

Background

- It is estimated that 44.5% of all patients diagnosed with cancer experience cancer-associated pain, leaving an unmet need of managing cancer pain effectively.
- The utilization of devices and wearables in remote patient monitoring (RPM) and at home diagnostics has garnered significant interest in supportive cancer care and cancer pain management.
- RPM digital technologies are under-utilized in oncologic care and should be incorporated in managing cancer associated pain

Methods

We performed a scoping review of the available literature in PubMed, including studies from January 2011 to July 2023 in the English language that pertained to RPM and wearable technologies within healthcare delivery and oncology. Papers focusing primarily non-oncologic applications of remote patient monitoring were excluded.

Wearable Health Devices

- Implementing digital health technologies with these capabilities offers patients a useful tool to treat and self-manage their cancer related pain, positively impacting QOL and supportive care preferences. Additionally, digital health technologies have the ability to overcome a number of challenges to improve health equity, especially increasing accessibility to supportive care, expanding patient-provider and patient-caregiver communication, and decreasing costs
- Wearable devices have transformed the medical landscape
 - Diabetes – continuous glucose monitoring
 - Neutropenia – patients undergoing chemotherapy treatment
 - Neulasta OnPro

Device	Functionality	Application in Cancer Care
Smartwatches and Fitness Trackers	Monitor heart rate, physical activity, sleep patterns, and vital signs	Track overall well-being and activity levels during treatment and recovery
Remote Vital Sign Monitors	Measure blood pressure, heart rate, and blood oxygen levels	Remotely monitor patients' health status and detect concerning changes
Wireless Thermometers	Enable continuous temperature monitoring without physical contact	Assist in managing side effects, like neutropenic fever, during treatment
Smartphone Apps	Help manage symptoms, side effects, and medication schedules	Provide tools for symptom tracking and emotional well-being management
Wearable Biosensors	Detect biomarkers in sweat or bodily fluids for early cancer detection	Aid in early detection or monitoring treatment responses
Remote Electrocardiogram (ECG) Monitors	Record and transmit heart activity to assess cardiovascular health	Monitor cardiovascular health during cancer treatment
Wearable Biometric Patches	Continuously monitor heart rate, respiratory rate, and skin temperature	Provide a comprehensive picture of the patient's health status
Virtual Reality (VR) for Pain Management	Help manage pain and anxiety during treatments or hospital stays	Support pain management during cancer care

Table 1: Functionality and applications of various RPM devices in cancer care

Discussion

Barriers still exist in implementing RPM technologies within oncology:

- 1. The need for streamlined interfaces,
- 2. Widening health disparities
- 3. Digital health literacy
- 4. Associated costs & Insurance coverage
- 5. Data security to have patients and providers to utilize technology.

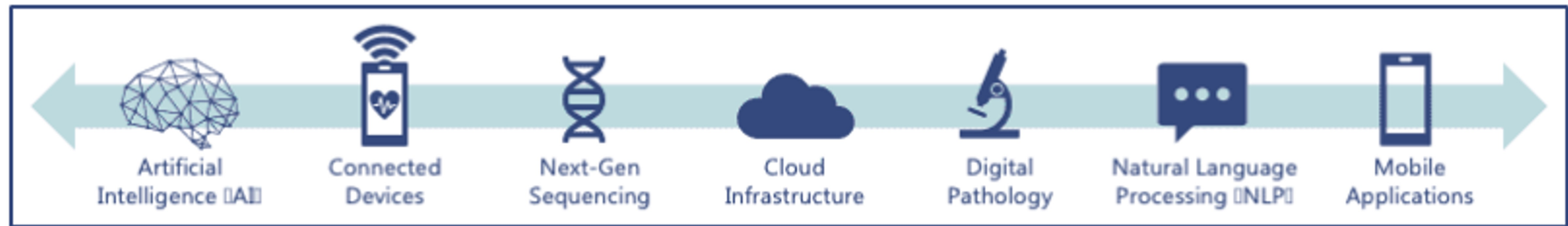


Figure 1 Applications of RPM/Technology in Cancer Care

Conclusions & Future Considerations

Drug delivery devices provide challenges across the healthcare landscape from approval to routine patient use.

Future considerations include analyzing the impact on health equity and access to these devices and expanding future directions, such as assisting in monitoring and reducing admissions for a variety of chemotherapy induced side effects such as nausea/vomiting.

Major Focuses	Clinical Adoption Considerations
Health equity	Regulatory approval
Improvement of patient care delivery	Reimbursement
Reduction in admissions	Patient use and satisfaction