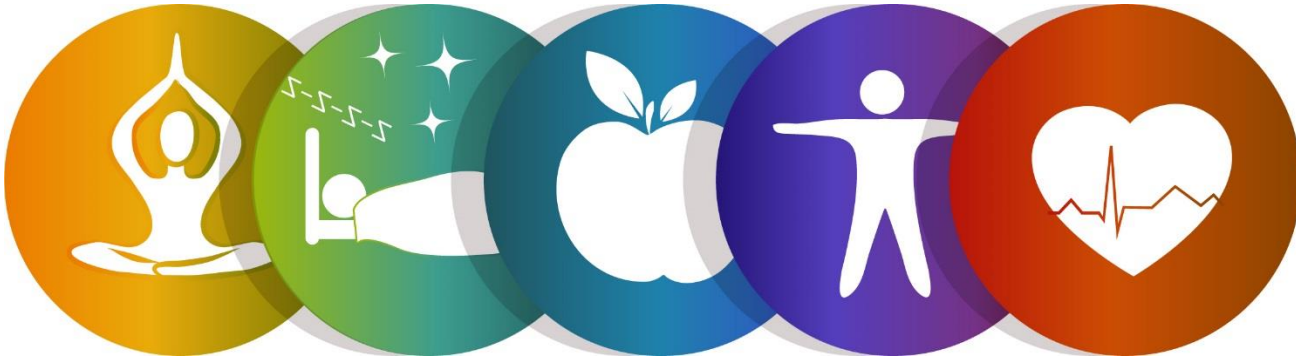
These apps constitute almost 75 percent of MMAs (Managed Medical Assistance) found on app stores.

These are related to nutrition, health tracking, fitness, and weight loss, and work with wearable technology devices such as a “FitBit”, Smart Watch, and other types of health monitors.



The most popular categories of health and wellness apps include:

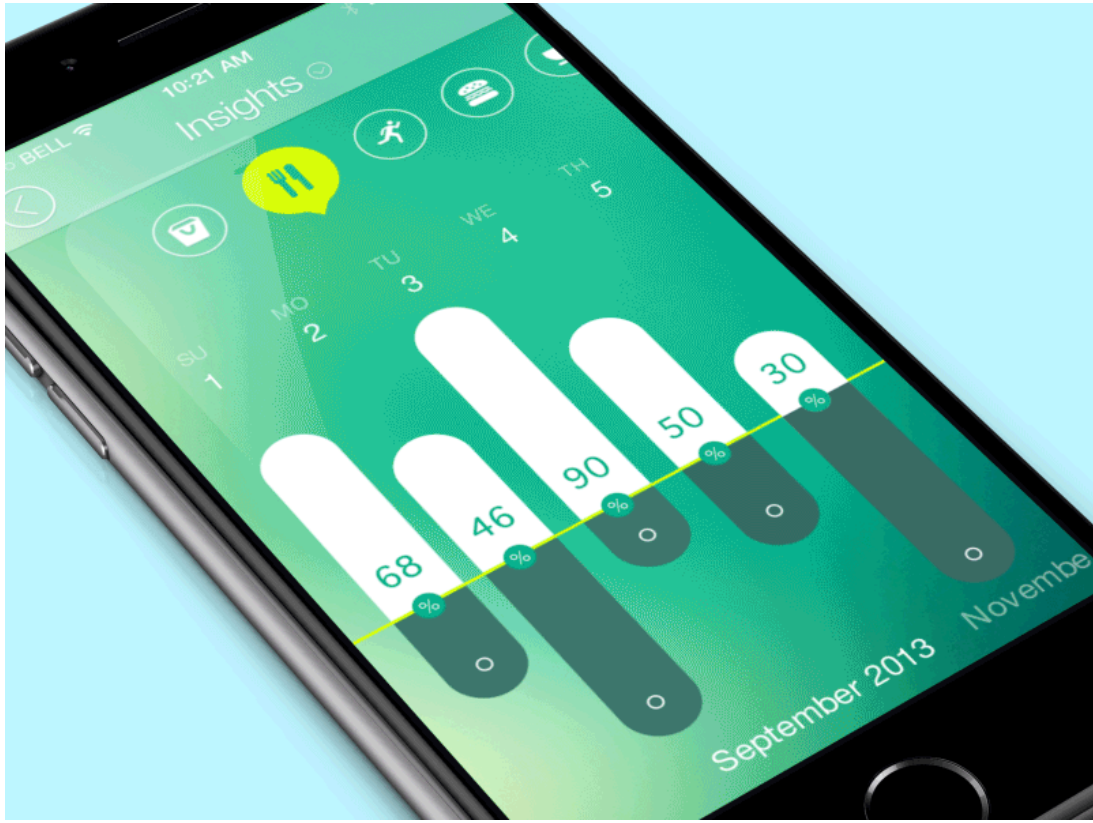
- Sports and fitness activity tracking
- Diet and nutrition
- Weight loss coaching
- Pharmacy
- Sleep cycle analysis



- Stress reduction and relaxation
- Meditation
- Medical advice and Patient & Caregiver communities
- Menstrual period tracking
- Pregnancy
- Hospital selection and Physician appointment management

THERE IS A RANGE OF GOOD OPTIONS A DIET APP CAN PROVIDE:

- Healthy Food Suggestions
- Water Consumption
- Food Logger
- Carbs Control/Weight loss
- Diet Planning
- Shopping List Organizers
- Calorie counter based on physical activity & food intake.
- How to hire a Nutritionist or a Dietitian



Medical and Health apps for smart phones and/or tablets, can be found mainly on the Apple or Android websites, which are located in the "Cloud".

APPLE: For Apple smart phones, tablets, or the Apple Watch, all apps can be found at the Apple iTunes Appstore at https://itunes.apple.com/us/genre/mac/id39?mt=12

THIS YEAR THERE ARE 48,608 APPLE HEALTHCARE APPS !!

THE ANDROID OPERATING SYSTEM IS A PRODUCT OF GOOGLE AND ALL OF THE REGULAR, HEALTH, AND MEDICAL APPS ARE AVAILABLE AT THE GOOGLE PLAY STORE.

In early 2021, there are 47,140 Android Healthcare apps !!

To go there on the Internet, the link to go to the Google PlayStore for all of their apps is https://play.google.com/store/apps

To just get the Medical & Health info, go to:

https://play.google.com/store/search?q=medical+and+health+apps

Google play

THE TOP CATEGORIES OF MHEALTH APPS AS DEFINED BY DOWNLOADS COMPLETED ARE:

- Weight loss (50 million)
- Exercise (26.5 million)
- Women’s health (10.5 million)
- Sleep & meditation (8 million)
- Pregnancy (7.5 million)
- Tools & instruments (6 million)
- Others (18 million)

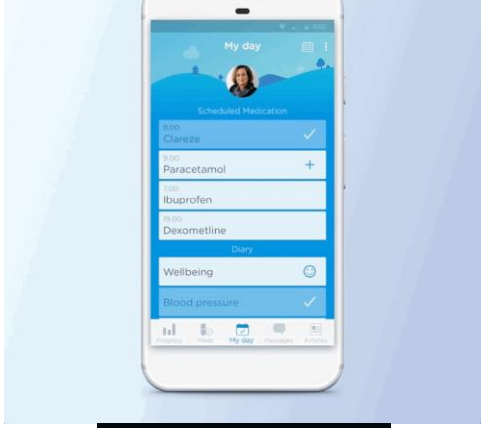
According to Research and Markets, the global market for mobile health applications in 2019 was valued at $40.7 billion and is expected to reach $102.35 billion by 2023.

MEDICAL APPS

Depending upon how they work, MMAs (Mobile Medical Apps) can be broadly divided into 4 categories:

1) Chronic Care Management Apps: These include apps to manage blood pressure, cancer care, diabetes care, breathing issues, mental health, and other illnesses.

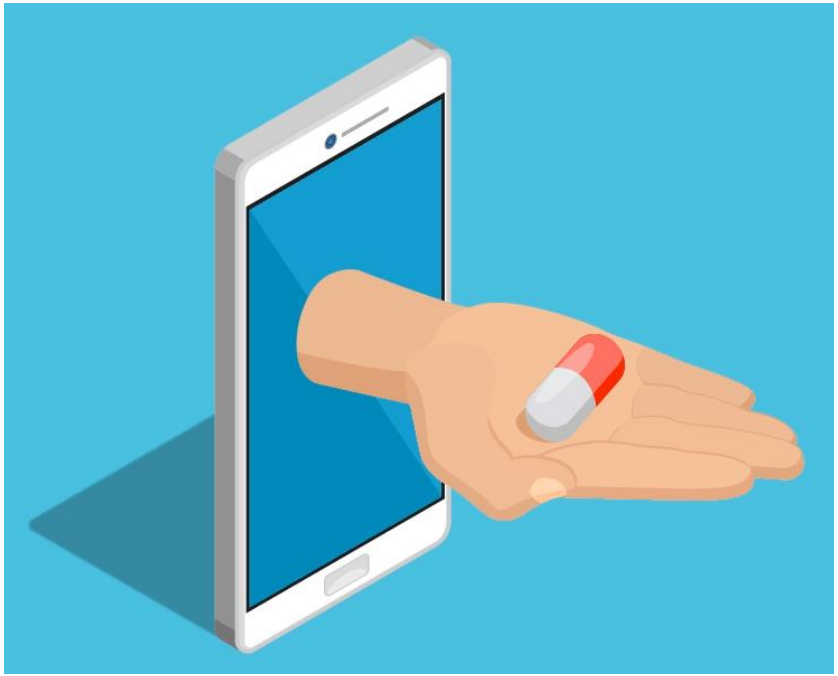
2) Medication Management Apps: These apps help in keeping track of medicine intake, such as Insulin, to ensure proper dosing at required intervals.



3) Personal Health Record Apps: These applications allow patients to make appointments for regular care or consultations, and store their medical conditions data, history, allergies, etc.

4) Women's Health Apps: This segment includes apps for pregnancy, fertility, breastfeeding, etc.

Apps to remind you to take your medication and to be sure and take the correct one.



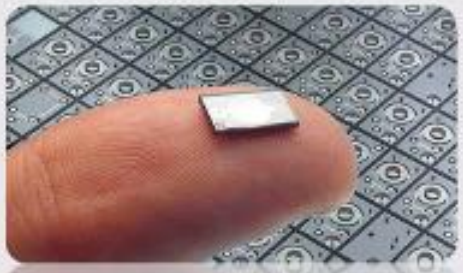
PERSONAL DRUG DOSAGE TRACKING

Wearable drug reminding devices

- ✓ Haptic, visual or sound drug reminder
- ✓ **Drug taking devices** for the elderly

Wearable tracking and healing devices

- ✓ **Insulin monitoring** – direct injection by the wearable
- ✓ Baby care – fever, pain, antibiotics…



Insulin Nano-pump
with MEMS

Apps to remind you when to take your pills

Sproutling wearable baby monitor

INTERCONNECTION OF WEARABLES

Computers, smartphones, tablets and the Cloud

Apps

Wearables

Google Glass

Polo Tech Shirt

Jawbone

RunScribe

Apple Watch

Sensor-Enabled Wearable Attributes

Hands-Free

- Voice / gesture control

Always-On

- Low power consumption
- Instant wake
- Background working / sensing

Environment -Aware

- GPS
- Accelerometer
- Compass
- Camera
- Microphone
- Other Sensors

Connected

- Wi-Fi
- 3G / 4G /5G
- Bluetooth
- NFC

Attention-Getting

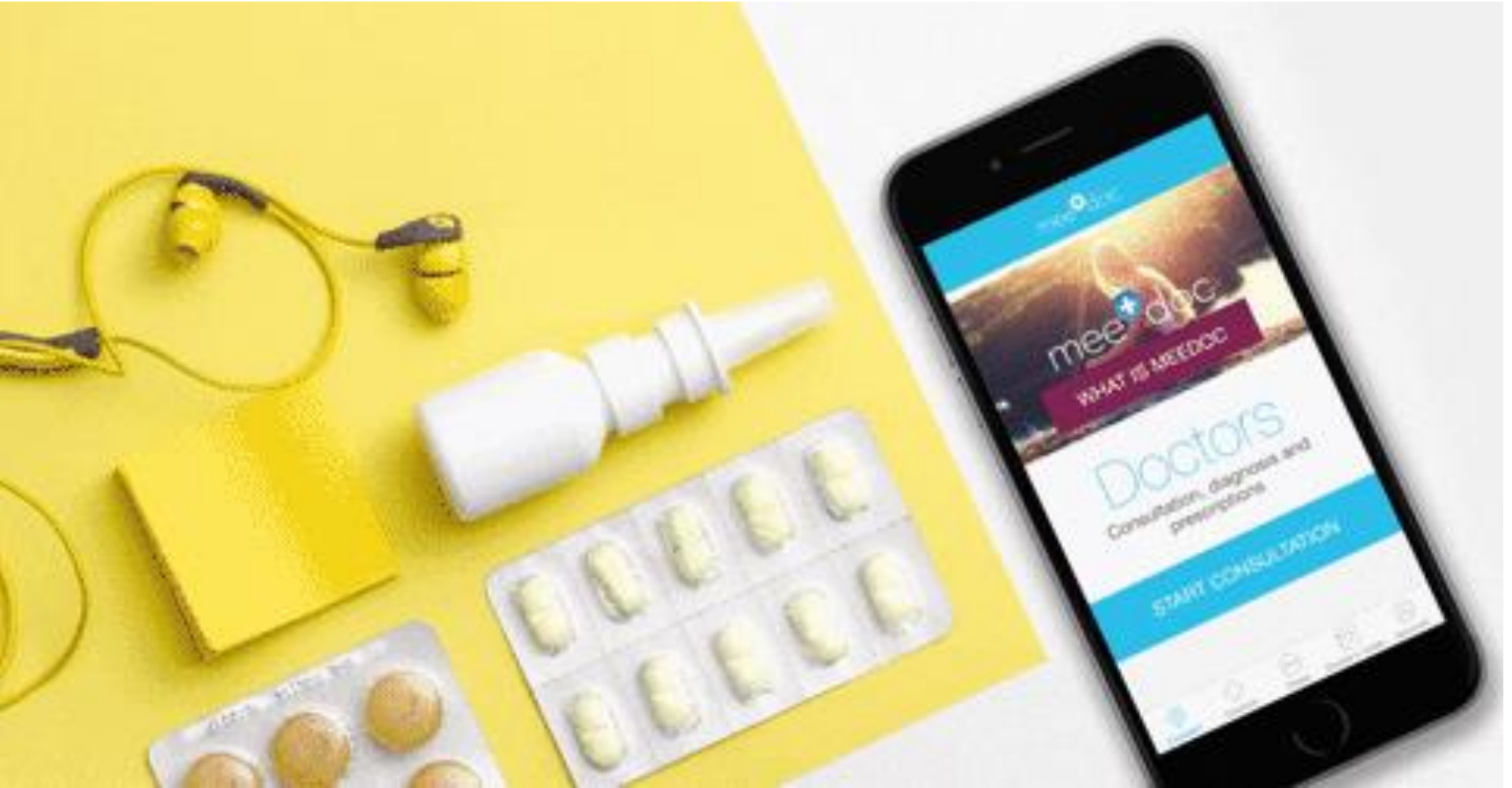
- Less distracting when receiving alerts / reminders / messages

Development Platform

- 3rd party apps
- API partners
- Accessories

Source: MIT, KPCB.

MOBILE HEALTH DEVICES



WHAT KINDS OF MOBILE WEARABLE DEVICES CAN BE USED TO IMPROVE A PERSON'S HEALTH AND/OR A MEDICAL CONDITION ?

There are 2 main types of these devices - those used for health conscious consumers and those for medical reasons.

