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When Collaborative Robots Meet the Bedside:

Nurses Informing Emerging Artificial Intelligence Technology

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Abstract

Across the United States, clinicians working in the acute care hospital settings continue to face persistent workforce shortages. As artificial intelligence (AI) becomes increasingly integrated into healthcare delivery, it is critical to explore technology-enabled solutions that reduce non-clinical workload without compromising care. At ChristianaCare, a nurse-led team of executive and clinical leaders, researchers, and informaticians, launched a three-year, grant funded collaborative robot (cobot) pilot program starting in 2022 to evaluate whether cobots could offload repetitive, time-consuming non-clinical tasks from staff. At the conclusion of the grant period in 2025, the findings demonstrated operational value in select high-volume workflows, such as non-urgent medication and equipment deliveries. However, the pilot also revealed that current cobot capabilities were unable to meaningfully augment nurses' complex and often time-sensitive patient care workflows. These findings underscore the need for engineers and scientists to partner closely with nurses and frontline hospital staff throughout the design and implementation processes to ensure AI powered cobots deliver high impact, workforce-supporting solutions. Additionally, healthcare leaders should not underestimate their role in facilitating these collaborations and removing organizational barriers that could influence operational success.

Nurses Shaping Robotic Innovation in the Hospital Setting

Nurses have been consistently recognized as the most trusted healthcare profession for 24 years and counting,[1] and they comprise the largest segment of the healthcare workforce with 4.7 million registered nurses nationwide.[2] Their credibility and firsthand clinical experience enable them to provide essential insight to inform successful deployment of new AI technologies into the healthcare setting.[3] Yet despite being uniquely positioned to influence robotic design, implementation, and evaluation, nurses are typically not engaged as strategic partners with academia and industry to transform their workflows in new and innovative ways.[3] This represents a missed opportunity to accelerate adoption into practice, optimization in utility, and advancement of robotic science in healthcare.

After receiving a $1.5 million grant from the American Nurses Foundation *Reimagining Nursing Initiative*, ChristianaCare embarked on a pioneering three-year journey to build, implement, and evaluate a nurse-led cobot pilot program. This initiative explored whether delivery focused cobots could offload non-clinical tasks from busy clinical nurses and hospital staff with the overarching goals of preserving nurses' time for direct patient care while generating evidence to inform workforce models and best practices.[4] The nurse-led team partnered with multidisciplinary teams spanning pharmacy, information technology (IT), clinical informatics, operations, facilities and vendor organizations to deploy three cobots across more than 80 patient areas.[4] Collaborating together, the interprofessional team identified and tested diverse use cases,

built monitoring systems, and embedded a research program to evaluate impact in real-world clinical environments.

Throughout the funding period, executive support emerged as a critical factor to succeed in reaching the pilot's overarching goals. Nurse-led innovation requires visible executive sponsorship, protected time, and patience for iterative learning. Non-traditional and innovative projects often surface achievements and limitations, and leaders must be willing to support pilots that generate insight even when outcomes challenge initial assumptions.

By the end of the grant period, three cobots completed more than 48,600 deliveries and tested several software integrations such as electronic health records and the elevator system.[4] At the same time, cobot operational testing clarified important workflow limitations. Nurses infrequently initiated cobot delivery requests as many of their patient care priorities required urgency or relied on informal coordination strategies that were difficult to automate with cobots. This critical insight reinforced the importance of engaging nurses and frontline staff early and continuously in planning and testing, rather than assuming their workflows would be ready for cobot integration.

Conclusion

As healthcare systems explore use cases for emerging AI technologies, especially to alleviate a stressed workforce, nurse executives and healthcare leaders can facilitate championing non-traditional, nurse-led innovation that could lead to tomorrow's discoveries. This pilot program demonstrated that nurses are indispensable in shaping how cobots must evolve, inform best practices, and keep aspirations grounded in reality to develop a new workforce frontier. By leaning in early, supporting multidisciplinary collaboration, and valuing learning alongside efficiency, healthcare leaders can ensure these initiatives generate meaningful, scalable solutions that truly support the workforce.

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