



Wearable Technology for Continuous Health Monitoring

**Revolutionizing
Data Collection
and Patient
Management in
Healthcare
Research**

White Paper

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Executive Summary

Wearable technology is transforming the healthcare landscape by enabling continuous health monitoring and providing real-time data that enhances patient management, particularly in high-stakes environments like emergency rooms (ERs). This white paper explores the potential of wearable devices in improving patient outcomes through continuous data collection, early intervention, and enhanced clinical decision-making. Insights from healthcare professionals, particularly in the ER setting, highlight both the opportunities and challenges of integrating wearable data into clinical care.

Introduction

The integration of wearable technology in healthcare is rapidly evolving. These devices, ranging from fitness trackers to medically-focused sensors, offer a wealth of real-time health data that could significantly impact patient care. Specifically, in emergency rooms (ERs), where timely and accurate decisions are critical, wearable devices have the potential to enhance monitoring, improve decision-making, and reduce the occurrence of medical emergencies through proactive care. This paper examines the role of wearable technology in healthcare, particularly focusing on its application within the ER. Through interviews with healthcare professionals, we will explore the benefits, challenges, and barriers of integrating wearable data into clinical care, while providing insights into the future of healthcare technology.

The Role of Wearable Technology in Healthcare

Continuous monitoring of a patient's vital signs and general health state is made possible by wearable technology, which includes smartwatches, heart rate monitors, glucose trackers, and other medical gadgets. These gadgets offer real-time data that can inform clinical judgments, enhance patient outcomes, and maximize emergency care in the setting of emergency rooms, where patients frequently enter in critical condition. These gadgets are able to monitor:

- **Heart rate**
- **Blood pressure**
- **Blood oxygen saturation**
- **Blood glucose levels**
- **Activity levels and movement**
- **Temperature regulation**

Monitoring these measurements on a regular basis can assist identify early warning indicators of illnesses such as diabetic crises, heart attacks, strokes, or arrhythmias before symptoms worsen. Additionally, by incorporating data into electronic health records (EHRs), wearable technology can help clinical procedures run more smoothly and enable emergency room staff to make quicker, better-informed choices.

Key Interview Insights

In the high-pressure environment of the emergency room (ER), rapid, data-driven decision-making is essential—particularly in pediatric care. Wearable health technology offers a new frontier in emergency medicine, providing real-time data that supports early detection, efficient intervention, and improved patient outcomes.

This white paper presents insights from Dr. M. Gombos, a pediatric doctor and supervising

ER physician with 13 years of experience, who shared expert perspectives on the potential of wearable devices in ER settings.

Insights from Clinical Practice

Dr. M. Gombos emphasizes the critical need for accurate, real-time data in managing multiple emergency cases simultaneously. Their responsibilities include overseeing acute pediatric care, managing critical cases, and ensuring the seamless operation of the emergency department.

ER professionals often face split-second decisions where every second counts. In this environment, the ability to access continuous, accurate data could dramatically enhance response times and clinical precision. **Wearable devices**—capable of monitoring vital signs in real time—could play a vital role in supporting these demands.

Practical Use of Wearable Data

Dr. Gombos shared a case where a pediatric asthma patient's wearable device sent an alert indicating a sudden drop in oxygen saturation. This real-time information allowed the ER team to act immediately, leading to faster stabilization and improved patient outcomes.

This example demonstrates how wearable devices can bridge critical data gaps by providing **immediate, actionable insights** that help clinicians make faster and more informed decisions during emergencies.

Preventive Potential of Wearables

Beyond emergency interventions, wearables also offer significant preventive potential. Dr. Gombos believes that by continuously monitoring key health indicators—such as heart rate,

oxygen levels, and blood glucose—wearables can help identify patients at risk before their condition deteriorates.

This proactive approach could enable healthcare providers to intervene earlier, reducing the number of preventable ER visits and hospital admissions.

Barriers to Implementation

Despite the promise of wearable technology, Dr. Gombos notes several barriers to widespread adoption in the ER setting.

Key challenges include:

- **Data integration issues:** Many wearable devices cannot seamlessly connect with existing Electronic Health Records (EHR) systems.
- **Data overload:** The volume of data generated can overwhelm already-burdened ER staff.
- **Privacy and security concerns:** Patient data must be protected in compliance with healthcare privacy standards. To overcome these barriers, healthcare systems will need **standardized data frameworks** and **streamlined processing systems** to ensure wearable data can be securely and efficiently utilized.