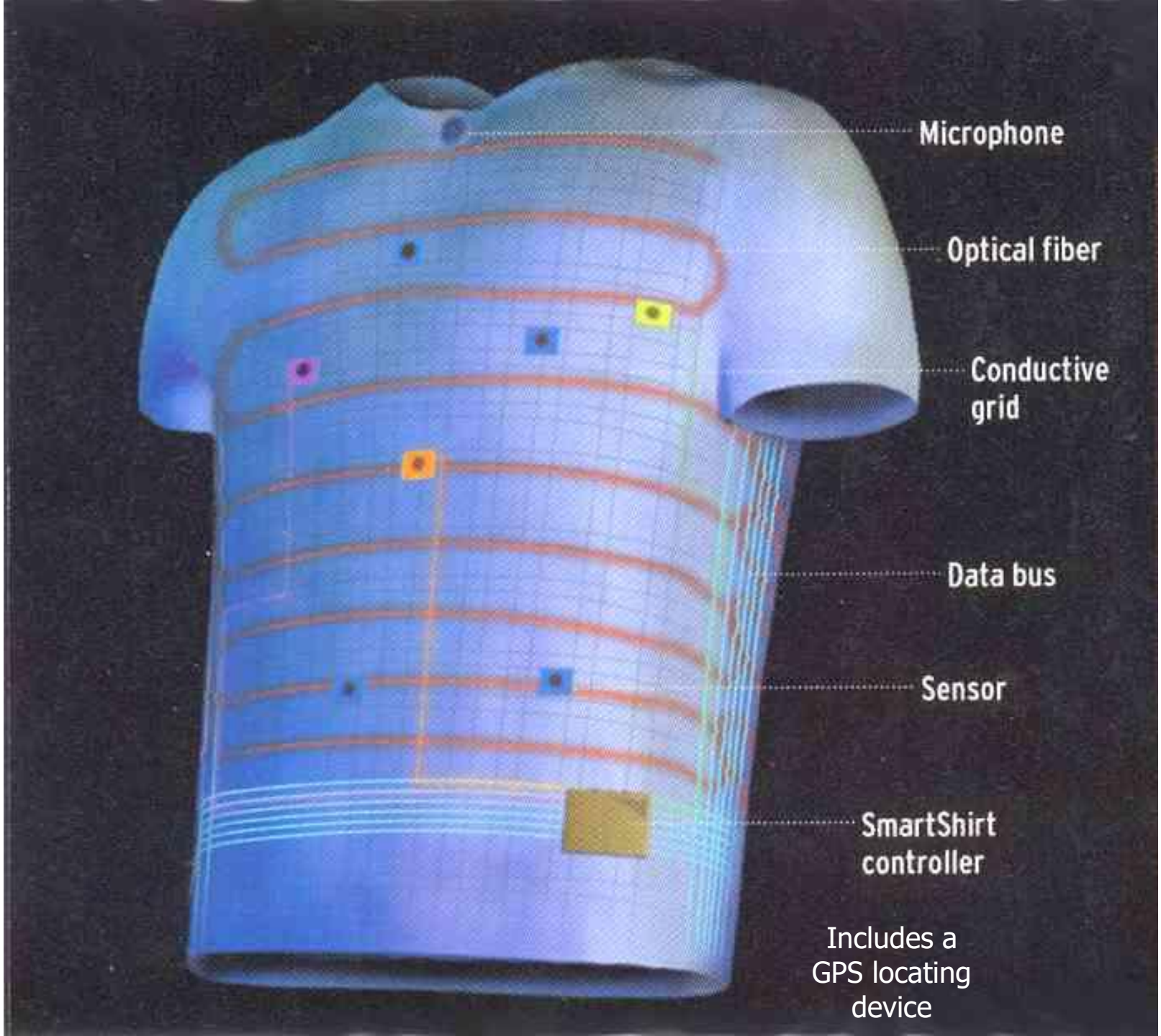
1) Health Wearables - There are the commercially sold health wearables like **FitBit**, that track the user's everyday activities, exercise levels and vital statistics, **the Apple watch**, as well as **smart phone apps, and Chatbots, such as Alexa on the Amazon Echo and Dot, Siri, Cortana, etc.**

2) MEDICAL DEVICES

The other types are for those who need medical monitoring or assistance like wearable glucose or heart rate monitors.

<u>Pulse oximeter</u> is a noninvasive device used for monitoring a person's **blood oxygen saturation (SO_2).**

DiaMon Tech has developed a non-invasive **glucose monitoring device**, based on a person's sweat.


Microphone
Optical fiber
Conductive grid
Data bus
Sensor
SmartShirt controller
Includes a GPS locating device

A SINGLE-CHIP ENCRYPTED WIRELESS 12-LEAD ECG SMART SHIRT FOR CONTINUOUS HEALTH MONITORING

FITNESS TRACKING AND IMPROVEMENT

Hand-worn and body-worn

- Jawbone, Apple watch, Polo Tech Shirt

Tracking

- Personal physiological and biological parameters, activity and performance

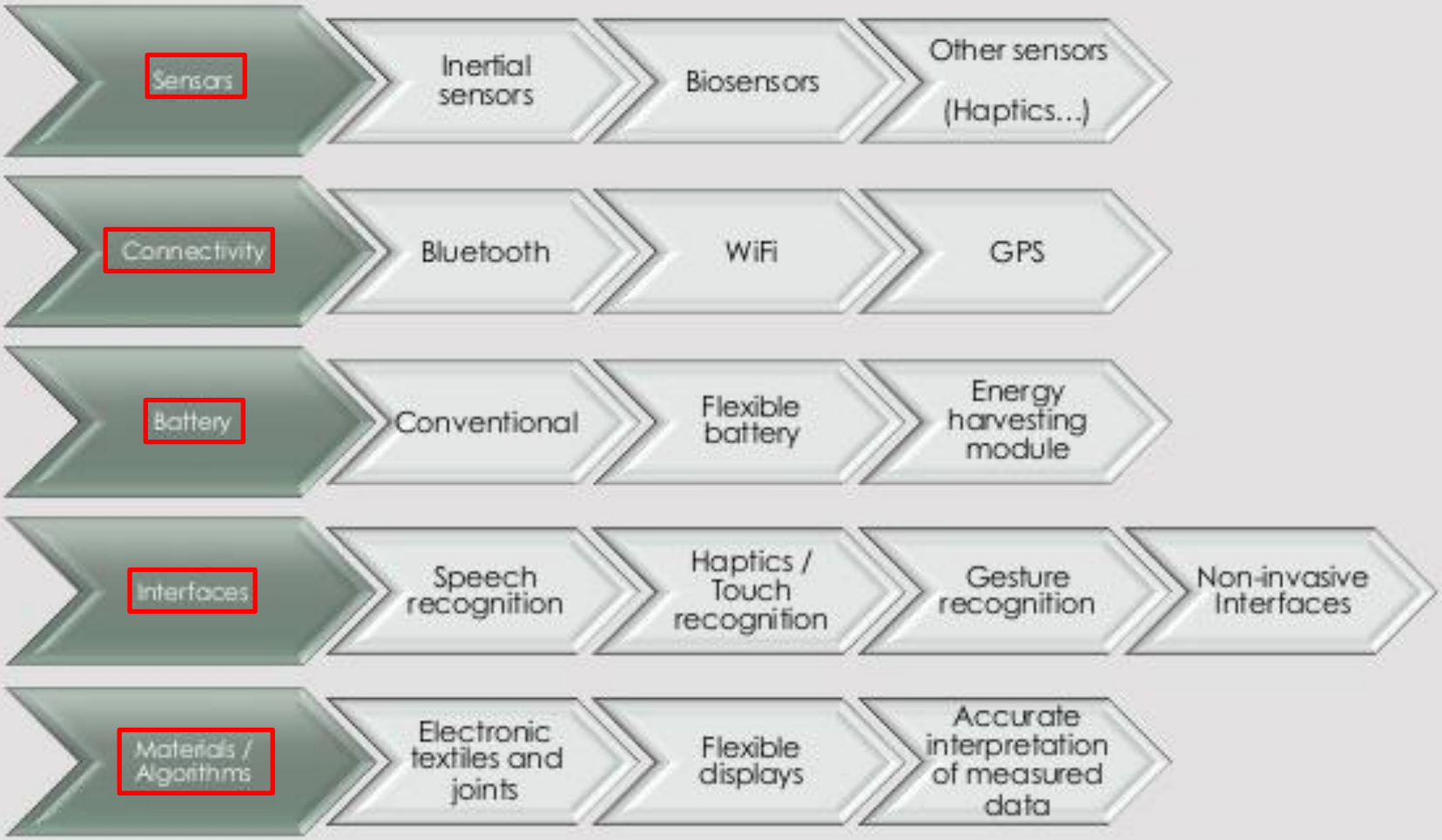
Data collected

- **Heart rate, stress, obesity, sleep, calories, 0_2 saturation, blood pressure**

Virtual coaching

- Apps

COMPONENTS OF WEARABLES



INERTIAL SENSORS TO TRACK BODY MOVEMENT

Nike FuelBand

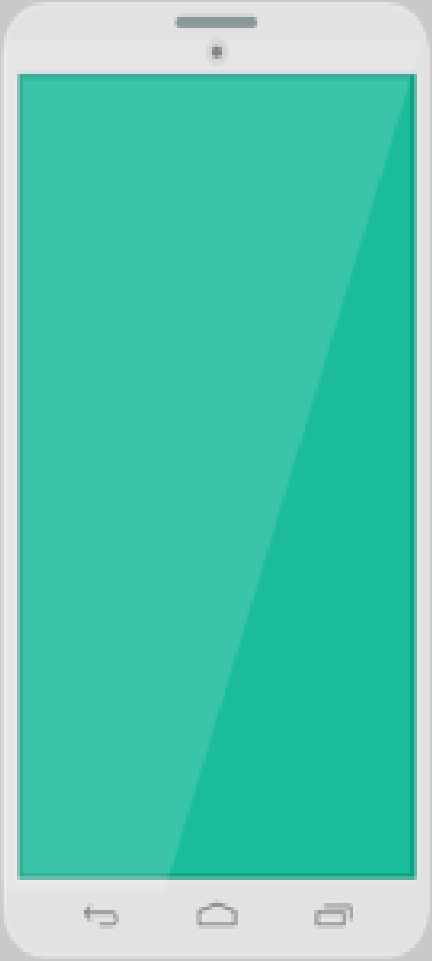
FitBits

Basis

Jawbone

CELL PHONE APPLICATIONS FOR HEALTHCARE AND MEDICAL USES

Different Kind Of Sensors Available On A Smartphone



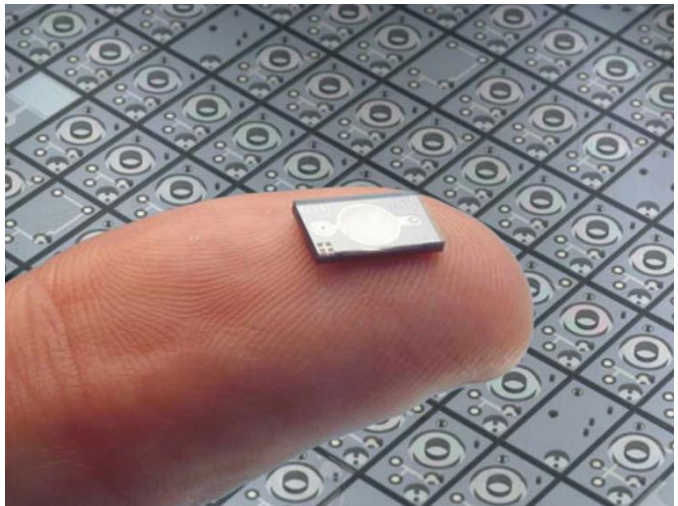
- Barometer
- Thermometer
- Pedometer
- Heart Rate Monitor
- Fingerprint Sensor
- Accelerometer
- Gyroscope
- Magnetometer
- Proximity Sensor
- Light Sensor
- Microphone

A MEMS (microelectromechanical system) is a miniature machine that has both mechanical and electronic components.

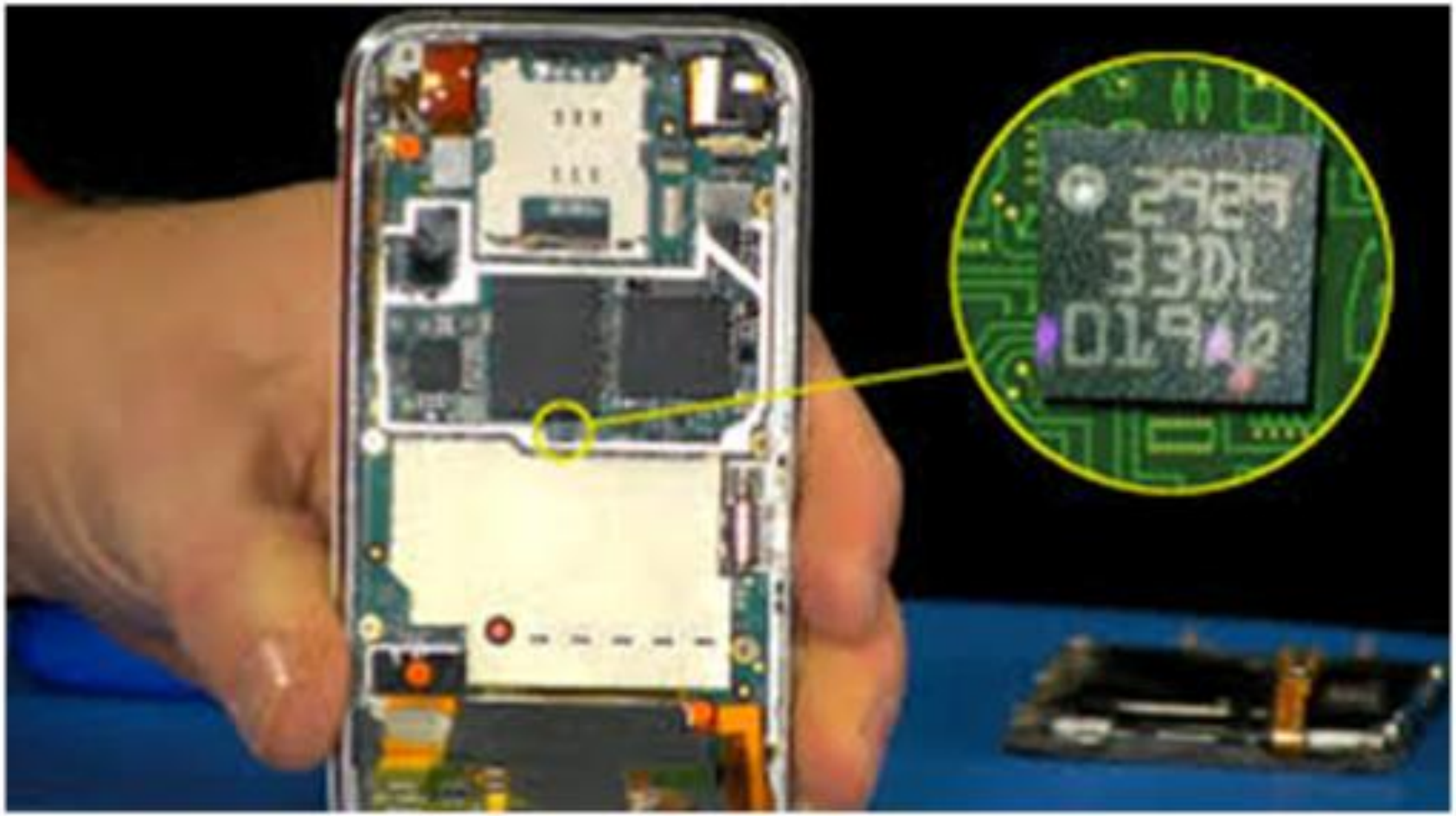
The physical dimension of a MEMS can range from several millimeters to less than one micrometer, a dimension many times smaller than the width of a human hair.

The MEMS shown below, at right, is actually a disposable, wearable insulin pump for managing diabetes.

The chip is a stack of 3 layers bonded together: a silicon on insulator (SOI) plate with micro-machined pump structures and two silicon cover plates with through-holes. A piezoelectric actuator on the chip moves the membrane in a reciprocating movement to compress and decompress fluid in the pumping chamber.



THE ACCELEROMETER IN YOUR SMART PHONE LETS YOU TURN THE PHONE 90 DEGREES AND THE PICTURE ROTATES WITH IT. THE DEVICE IS AN EXAMPLE OF AN AMAZING SMALL PART CALLED A MEMS (MICROELECTRICALMECHANICAL SENSOR)



HANDHELD ULTRASOUND SYSTEM

Wireless and app-based, Clarius delivers fast imaging and sharp detail at the point of care.

eFAST (extended Focused Assessment with Sonography in Trauma) can do a variety of Ultrasound exams with the Clarius handheld ultrasound scanner.

