News and Perspectives

The Robot at the Bedside: How Robotics Could Change the Future of Nursing Care

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Abstract

While artificial intelligence increasingly automates behind-the-scenes tasks in nursing, robotics may be moving up to the bedside. In this *News and Perspectives* article, JMIR Correspondent Jenna Congdon reports on the current state and future potential of robotics in nursing.

Key Takeaways:

- Current bedside robots primarily handle repetitive, physical, or logistical tasks, potentially reducing workload while allowing nurses to focus on assessment, clinical decision-making, education, and relationship-building.
- Automation can also remove valuable opportunities for clinical observation. Routine activities often allow nurses to identify subtle changes in a patient's condition, making thoughtful task selection essential.
- Health care organizations should involve nurses throughout robot design, selection, implementation, and evaluation to identify workflow and safety concerns, support adoption, and ensure technology addresses genuine clinical needs.

A nurse's job is never truly done—patient assessments, medication administration, hands-on care such as repositioning and feeding, gathering supplies, and performing procedures keep many nurses on their feet for their entire 12-hour shift. Add to that rising health care demands, an aging and increasingly sicker population, and ongoing nursing shortages, and many health care facilities are feeling pressure to find solutions that can simultaneously improve workflow efficiency and reduce nursing workload while maintaining a high standard of care.

Robotics have already been incorporated into other areas of health care, such as in the operating room, patient rehabilitation, and hospital logistics. More recently, robots have begun to join the nursing workforce at the bedside. Could robots help nurses provide better care?

What Are Robots Doing at the Bedside Today?

Ryan Shaw, PhD, RN, FAAN, is the Chief Nurse Innovation Officer and a Professor of Nursing at Duke Health. He explains that current robotics used in hospitals can be divided into three distinct categories: "There are robots that have predefined structure and processes...They might deliver things like medications or linens, or you might follow them to get to a patient's room. From a safety perspective, these are relatively safe. They aren't making autonomous decisions. The second category is where the clinician or the end user is operating the robot, like in an operating room, where the surgeon has autonomy over the robot's actions. Those are robots that already exist. Then we have the third category...what you might think of as autonomous robots."

Shaw explains that many people imagine "robot nurses" as this type of autonomous machine that goes into patient rooms to perform hands-on care and make complex, independent decisions. He clarifies that "We aren't there yet...That is a newer area, and I think we'll see those kind of robots actually appear first outside of health care, which I think is a good thing because of the risk involved when people are sick. There's a lot of a pushback to losing that human connection, too."

Today's health care robotics aim to reduce repetitive physical tasks, decrease time spent on nonclinical activities, and allow nurses to focus on assessment, education, and relationship-building. Most current systems are designed to augment nursing care by supporting daily workflows rather than replacing nurses entirely.

An example is Obi, a robot made by DESiN, LLC, which was designed to restore self-feeding for people with upper-extremity motor impairment. Feeding time across multiple meals per day can total many hours, so devices like Obi both lessen caregiver workload and support patient independence.

Another current use-case of robotics at the bedside is known as telepresence care, wherein a remotely located nurse or physician controls a robot located at the patient's bedside to perform direct patient care tasks and assessments.

What Robotics Can and Cannot Do for Bedside Nurses

One literature review found that a staggering 62% of nursing tasks could potentially be performed by robots and broke those tasks down into 26 categories, including bath and meal

assistance, repositioning support, phlebotomy, disinfection, and rounding. However, another study makes the case that "the complexity and unpredictability of health care environments cannot be replicated in a laboratory setting," highlighting the difficulties of developing reliable robots that assist rather than impede the nursing workflow.

While robotics may improve efficiency, nursing is not simply a collection of tasks. Robots may help address tasks that consume nursing time and do not require nursing judgment, but they may not have the capacity for the nuanced care and assessment offered by a human medical provider. Automating tasks such as recognizing subtle changes in patient condition, offering emotional support, clinical decision-making, patient advocacy, and engaging in complex communication may be more difficult—and even ill-advised.

Danielle Miller, DNP, RN, and founder of The Pivot Nurse, highlights the irreplaceable human monitoring entwined in even the most mundane nursing tasks. "...Robotics in bedside care raises a larger issue than whether a device can technically perform a task," she says. "Many nursing activities, such as feeding, repositioning, mobility assistance, and routine bedside interactions also function as opportunities for assessment. A nurse may simultaneously observe swallowing difficulty, changes in cognition, skin integrity, respiratory status, mobility, pain, or subtle deterioration while performing what appears to be a simple task."

When it comes to the decision of whether and what to automate, she notes: "We should be asking questions not only related to whether a robot can do this task, it should be more related to, what clinical information and human interaction are we potentially removing when we automate it, and what must be intentionally replaced?"

Considerations for Implementation

When choosing which robotics—if any—to implement into bedside workflows, health care leaders should include nurses in the entire implementation process, from design to execution to ongoing integration and staff education. Including nurses in these processes supports health equity and enhanced patient outcomes as staff uptake and integration of the new technology improves. Nurses can identify real workflow problems, safety concerns, patient experience issues, and practical barriers before they become roadblocks. Simply put, a robot designed or purchased to complete or support nursing tasks, without nursing input, may solve the wrong problem entirely.

Beyond the need for collaborative design, successful integration requires health care organizations to address a wide array of practical and ethical challenges—from anticipating potential technical hurdles, staff training requirements, and the possibility of workflow disruptions to assessing patients' comfort with new technologies, addressing whether such tools might exacerbate existing inequities, and developing robust frameworks for safety, monitoring, and accountability. Leaders must also assess whether a more effective answer would simply be to hire more human staff.

Ultimately, addressing these complex challenges and ensuring technology truly supports the clinical environment requires early and ongoing nursing collaboration at every stage of development and deployment.

The Future of Nursing Robotics

Many express concern that robotics may someday replace the nursing workforce, but these technologies may instead be viewed as another evolving tool in the health care ecosystem, similar to the integration of electronic health records, remote monitoring, and AI.

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>
> Danielle Miller, DNP, RN

The ultimate success of these technologies depends less on the mechanical capabilities of the robots themselves and more on thoughtful integration into clinical workflows. The future of nursing may be about creating systems where technology handles the time-consuming basics, while nurses continue doing those crucial pieces that only humans can do.

Keywords: robotics; autonomous robots; nursing staff; nursing staff, hospital; workload; nurse's role; practice patterns; nurses; patient care team; patient care management; health personnel

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