Smartwatches in Health and Fitness: Benefits and Considerations

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Learning Objectives

- . Identify common health and fitness metrics tracked by wearable devices and discuss their relevance in monitoring personal health and informing healthcare practices.
 - Explore the **potential benefits of wearable technology** in supporting health goals, patient engagement, and self-monitoring across diverse populations.
 - Evaluate **considerations and limitations** associated with wearable health devices, including data accuracy, privacy concerns, and accessibility, to assist with informed decisionmaking and patient counseling.

Note on Presentation Product Examples:

In discussing the potential health benefits of smartwatches and devices, **no specific brand is being promoted**. Product mentions are intended solely to highlight the variety of features available across different models.

These examples are provided to help identify relevant functions (e.g., heart rate monitoring, step tracking, EKG capabilities) and current research, and **should not be interpreted as endorsements**.

Nurses, physicians and all healthcare professionals and smartwatch users are encouraged to **explore a range of options that meet their individual needs and institutional policies**.

ACSM's 2025 Worldwide Health & Fitness Trends

- The American College of Sports Medicine reported in the annual trends survey that for the past 4 yrs, **wearable technology ranked #1** according to health & fitness professionals surveyed.
- The survey data suggested that wearable devices were useful for health and fitness professionals as they aim to encourage daily physical activity behaviors and are beneficial for prescribing, monitoring, and measuring health and fitness behaviors



Health & Fitness Tracker Market Trends

According to Fortune Business Trends research, the global fitness tracker market size was valued at \$62.03 billion in 2024 & is projected to grow from \$72.08 billion in 2025 to \$290.85 billion by 2032!



What are some of the most common health & fitness metrics tracked?

- •Step Count
- •Heart Rate
- •EKG
- •VO₂max
- Sleep Tracking



Step Count

- The smartwatch uses an **accelerometer** which is a sensor that tracks movement and measures the change in velocity.
- The **number of steps** taken per day, the average per week, month and year are often reported on smart devices.
- Step goals and reminders to move, can be programmed in, so if the user is inactive for too long, it will alarm or vibrate
- The Average American takes 4,000-5,000 steps/day
- <5,000 is considered sedentary</p>
 - Every increase of 1,000 steps/day OR ½ mile in sedentary individuals, reduces the risk of heart disease and death by 15%.





What about 10,000 steps?

The 10,000 step goal originated in 1965 as marketing for a Japanese pedometer called the Manpo-kei OR "10,000 step meter" not based on research. It may be intimidating for some.

Heart Rate

- Smartwatches use optical sensors called **PPG** (*photo*plethysmography) to measure heart rate.
- The smartwatch uses the LED green light to detect changes in blood flow under the skin as the heart beats and vessels expand and contract.
- Research has found that most smartwatches and devices are very accurate at rest and during mild or moderate exercise.
- Accuracy may be lower with higher levels of exercise, darker skin tones, tatoos or if the device is not worn tight on the wrist.



EKG (Electrocardiography)



- Many smartwatches record EKG measurements
- The smartwatch has 2 electrodes: one on the wrist and one in the digital crown/dial of the watch
- The EKG recorded from a smartwatch is a single lead (or one view of the heart's electrical activity, typically Lead I) vs. 12-Lead EKG
 - 12 Lead EKG = 6 frontal leads & 6 horizontal or chest leads OR 12 views of the heart
- Smartwatch EKG recordings are helpful in detecting signs of an irregular rhythm like **atrial fibrillation**
 - Atrial fibrillation is when the heart's upper chambers (atria) beat irregularly and increase the risk of stroke and heart failure if untreated
- After recording the EKG, most smartwatches allow for signs and symptoms to be documented & many give an alert or reminder to seek medical attention if needed.
- Some researchers have examined using the smartwatch on different parts of the body to record up to 9 Leads of the EKG which could be helpful in other diagnosis, such as early detection of a heart attack, but more research is needed.

VO₂max

- The gold standard for aerobic capacity or cardiorespiratory fitness is maximal oxygen consumption or VO₂max
- Smartwatches estimate VO₂max based on an algorithm or a prediction equation that takes into account training heart rates, training intensity and personal data like age & gender to predict VO₂max.
- Research has found estimate error of 3-15% when compared with direct laboratory testing using a metabolic measurement cart that measures maximal oxygen consumption.
 - Note: Images are from our testing lab, both were 14% error (one smartwatch overestimated VO2max, the other underestimated the actual measurement).





Sleep

- Smartwatches and smart devices like the smart ring typically estimate sleep and recognize sleep patterns using various sensors:
- Accelerometer measurements
- Heart rate monitoring
 - heartrate and HR variability
- Skin temperature
- Breathing rate

A sleep study at a medical facility is a more accurate method for studying sleep disorders like sleep apnea



Smartwatches in healthcare medicine Review article by Masoumian, et.al.

Covid pandemic



Benefits of Wearable Technology



Supporting health goals

 Tracking activity and other health behaviors can help patients achieve goals and notice progress or patterns of behavior

Patient motivation and engagement

- Some users appreciate the reminders and positive reinforcement
- Smart devices can enhance client participation and enjoyment through friendly competition at worksites and patient programs

Real-time self monitoring

• Measurements such as heart rate, EKG, blood oxygen, and sleep tracking can help clinicians to identify, treat and monitor patients

Considerations and Limitations



- It is helpful to understand the values that are being measured and what factors can affect accuracy (type of sensor used in the smart device, different brands, models available and individual differences).
- Think about patient/client usage what features are most important to you and your patient to meet their goals and desired health and fitness outcomes.
- **Cost and Ease of Use** are important factors. Are there any subscription fees associated with the smart device? Check to make sure that it is **compatible** with your smart phone and/or computer operating system.

Considerations and Limitations

- Data that is stored in the cloud may be vulnerable to cyberattacks and privacy risks.
 - Back up data & consider keeping hard copies of some data, if it is important to access.
- Users should **review device settings** and adjust prior to use to maximize security.
 - Personal location settings, health data and social network settings can be set to minimize sharable information that can put the user at risk.
- Always use a **strong password** and **two-factor authentication** when logging in to apps.
- Remind patients and clients that smart devices are never a substitute for medical advice and professional consultation



Thank you!

Questions?



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