Breath Analyzer for Smartphone

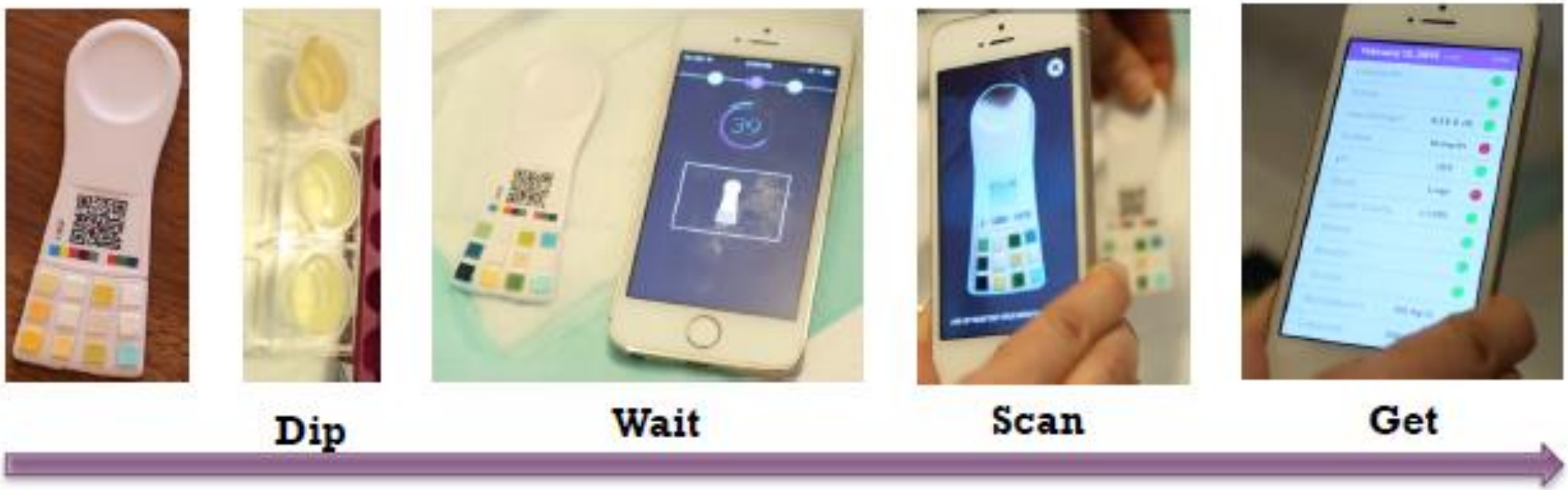
- FDA registered fuel cell sensor
- Plug into to headphone jack
- Learn drinking habits, enhance lifestyle
- $49.9 to $99.9

Mobile Ultrasound Device

- Until now, 60% of the world did not have access to ultrasound.
- Mobisante- the world's first smartphone-based ultrasound imaging system, the MobiUS™ SP1 ultrasound system.
- This device has been approved by the FDA

Urine Test on Smartphone

- Scanadu Scanaflo
  - 99¢ for the apps, $20 for a packet of strips
  - Test for levels of glucose, protein, leukocytes, nitrites, blood, bilirubin, urobilinogen, microalbumin, creatinine, ketone, specific gravity, and pH in urine
  - Use color to give feedbacks: Green = normal, red = abnormal
  - Urine tract infection, kidney disorders, pregnancy evaluation, etc



HEALTHY.IO

It transforms the smartphone camera into a clinical grade medical device by combining AI and machine learning (ML) for colorimetric analysis.

The company’s first product is a **smartphone-powered urinalysis** device cleared by the FDA and European regulators as equivalent to lab-based testing.

Dario™, a cloud-based mobile **Diabetes management platform**, is the next generation in advanced Diabetes self-management.

https://www.youtube.com/watch?reload=9&v=IuDkX41hpNM&feature=emb_logo 2.3 minutes

CUE

This state-of-the-art mobile medical lab **can test samples of blood, saliva**, and instantly obtain molecular-level data about one of 5 healthy lifestyle indicators:

- Vitamin D
- Influenza
- Testosterone
- Fertility
- Inflammation.

Cue analyzes and zaps data to a smartphone app via Bluetooth, and offers exercise, food, and sleep recommendations.

CLINICLOUD

It is an infrared, touchless thermometer and digital stethoscope that syncs with your phone to gather the same information your pediatrician would.

You can determine if your little one has pneumonia or gas without disturbing your baby, leaving your house, or making a copay.

CliniCloud partners with "Doctors On Demand" for their expert analysis, so you can give your pediatrician another pediatrician's opinion when you bring your child in.

KINSA SMART THERMOMETER

Just fire up the app, plug the thermometer into your headphone jack, stick it under your kid's tongue (or in their … you know) and get a reading in less than 10 seconds.

It's virtually unbreakable and compatible with iOs and Android devices.

The app can track, record, and save symptoms and medication information for up to 8 profiles.

NIMA

In just 2 minutes, Nima can **test any food sample and tell you if specific allergens are detected.**

Everything is trackable via a mobile app.

Withings Wireless Blood Pressure Monitor

With this home **blood pressure kit**, you can track systolic and diastolic pressure and heart rate, get instant feedback, sync with one of multiple partner apps, and easily download or share data with your doctor.

CELLSCOPE OTO HOME

Quickly and easily **capture ear images** to determine whether your child has an infection, allergies, or swimmer's ear.

The accompanying app provides guided exams, or you can share the images with a doctor on Cellscope's HIPAA-compliant platform.

StethIO has designed and developed an **elegant stethoscope** using a smartphone.

The StethIO hardware combines aesthetic design with a sound capture module to record and decompose sounds into their frequency components, constructing a spectrogram.

Audio playback is synchronized with accurate visualization to assist in diagnosis.

BUTTERFLY IQ

Itis a portable single probe ultrasound device that delivers a 2D array of 9000 micro-machined sensors connected to a smartphone.

Butterfly's Ultrasound-on-Chip™ technology replaces the older transducer system with many sensors on a single silicon chip.

The device is designed with a built-in battery and wireless charging, which offers over two hours of scanning time.

This portable ultrasound tool can help medical practitioners make better decisions at the point-of-care.

THE PARATUSPERIO® TEST

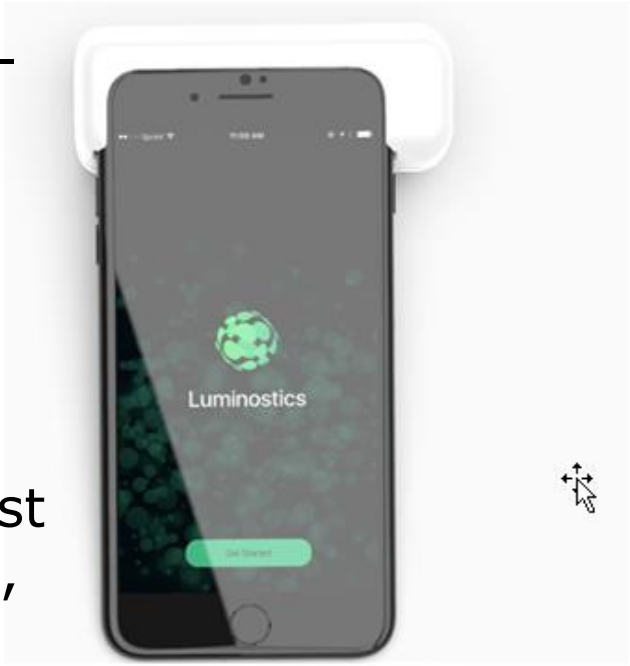
It analyzes 5 bacteria, 2 cytokines (indicators of inflammation), and 1 proteinase (actual molecule that destroys tissue) to determine a patient's oral health.

The diagnostic tool includes a cartridge that attaches to a smartphone.

The device uses the smartphone's camera to capture an image of the assay reaction and analyses the result using an app.

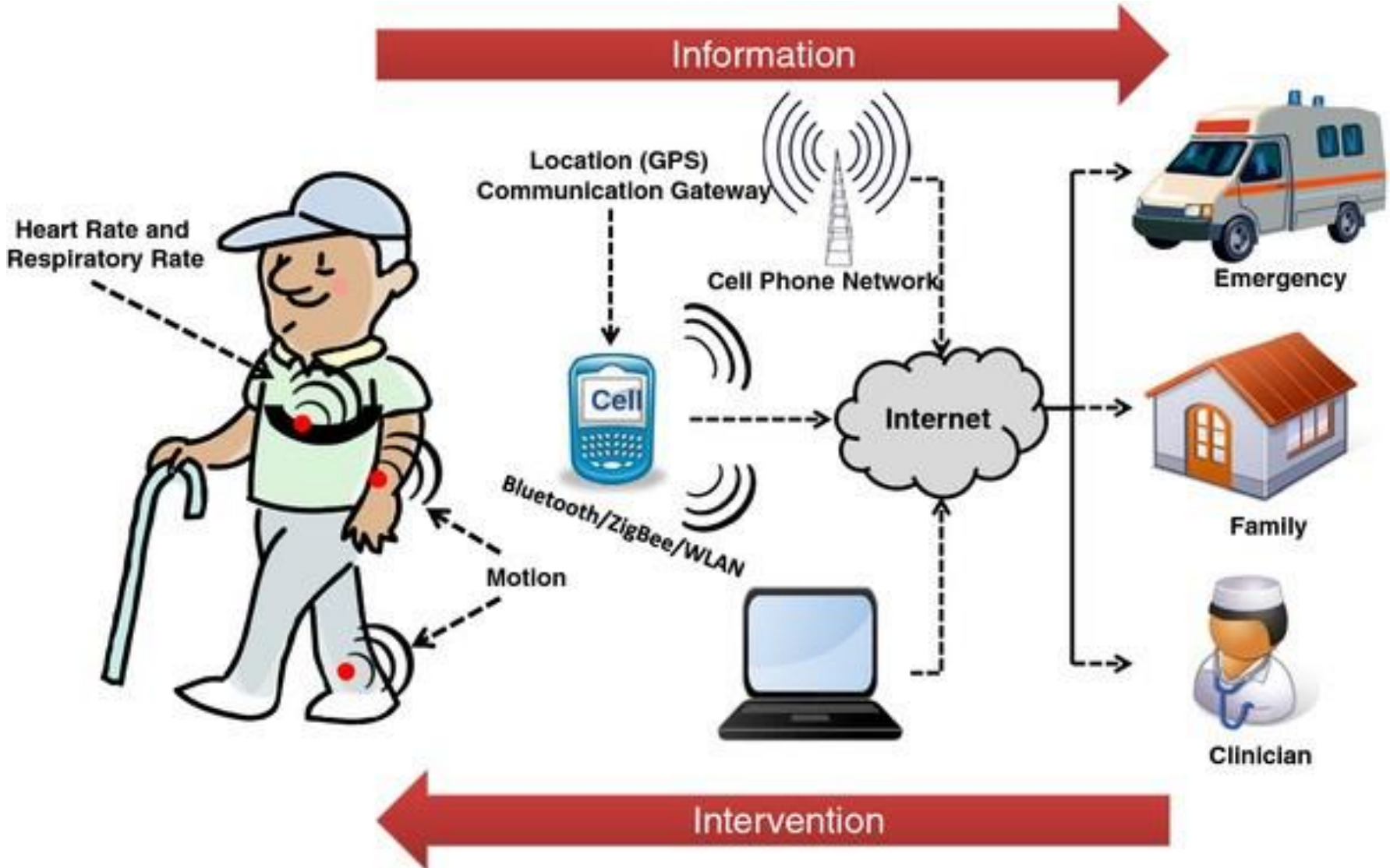
Luminostics developed a diagnostic platform with smartphone readout for rapid home testing, point-of-care testing, and global health applications.

The diagnostics platform is compatible with most smartphone models, **can detect or measure bacteria, viruses, proteins, and hormones from swabs of saliva, urine, or blood.**

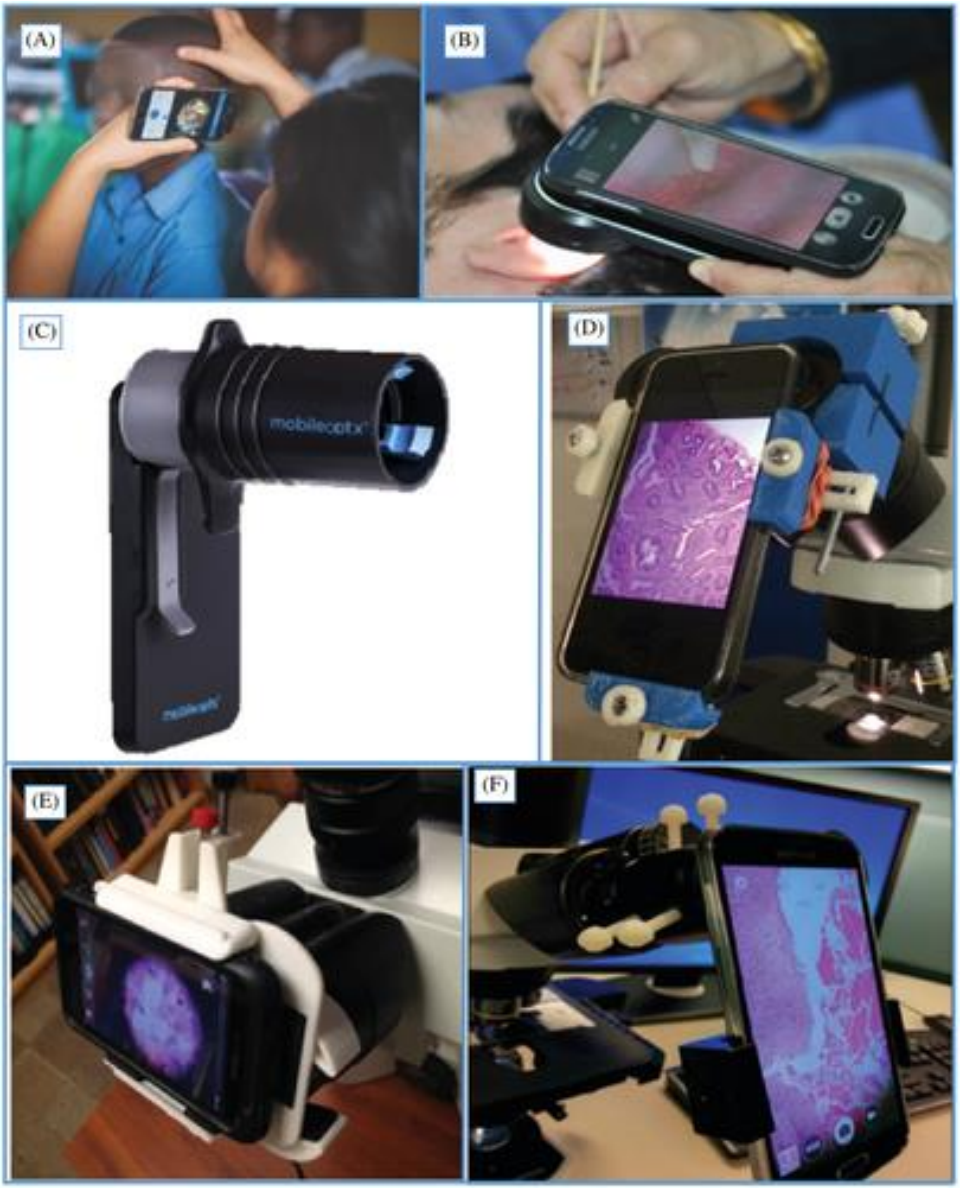


Health related information is gathered via body-worn wireless sensors and transmitted to the caregiver via an information gateway such as a mobile phone.

Caregivers can use this information to implement interventions as needed.



SURGICAL DIAGNOSIS APPLICATIONS OF SMARTPHONE CAMERA ADAPTERS.