Patient Awareness and Engagement

According to Dr. Gombos, most patients are not fully aware of how their wearable data can contribute to their clinical care. Improved education on the benefits of data sharing could foster greater collaboration between patients and healthcare providers. Educating patients about the value of continuous monitoring and real-time health insights could significantly enhance engagement and outcomes, particularly in managing chronic conditions.

Designing the Ideal ER Wearable

In envisioning the optimal wearable device for emergency care, Dr. Gombos highlights several essential features:

- Accurate, continuous vital sign tracking
- Real-time data transmission
- Seamless integration with EHR systems
- Non-invasive, comfortable design
- Intelligent alert capabilities
- Strong data security and privacy protections

A device with these features would empower ER teams to work more efficiently while maintaining high standards of patient safety and comfort.

Henry Schmidt, MD, is leading research that looks at a wearable gadget that can help record, transmit, and interpret pediatric breath sounds in real time. This could help children with asthma receive treatment sooner and stay out of the hospital.

The RESPTM Biosensor, a wearable gadget from Strados Labs, is being used in this new clinical trial to assess wheezing in children. The FDA has already approved the device for use in adults, and this is the first study project specifically for children.

Key Benefits of Wearable Devices in ER Settings

- **Improved Monitoring:** Wearables provide continuous data on patient vital signs, which helps detect early signs of deterioration and supports timely intervention.
- **Faster Decision-Making:** By integrating wearable data directly into clinical systems, ER staff can make faster and more informed decisions, reducing the risk of errors.

- **Reduced Emergency Visits:** By identifying at-risk patients early through continuous monitoring, wearables can help prevent emergencies and reduce unnecessary ER visits.
- **Better Patient Management:** Wearables help track chronic conditions such as diabetes, heart disease, or asthma, enabling more tailored and effective care.

Challenges and Barriers to Adoption

Despite the significant potential benefits, several barriers prevent widespread adoption of wearable technology in healthcare, particularly in ER settings:

- **Data Integration:** Many wearable devices do not seamlessly integrate with existing hospital systems, such as Electronic Health Records (EHRs), limiting their utility in clinical decision-making.
- **Data Overload:** The volume of data generated by wearables can overwhelm healthcare providers in high-pressure environments like the ER, where quick decisions are crucial.
- **Privacy and Security:** Given the sensitive nature of health data, security concerns and compliance with regulations such as HIPAA are critical when transmitting and storing wearable data.

Conclusion

Wearable technology has enormous potential to improve patient care in the emergency room and to support ongoing health monitoring. The potential advantages of wearables, which range from better decision-making to early identification of health conditions, outweigh the difficulties associated with data integration, security, and patient education. Wearables may become a commonplace part of patient care in ERs and elsewhere as technology develops and

integration gets better, helping to provide more preventative, individualized, and effective healthcare.

There has never been a greater need for more precise, efficient, and individualized care as the healthcare industry changes. With the continuous, real-time data that wearables offer, healthcare professionals have never had a better chance to act quickly, keep a closer eye on patients' conditions, and make well-informed decisions in the heat of an emergency. Realizing wearable technology's full potential and improving its influence on emergency treatment will require addressing the obstacles to adoption and integration.

References

Interview:

M. Gombos. (2025, October). *Personal communication*.

Lurie Children's Hospital. (2024, January). *New study may show promise for wearable tracking device in asthmatic pediatric patients*. Lurie Children's Newsroom.

<https://www.luriechildrens.org/en/news-stories/new-study-may-show-promise-for-wearable-tracking-device-in-asthmatic-pediatric-patients/>

Strados Labs. (2023, September 26). *Strados Labs announces pediatric asthma study to validate its wearable device in children with wheeze* [Press release].

<https://stradoslabs.com/strados-labs-announces-pediatric-asthma-study-to-validate-its-wearable-device-in-children-with-wheeze/>

Strados Labs. (2022, May 3). *Strados Labs receives FDA 510(k) clearance for home use of its smart sensor platform for respiratory health, RESP®* [Press release].

<https://stradoslabs.com/strados-labs-receives-fda-510k-clearance-for-home-use-of-its-smart-sensor-platform-for-respiratory-health-resp/>

Wardi, G., Nemati, S., & Nagarajan, V. (2024). Use of wearable data to predict emergency department revisits and rehospitalization within 90 days. *Annals of Emergency Medicine*, 84(4), S76.

<https://doi.org/10.1016/j.annemergmed.2024.08.167>