(A) iPhone-based otoscopy and laptop-based wireless endoscopic otoscopy

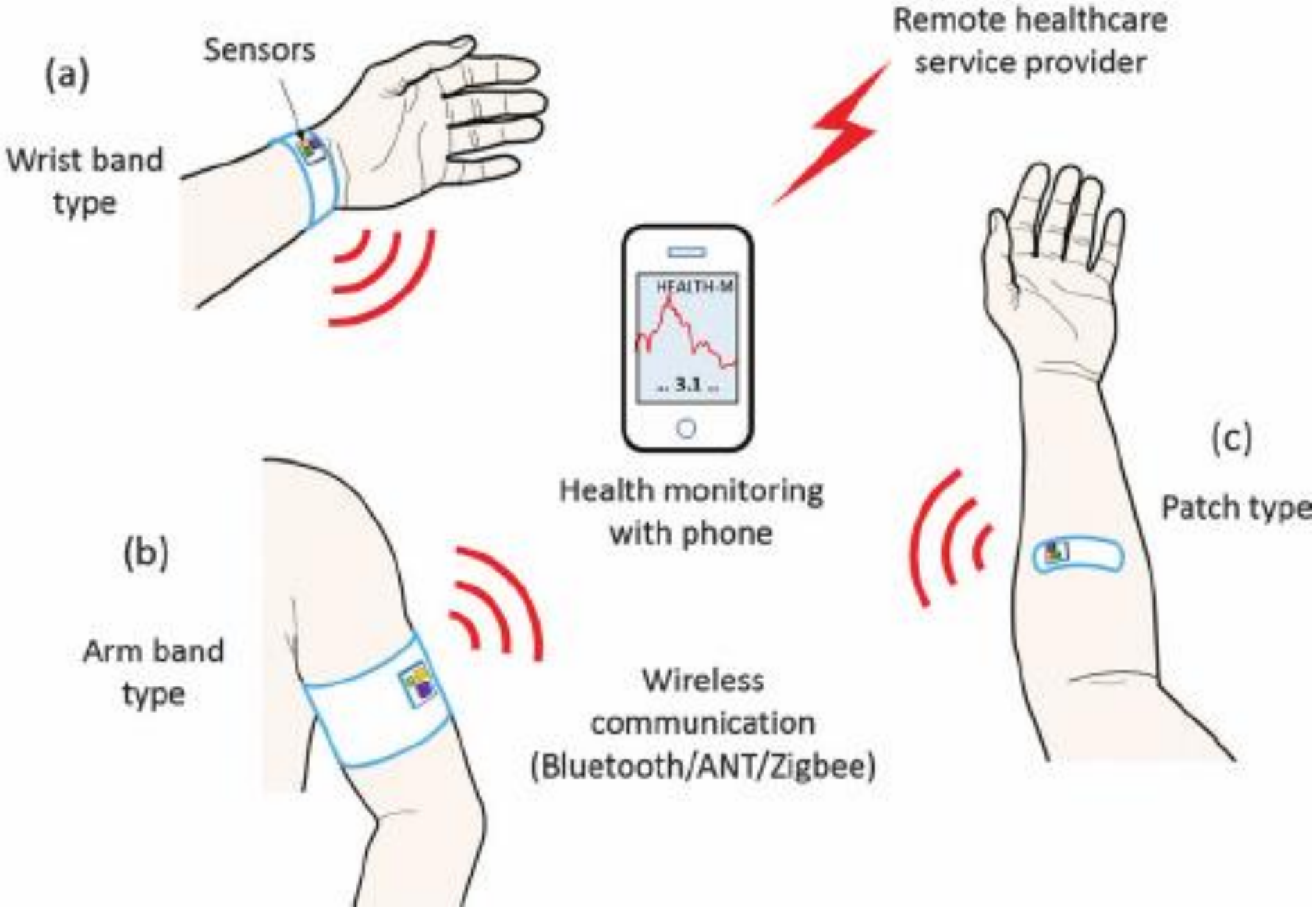
(B) A polarized dermoscope enables accurate comedone manipulation

(C) Smartphone-endoscope adapter to capture video

(D) Smartphone attached to a microscope through a 3D printed adapter

(E) Smartphone microscope adapter

(F) Smartphone attached to a microscope through an adapter

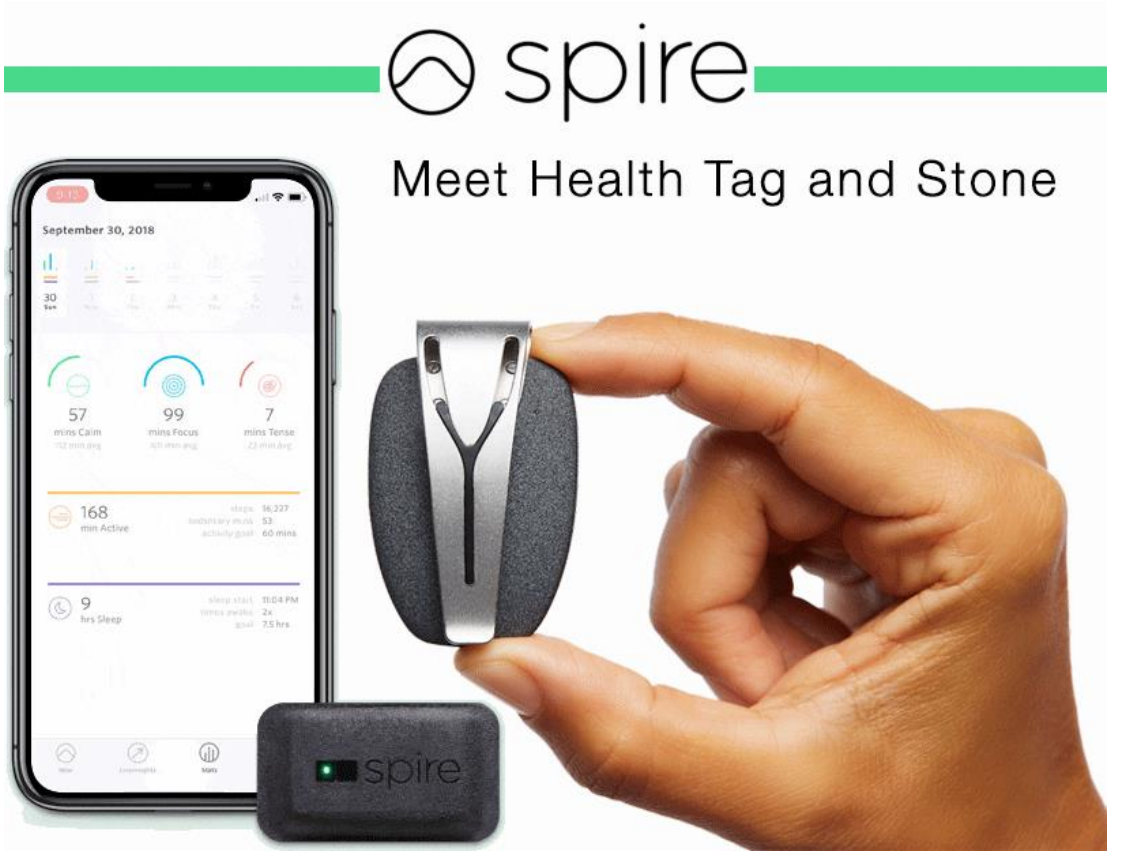

(a)
Sensors
Wrist band type
Remote healthcare service provider
HEALTH-M
.. 3.1 ..
Health monitoring with phone
(c)
Patch type
(b)
Arm band type
Wireless communication (Bluetooth/ANT/Zigbee)

24/7 HEALTH VITALS FOR A BETTER YOU

Spire Health Tag is the world's first invisible health tracker.

Designed to be adhered to your clothes,

Health Tags are the easiest way to monitor your sleep, stress and activity.

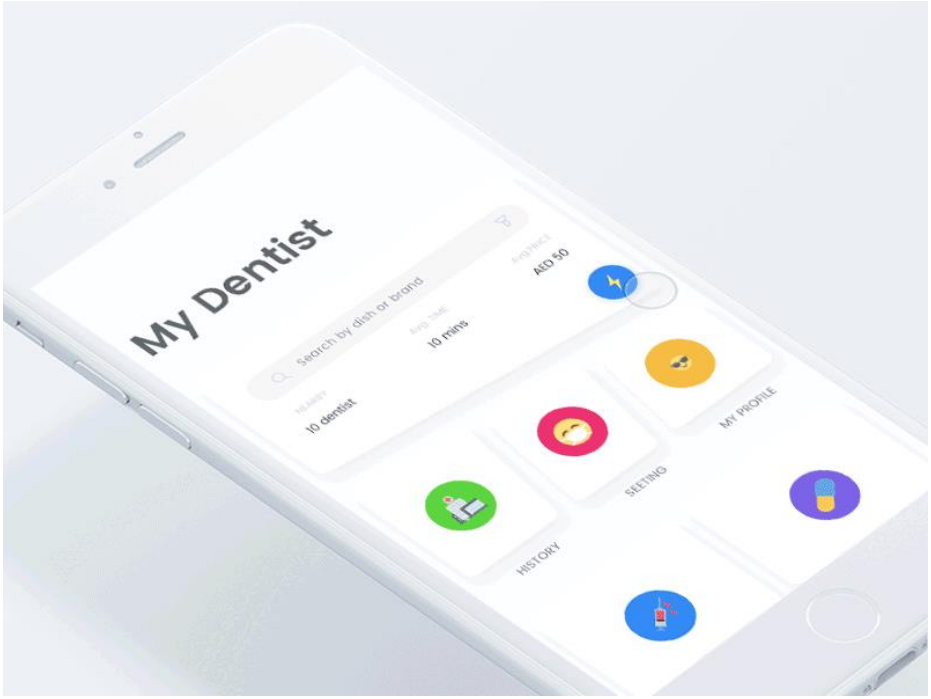


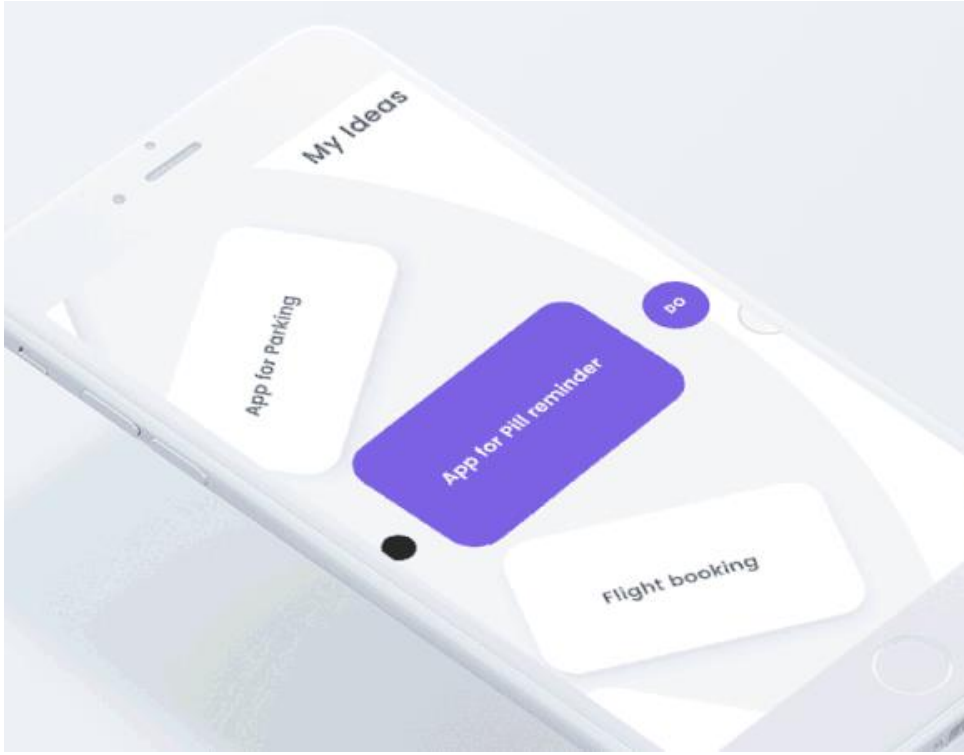
Meet Spire Health Tag

The clinically-proven invisible health monitor for sleep, stress, and activity

https://www.youtube.com/watch?v=sEv5Al2cMVo&feature=emb_logo

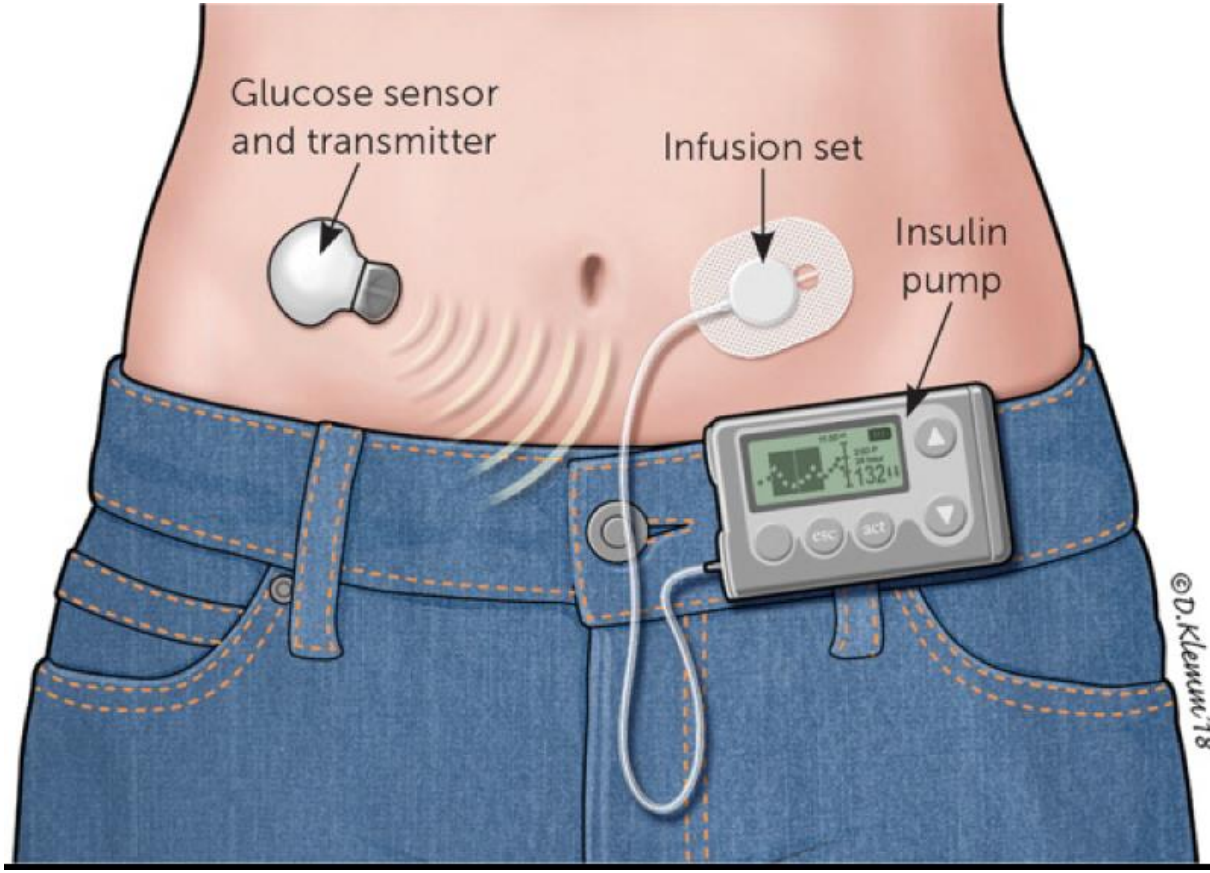
NEW APPLICATIONS FOR MOBILE HEALTHCARE DEVICES





INSULIN MONITORING AND A PUMP

Technological developments in diabetes have expanded to include hybrid devices that both monitor glucose and deliver insulin, automatically, like an artificial pancreas, and includes software for the medical device.

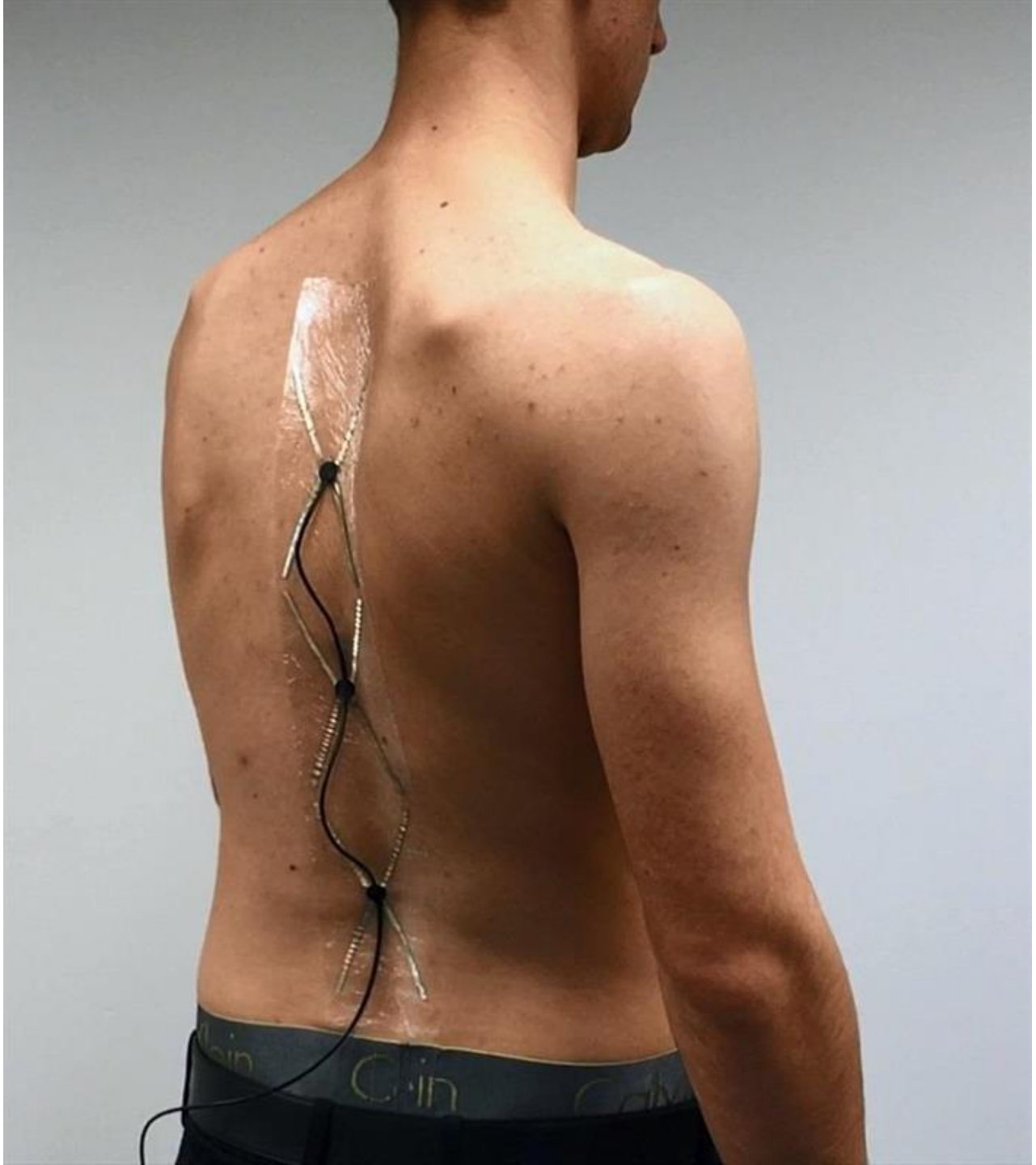


VALEDO DEVICE FOR HELPING TO REDUCE LOWER BACK PAIN

Sensors adhere to the lower back and then transmit data through the app.

The app and interface then gives exercises and instructions to the wearer of how to treat their back pain.

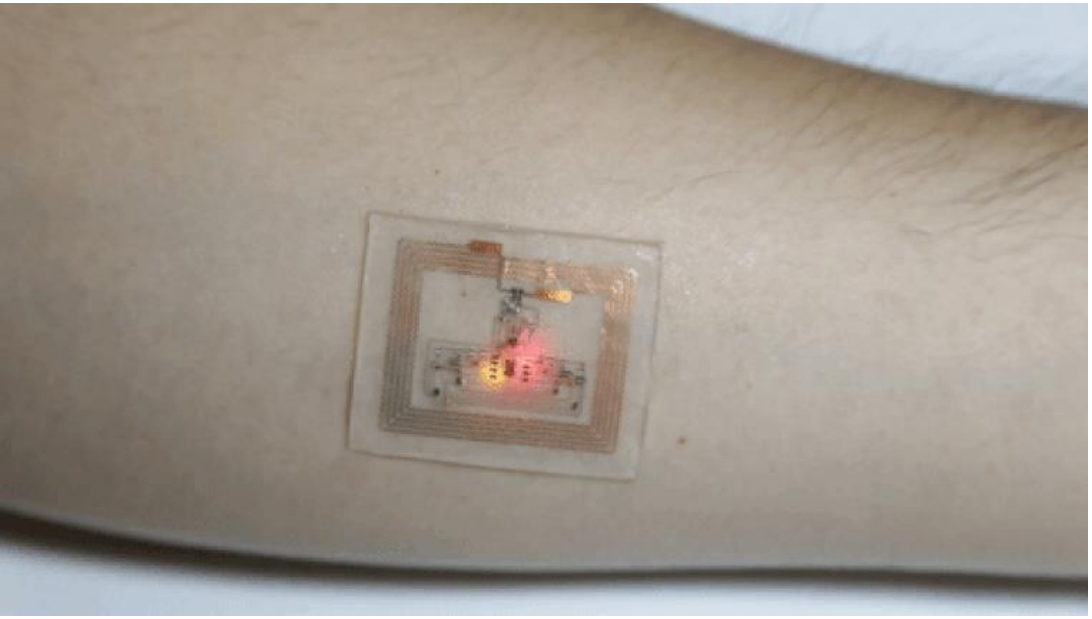
Bainisha's ultra thin skin patches allows back motion to be measured with high accuracy.

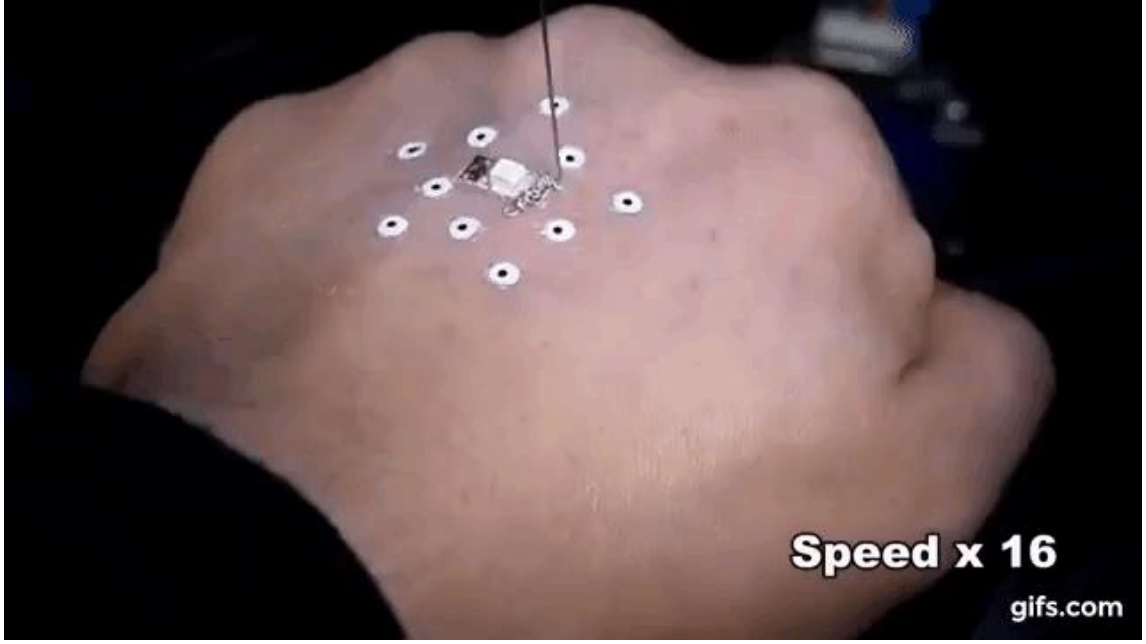


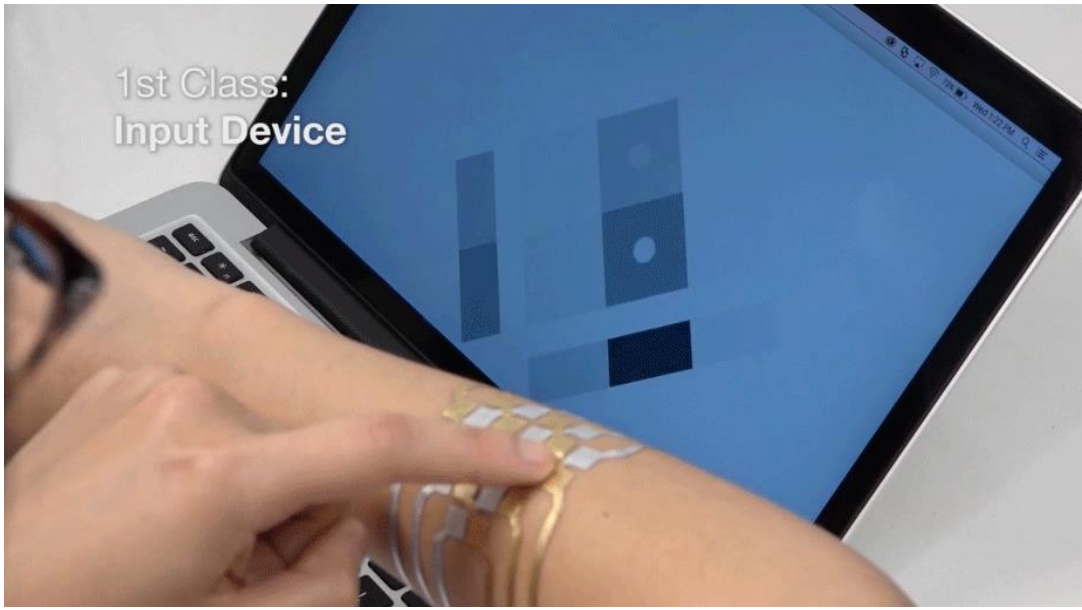
REDUCING CHRONIC PAIN – Another orthopedic wearable **(Quell Relief)** comes in the form of a knee brace which offers all the support and functionality of a knee brace while using sensors/electrodes to transmit information and deliver pain medication.

- **Quell** is always worn on the upper calf and stimulates sensory nerves
- It taps into your body's natural pain relief response
- Sensory nerves carry neural pulses to your brain
- Neural pulses trigger a natural response that blocks pain signals, leading to widespread pain relief
- The app works on both iOS (I-phone) and Android devices
- You can control therapy from your smartphone.
- Start and stop therapy sessions as well as adjust the intensity of therapy.
- View detailed therapy and on 8 aspects of your sleep.

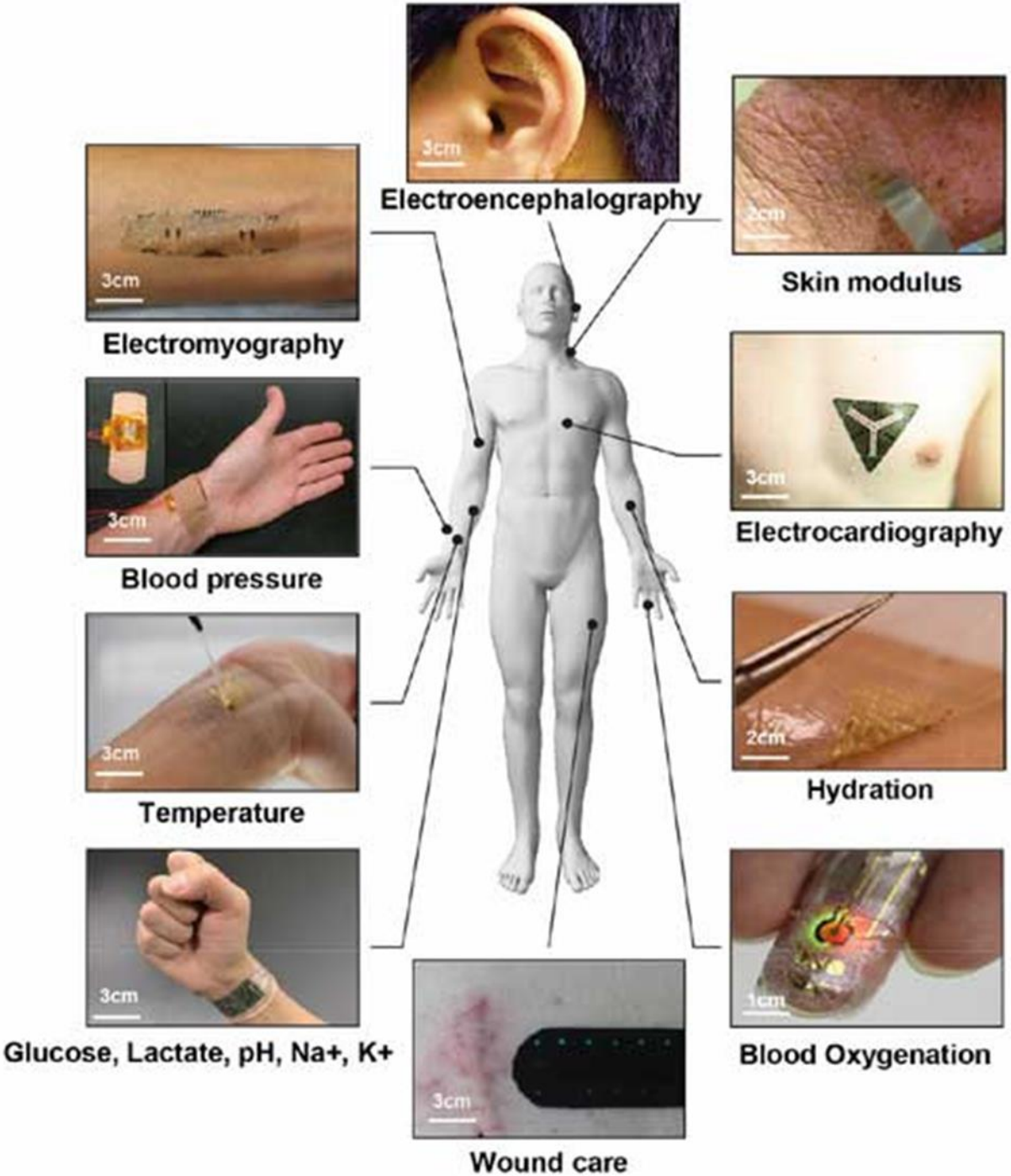
SKIN PATCHES AND TATOOS THAT PROVIDE HEALTH AND MEDICAL BENEFITS



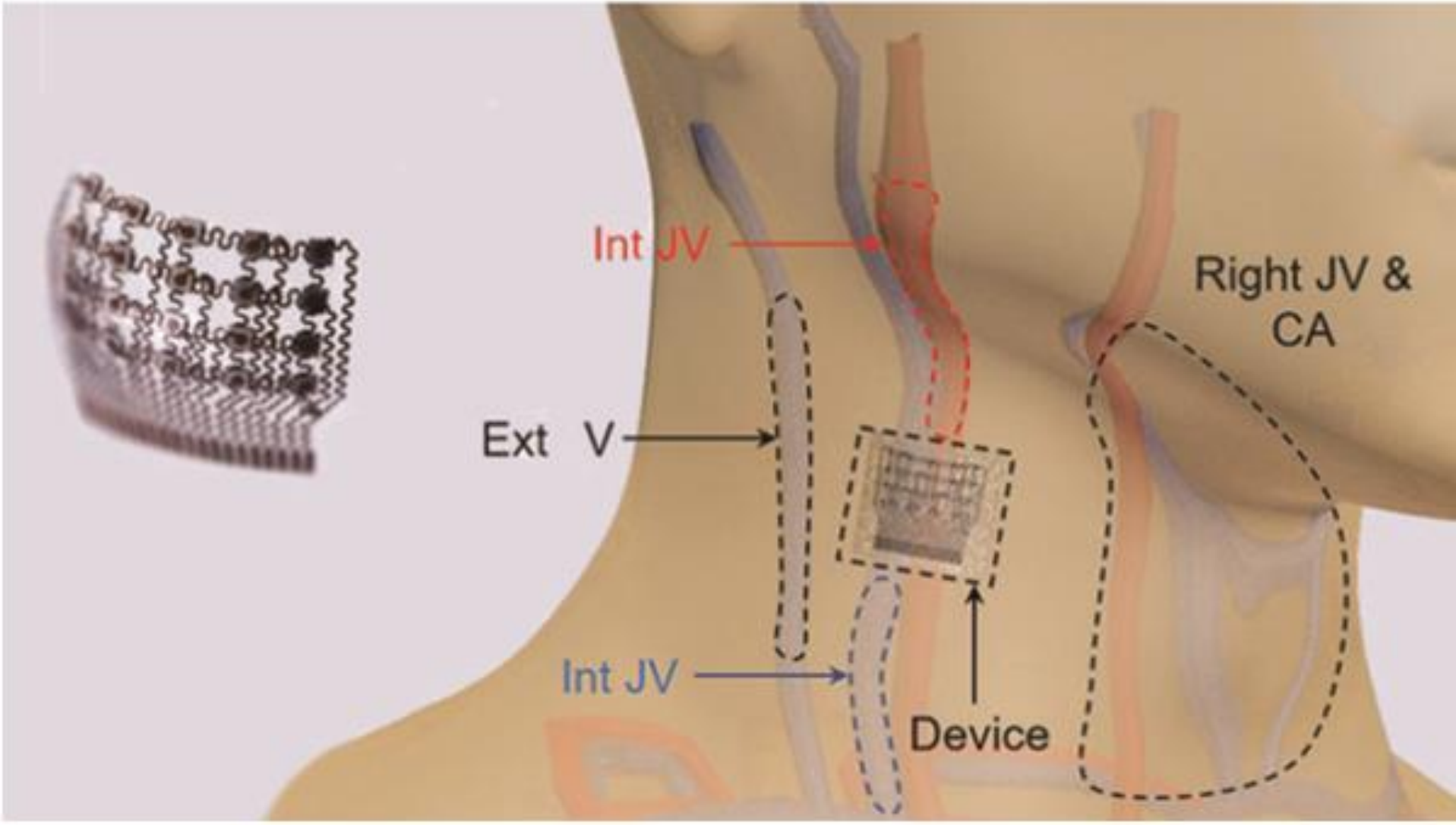

Speed x 16
gifs.com


1st Class:
Input Device

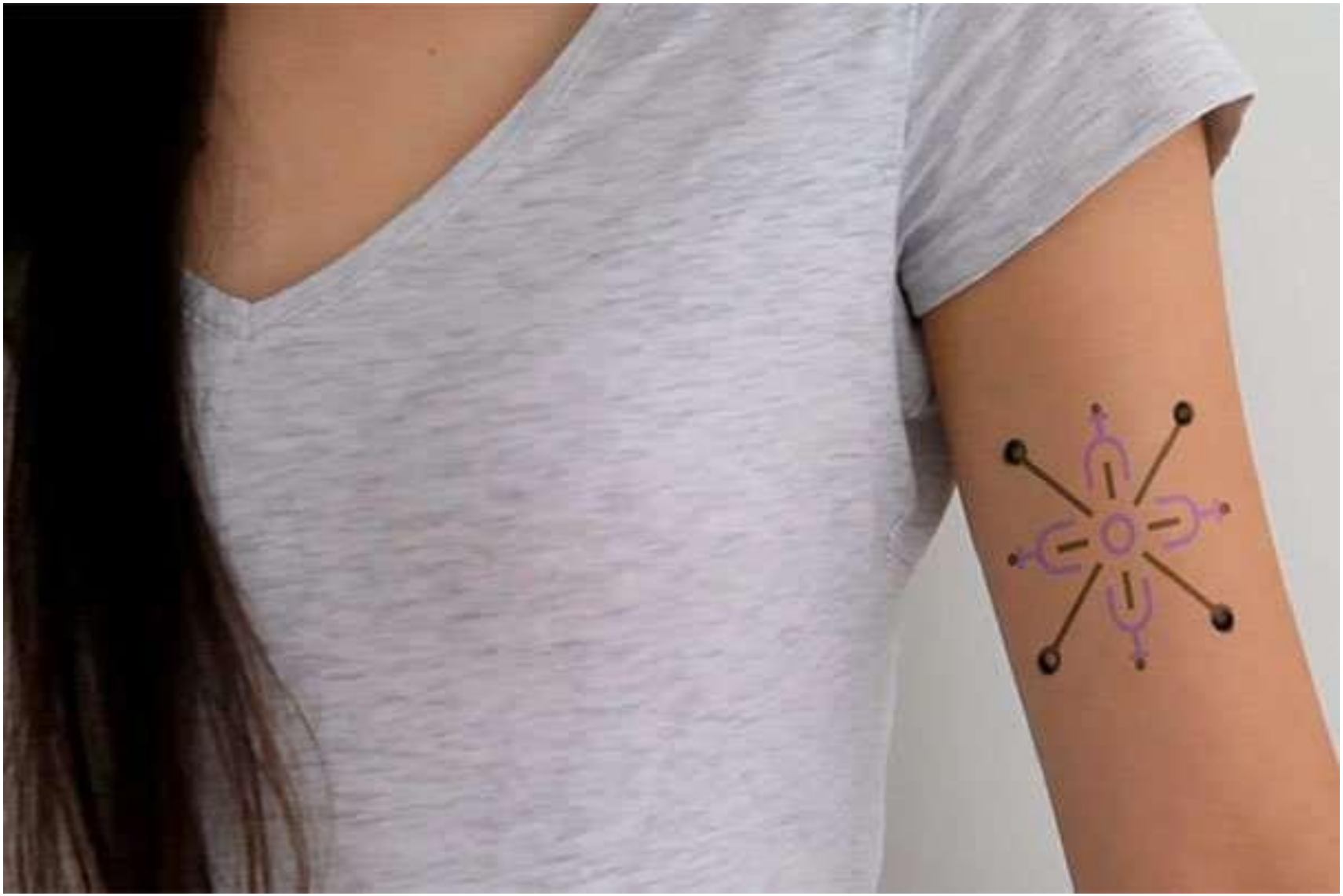
NEW KINDS OF ELECTRONIC TATOOS AND CIRCUITS THAT CAN BE PUT ON THE SKIN WHERE REMOTE MONITORING IS NEEDED



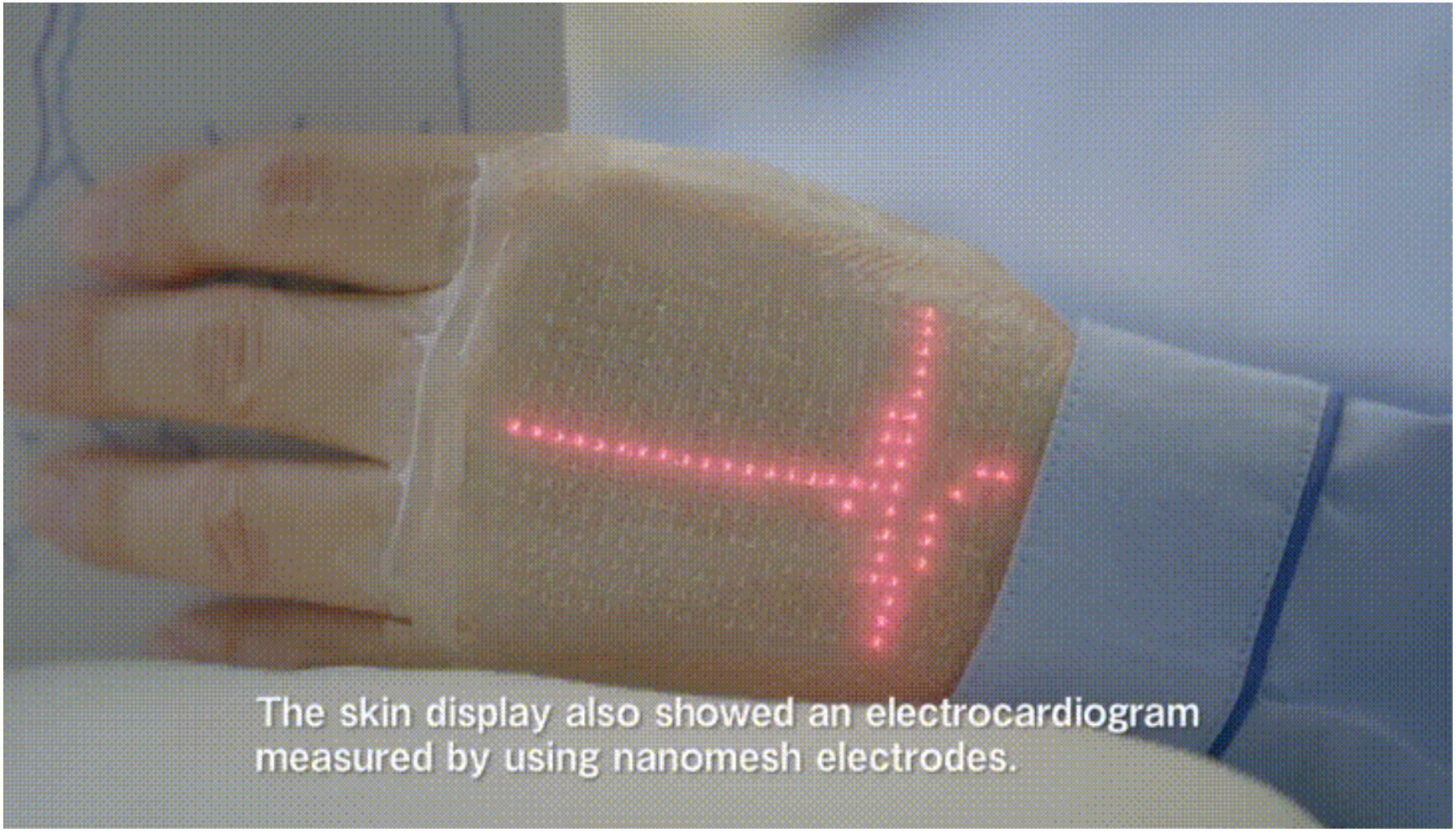
WEARABLE ULTRASOUND PATCH MONITORS BLOOD PRESSURE



Researchers have developed smart bio-sensitive tattoo ink capable of monitoring health by changing color to tell an athlete if she/he is dehydrated or a diabetic if their blood sugar rises.



Japanese researchers developed an ultrathin, highly elastic skin display.
The device displays an electrocardiogram recorded by a skin sensor, which holds promise for home healthcare application.



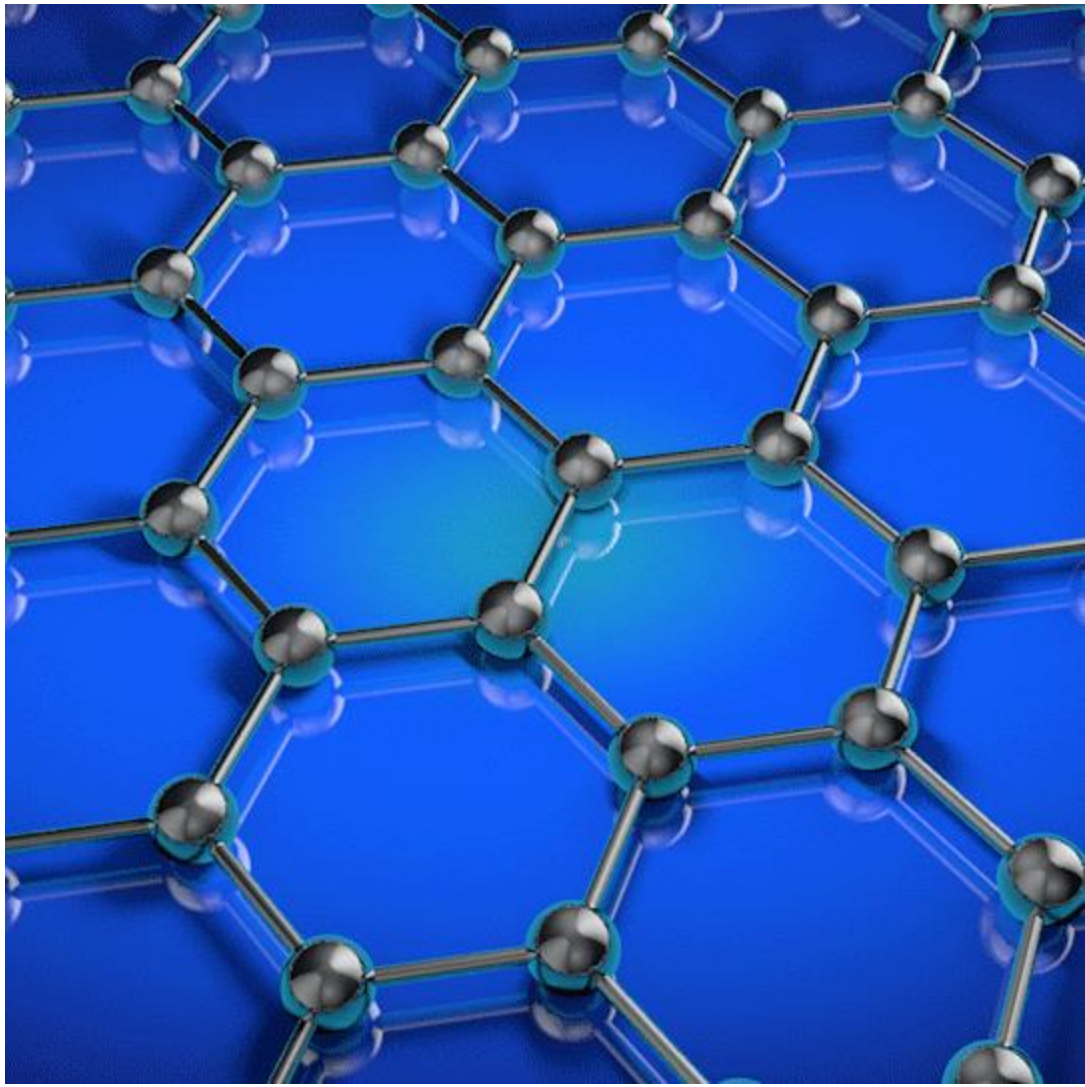
https://www.youtube.com/watch?v=zpGujcLRHNw

GRAPHENE

Graphene is material made of a single layer of carbon atoms arranged in a two-dimensional honeycomb lattice.

It conducts heat and electricity very efficiently along its plane.

It is also about 100 times stronger than the strongest steel of the same thickness.



Graphene-based Sensors in Health Monitoring

Invasive Applications

Nervous System

- ECoG
- Nerual stimulation

Cardiovascular System

- ECG
- Blood glucose

Digestive System

- Gastrointestinal diagnosis

Locomotor System

- EMG
- Muscle stimulation

Non-invasive Applications

Biophysical

Electrophysiological

- EEG
- EOG
- ECG
- EMG

Kinematic

- Pulse/heart rates
- Respiration
- Phonation
- Facial expressions
- Blood pressure
- Joints movements
- Gesture
- Muscle movements

Thermometer

- Body temperature

Environmental

- Light
- Gases
- Heavy Metal

Bio-chemical

- Volatile gases
- Electrolyte
- Metabolite
- Bacteria
- Drug
- Dopamine
- Tumor markers
- Others

ECoG – Eastern Cooperative Oncology Group rating

ECG or EKG – Electrocardiogram (heart rhythm)

EMG – Electromyography (muscles & nerves)

EEG – Electroencephalogram (brain)

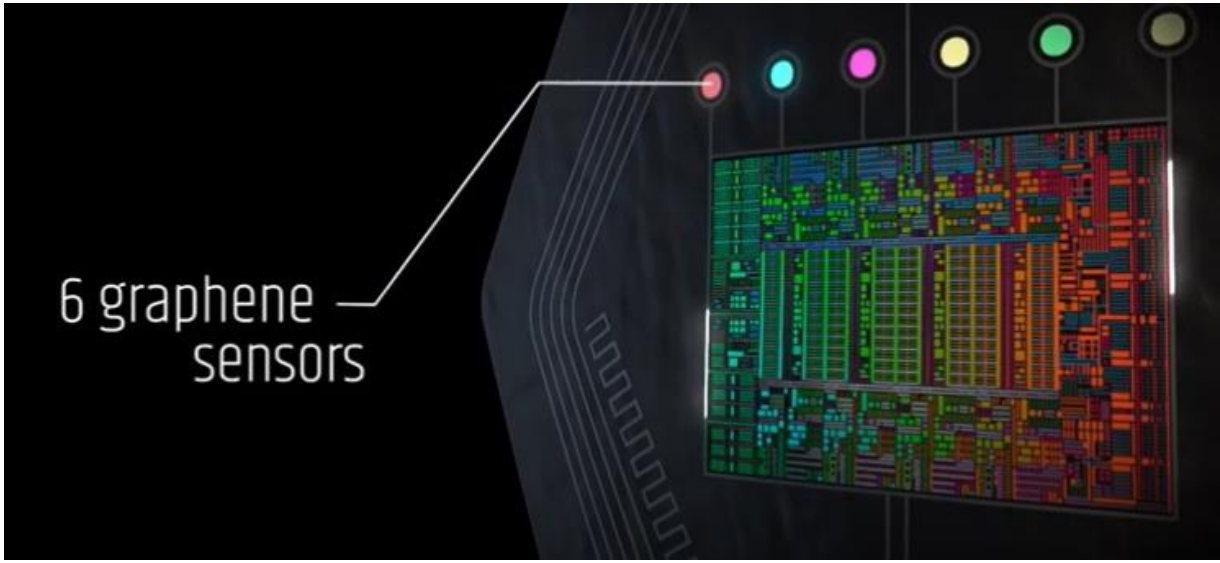
EOG – Electrooculography (eyes)

GRAPHENE FITNESS PATCH

Since it is flexible and extremely sensitive to changes in heat and light, graphene has a big future in wearable devices.

This 'transdermal fitness patch' from the ICFO in Barcelona **does everything your Fitbit can do, and more, but in the form of a stick-on patch.**

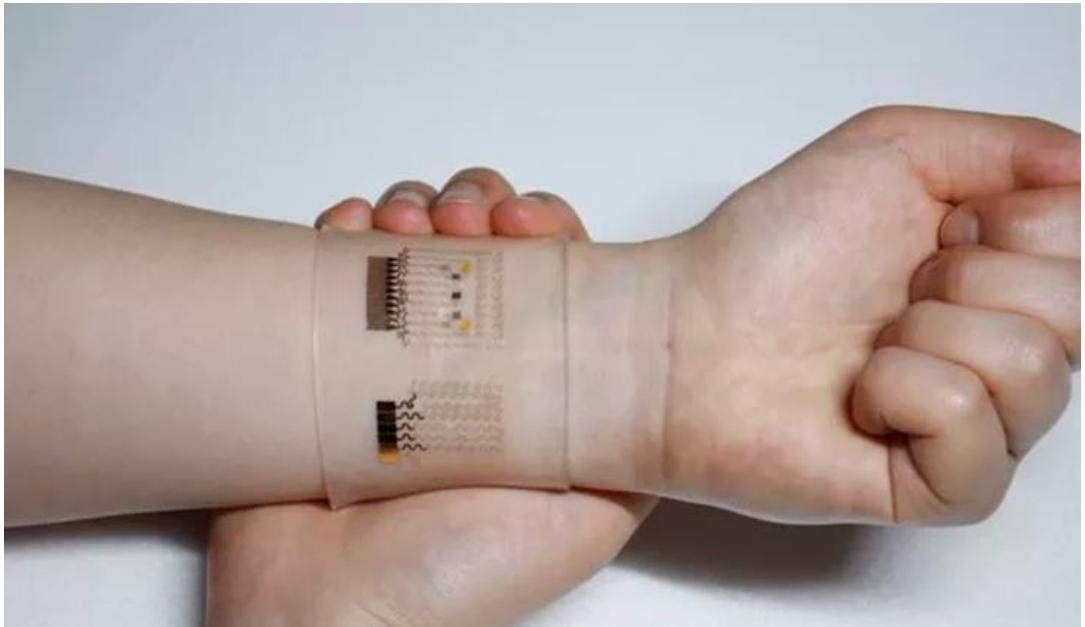
It measures heart rate, hydration and breathing rate with improved accuracy and less power consumption than current fitness bands and conforms to any surface.



https://www.youtube.com/watch?v=_Wb0qCnMObw&feature=emb_logo

GLUCOSE MONITORS

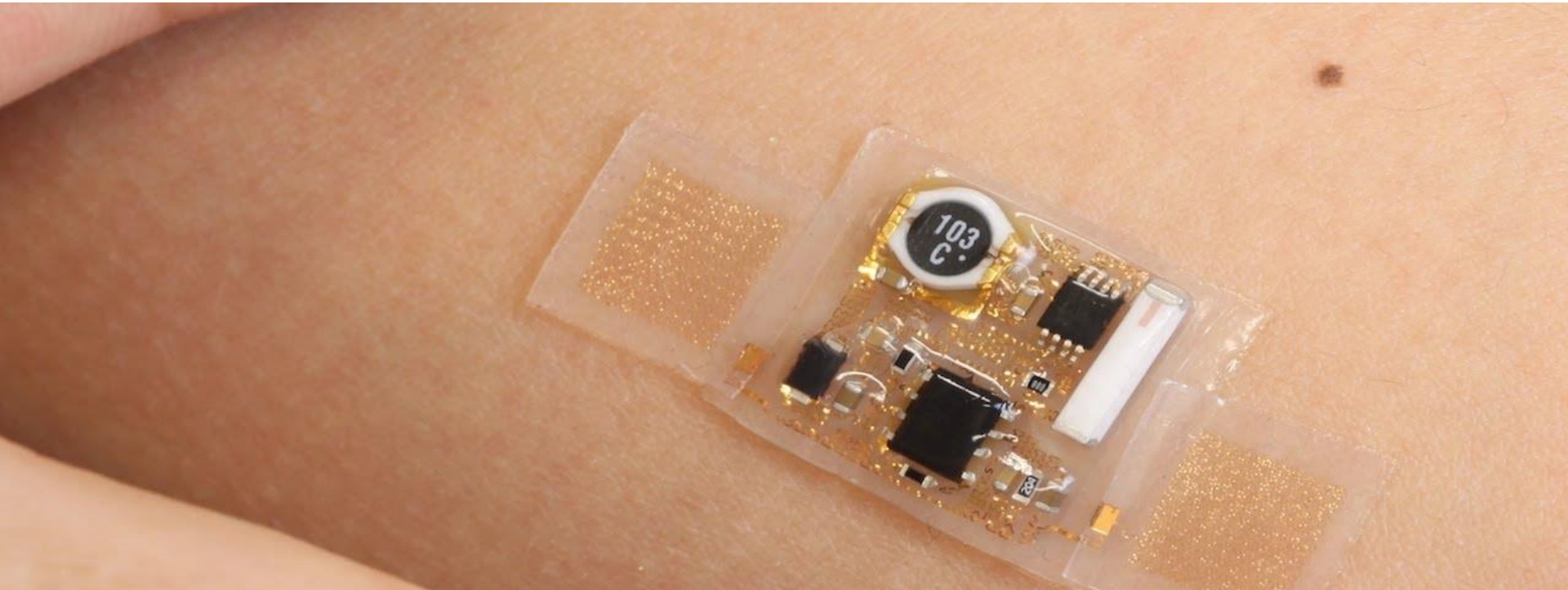
2 Types of Wearable Patches, Use Sweat To Monitor Blood Glucose Levels and can automatically deliver medication with microneedles

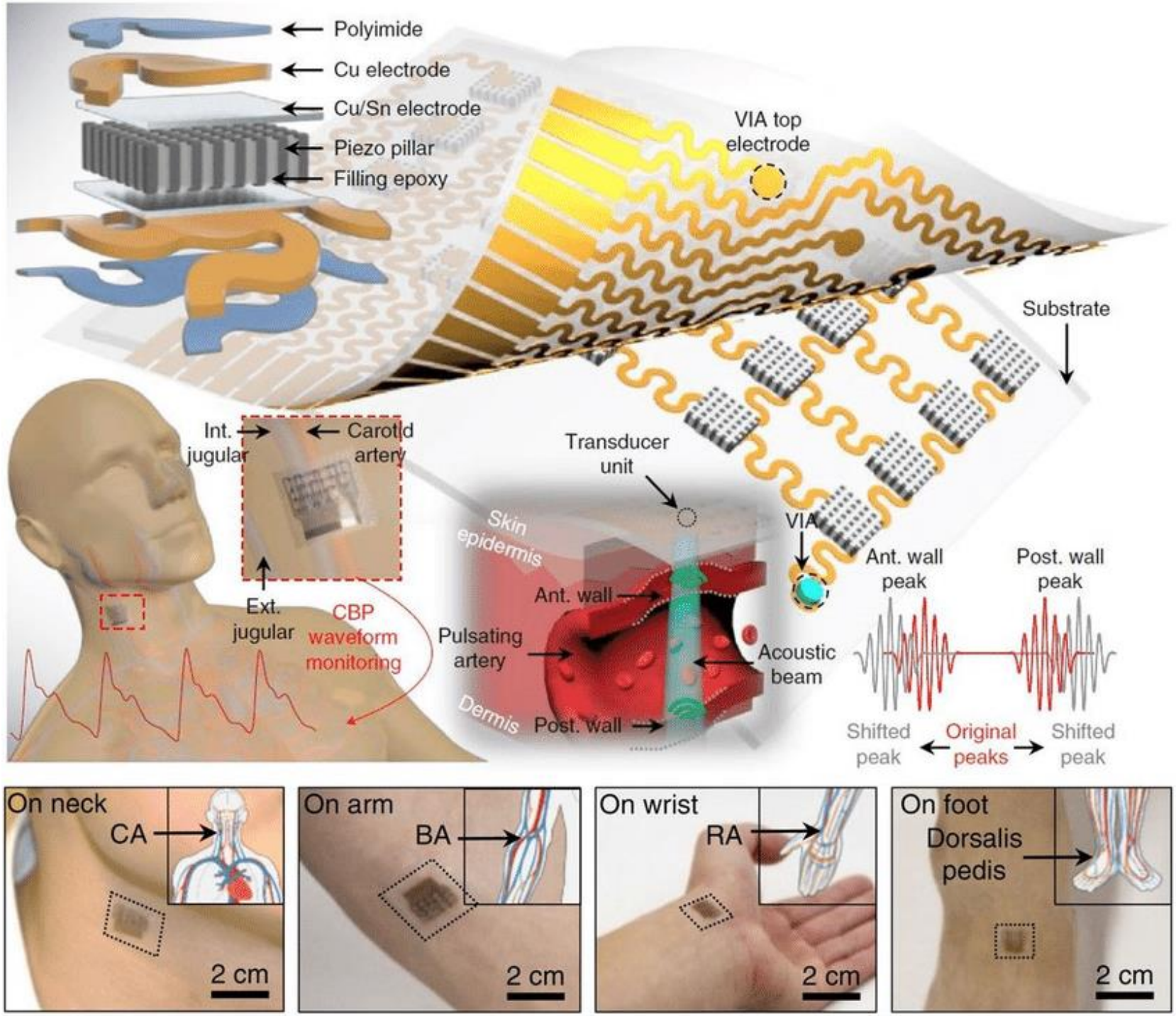


EPIDERMAL ELECTRONICS: WEARABLE HEART MONITOR WITH SPEECH RECOGNITION

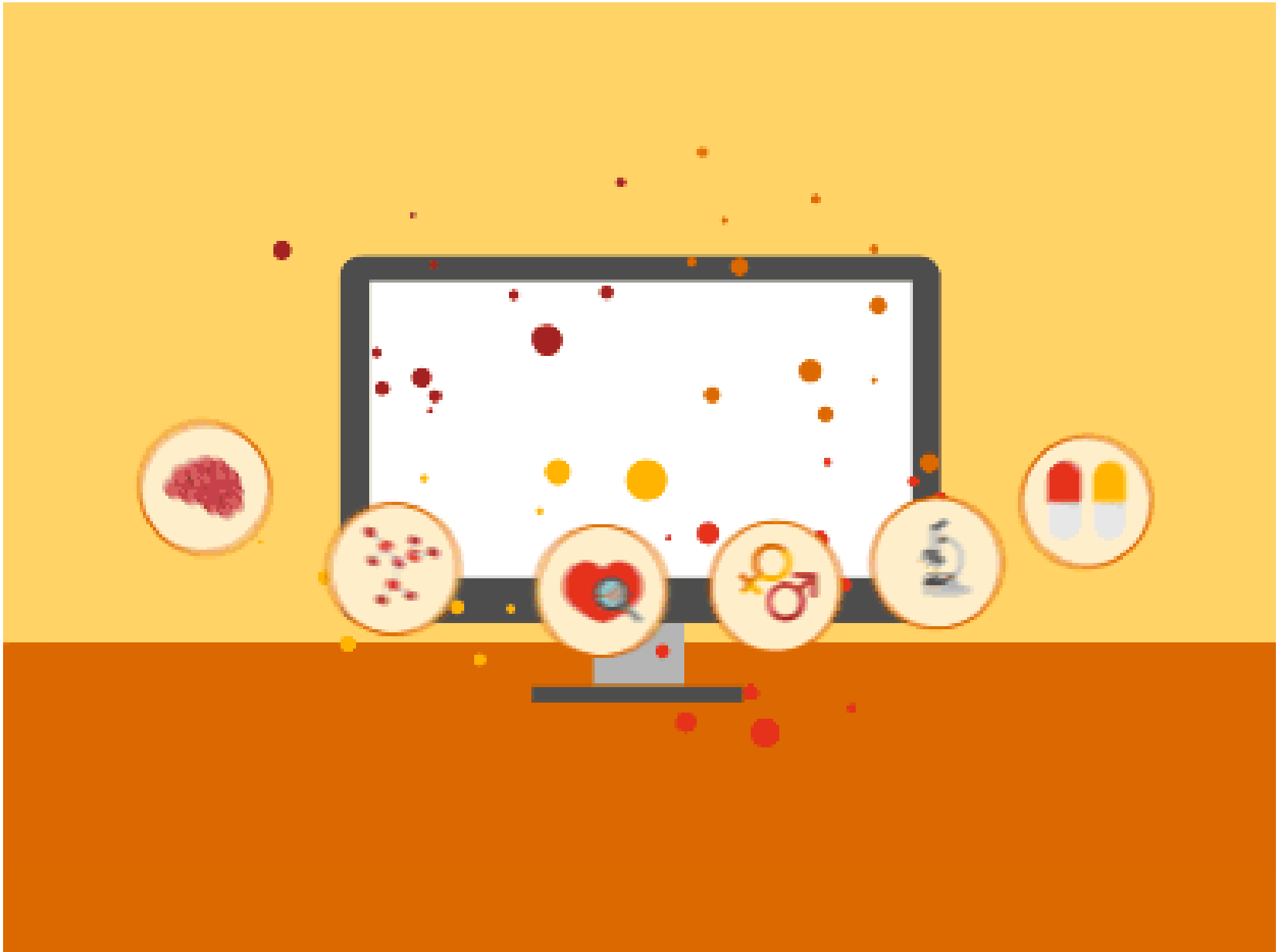
There have been many developments of skin-mounted electronics that **integrate electrophysiological sensors such as electrocardiogram (ECG) and EMG sensors, temperature sensors, strain sensors, and many others.**

This device **can pick up mechanical waves that spread through tissues and fluids in the human body that reveal acoustical characteristic signatures, which helps diagnose cardiovascular diseases.** For instance, it can recognize and record the opening and closing of heart valves, vibrations of the vocal cords, the contraction of skeletal muscles, and movement in the gastrointestinal tract.




Polyimide
Cu electrode
Cu/Sn electrode
Piezo pillar
Filling epoxy
VIA top electrode
Substrate
Int. jugular
Carotid artery
Ext. jugular
CBP waveform monitoring
Transducer unit
Skin epidermis
Ant. wall
Pulsating artery
Dermis
Post. wall
Acoustic beam
VIA
Ant. wall peak
Post. wall peak
Shifted peak
Original peaks
Shifted peak
On neck
CA
2 cm
On arm
BA
2 cm
On wrist
RA
2 cm
On foot
Dorsalis pedis
2 cm

OTHER NEW TYPES OF DEVICES



UC SAN DIEGO DEVELOPING FACE MASK SENSOR THAT DETECTS THE CORONAVIRUS

- **The lightweight sensor would be attached to face masks to monitor for the presence of coronavirus-related molecules that appear in a person's breath and saliva**.

- It can also detect virus molecules expelled by someone else and possibly inhaled by the mask wearer.

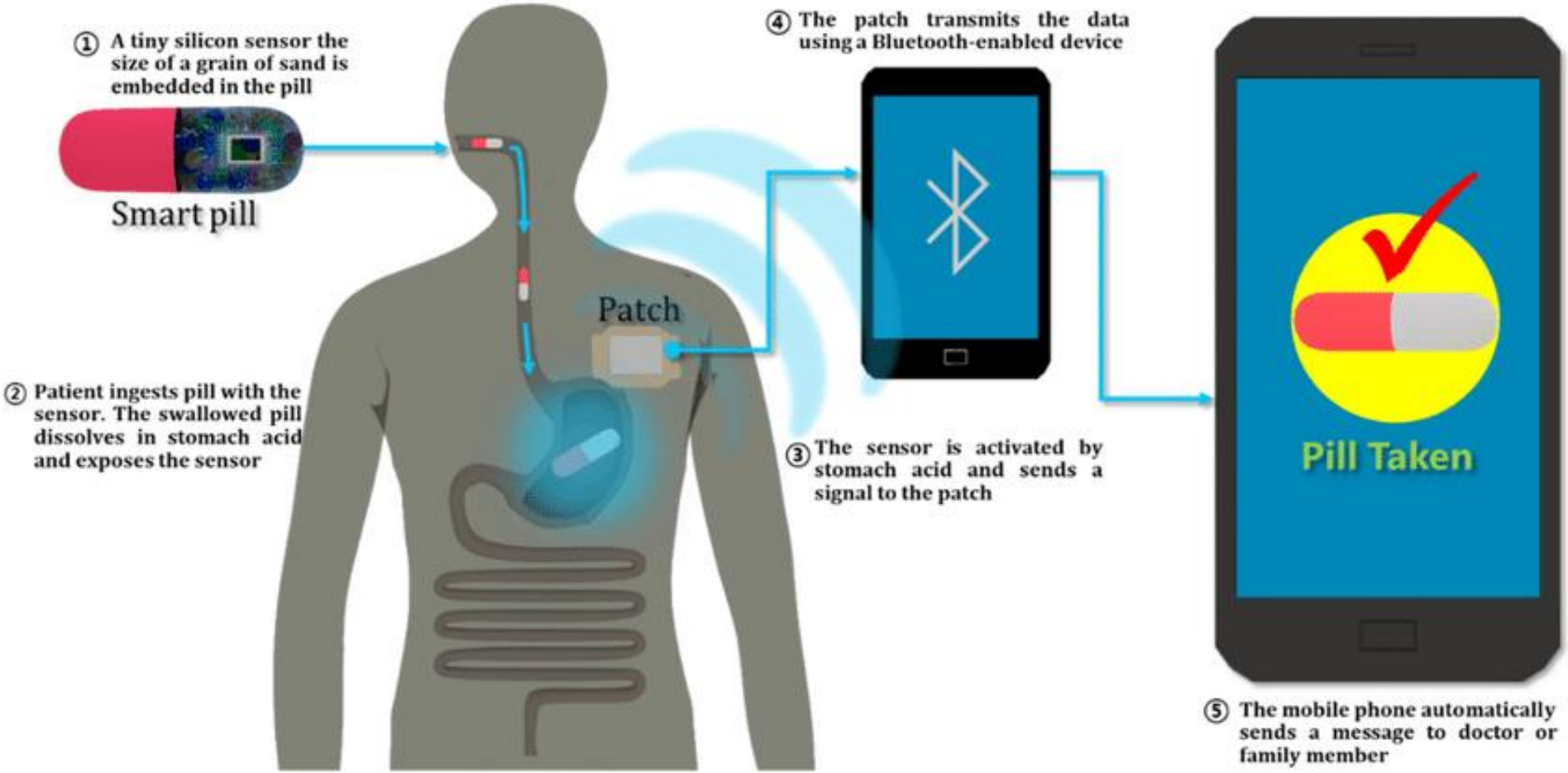
- If there's a positive reading, the mask wearer would then get a test to confirm the infection.

Hidrate Spark 2.0 Smart Water Bottle - Tracks your Water Intake & Glows to Remind You to Stay Hydrated

Tracks water intakes and syncs with smartphones (iOS and Android) via Bluetooth.
Integrates with Fitbit, Apple Watch, and other activity trackers to adjust your daily water goal to your activity level.


AliveCor
00:11 secs
76
BPM
Record
History
Insights
More

In collaboration with AliveCor, the KardiaMobile 6L is a medical-grade, pocketable heart health device capable of delivering 6-lead mobile EKG, advanced artificial intelligence, cloud technology, and resulting state-of-the-art cardiac care.


① A tiny silicon sensor the size of a grain of sand is embedded in the pill
Smart pill
② Patient ingests pill with the sensor. The swallowed pill dissolves in stomach acid and exposes the sensor
Patch
③ The sensor is activated by stomach acid and sends a signal to the patch
④ The patch transmits the data using a Bluetooth-enabled device
Pill Taken
⑤ The mobile phone automatically sends a message to doctor or family member

Apple and other smart watches

SPO2 IS A BLOOD OXYGEN SATURATION SENSOR

World's First Non-invasive Continuous Blood Glucose Monitoring Wearable

The patent-pending multi-sensor device, called **LifeLeaf,** non-invasively and continuously monitors:

Heart rate

Blood pressure

Respiration rate

Oxygen saturation.

It monitors and tracks chronic health risks such as:

Diabetes

Cardiac arrhythmia

Congestive heart failure

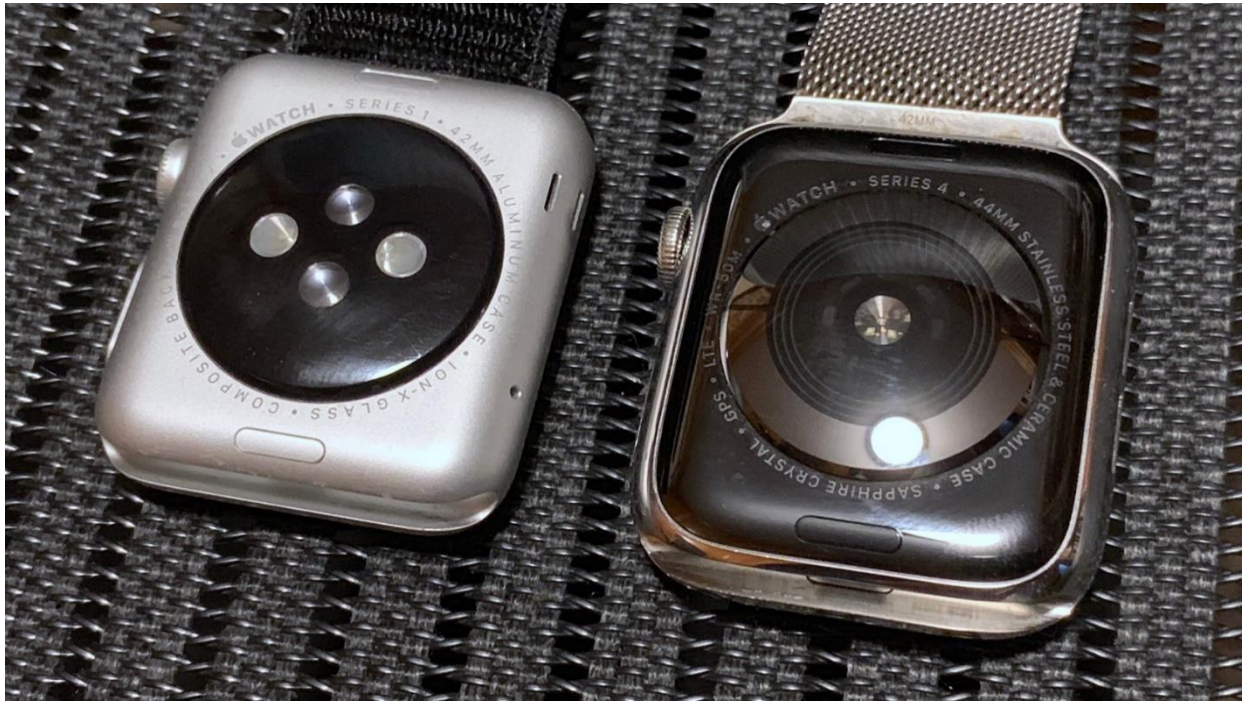
COPD

Sleep apnea and hypertension.

THE APPLE SMART WATCH

The Apple Watch Series 4 (right) completely redesigns the health sensor array on the bottom of the watch to incorporate an ECG (Electro-cardio-gram) (or EKG) electrode and new optical heart rate sensor.

By adding this feature, the Apple Watch has gone from a smart fitness tracker to a potentially life-saving medical device that will be able to warn wearers of abnormal heart rhythms associated with atrial fibrillation (Afib) and other serious medical conditions.



THE APPLE WATCH 6

The future of health is on your wrist.

Measure your blood oxygen level with a revolutionary new sensor and app.

Take an ECG anytime, anywhere.

See your fitness metrics at a glance with the enhanced Always-On Retina display.

With Apple Watch Series 6 on your wrist, a healthier, more active, more connected life is within reach.

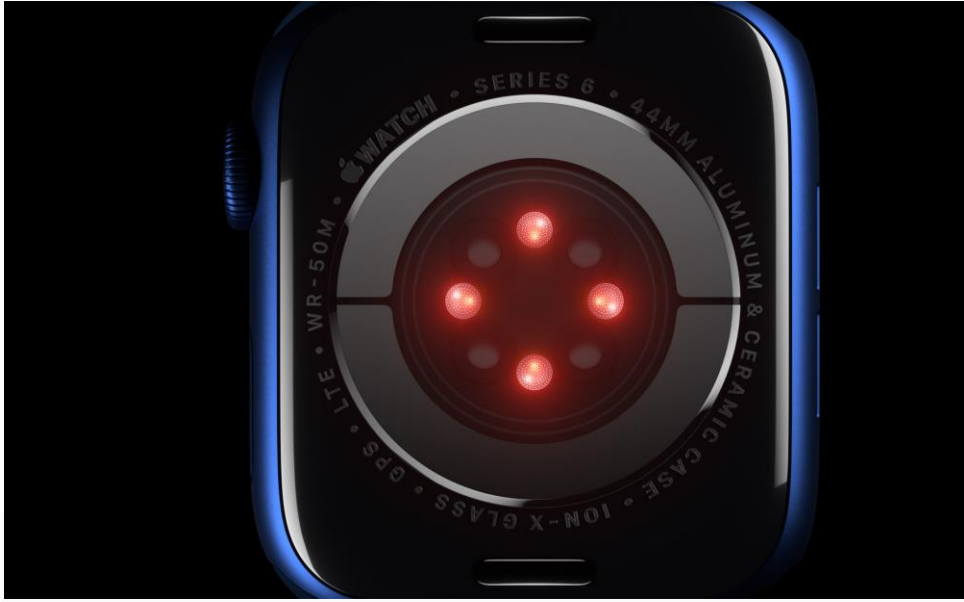
NEW FEATURE IN THE APPLE 6 WATCH !

BLOOD OXYGEN MEASURING

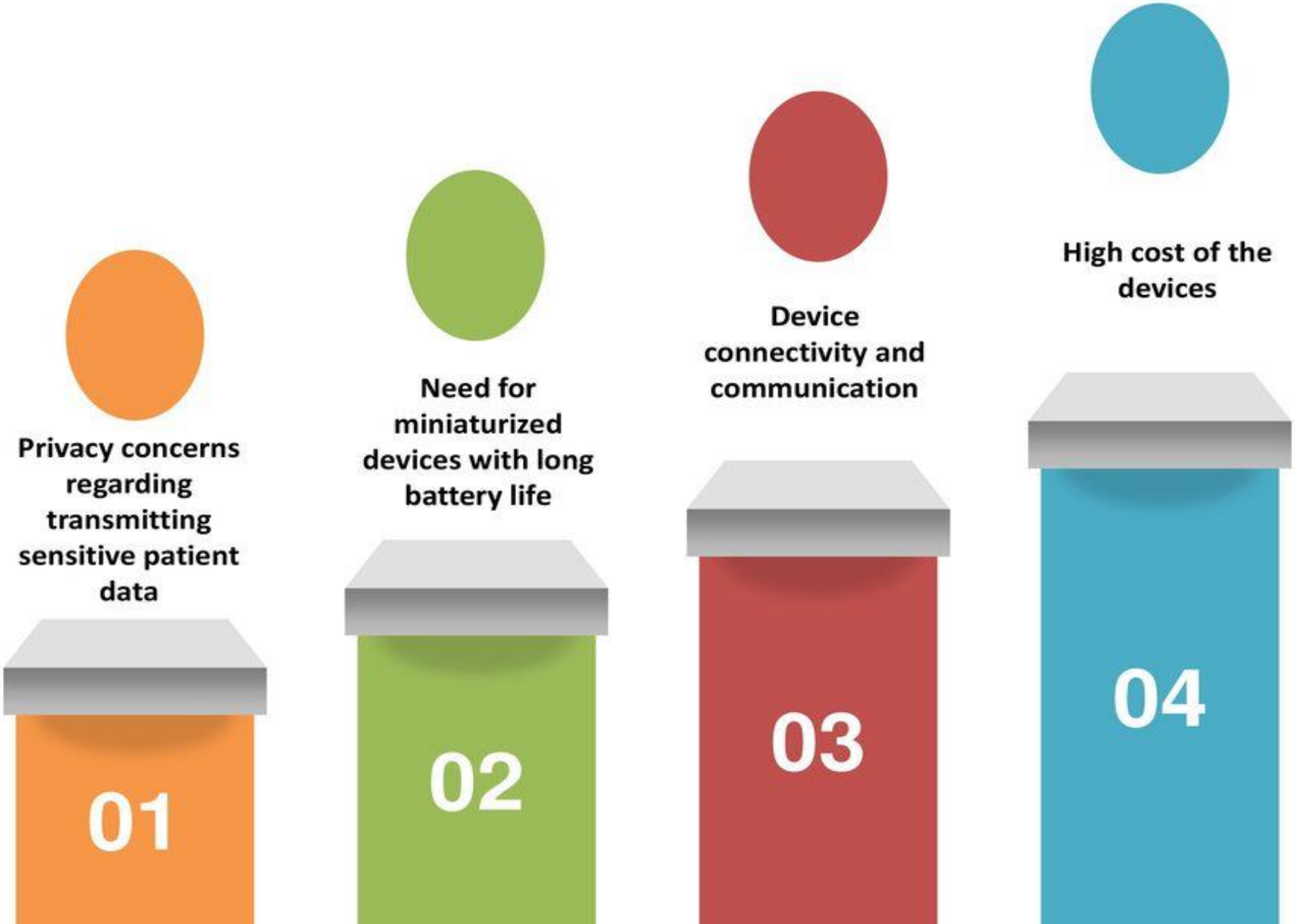
Your blood oxygen level is a key indicator of your overall wellness.

It can help you understand how well your body is absorbing oxygen, and the amount of oxygen delivered to your body.

The remarkable new sensor and app in Apple Watch Series 6 allow you to take on-demand readings of your blood oxygen as well as background readings, day and night.



Challenges in wearable health monitoring device market



CONCERNS TO BE EVALUATED:

In all cases, merely tracking data is not enough to maintain health behaviors long-term.

The software must incorporate motivational methods important for the adoption and habituation of health-related behaviors.

Further research is needed to validate their use and long-term impact, such as:

- Physiological harm
- Breaching of privacy and confidentiality with insecure devices
- How to resolve and minimize any risks.
- Have physicians try devices and study the evidence to support the use of the Technology

LADIES AND GENTLEMEN,
I PRESENT TO YOU – FITBARK !!

FATBIT: HOW TO CHEAT YOUR FITNESS TRACKER !!

https://www.youtube.com/watch?v=tjTLOKjB_50
(4 minutes)


LOONEY TUNES

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