LEADERSHIP THINK TANK

Research results: Frontline leader involvement in implementing new technology to health systems
Prepared by Alyssa Vincent, Research Information Specialist, Resource Center, October 2023

- Lit review on the successful implementation of new technology tools in health systems, and how involving frontline healthcare workers in the decision-making, implementation, and training on new technology tools and products.
- Questions:
  - Is it common for the frontline nurses or clinicians to be involved in the process?
  - Does the involvement of frontline nurses or clinicians have an effect on the success of a new technology tool?

Unless otherwise noted, the full text of the articles are hyperlinked.

- "[What We Lose By Leaving Nurses Out of Tech Decisions](#)," Woebot Health, October 2023
  - "Many new healthcare technologies are designed without sufficient input from frontline nurses who will actually be using them. This has resulted in systems that increase nurse frustration and workflow disruptions rather than improving efficiency and care. Nurse burnout and turnover is high, with 40% attributed directly to EHR systems. Ending nurse burnout must be a priority to address nursing shortages."
- "[Engaging Frontline Nurses in Building an Electronic Workload Acuity Tool](#)," *Nurse Leader*, March 2023
  - Abstract: "Nursing leadership and nursing informaticists engaged bedside nurses in the design, build, and evaluation of the Nursing Workload Acuity tool, which produced a robust evaluation process and seamless implementation of an acuity tool embedded in the electronic health record. The tool uses existing data elements from the electronic health record that are mapped to rules to produce a dynamic score. Bedside nurses evaluated content, points, and scoring, which confirmed the acuity tool included necessary elements and matched nursing perception of workload greater than 90% consistently."
- "[Co-designing a digital application for dementia care with healthcare staff in hospital and long-term care](#)," University of British Columbia Master's Thesis, January 2023
  - Abstract: "This study highlights the importance of incorporating healthcare staff's expertise and experience into the design of digital applications (apps). Despite the potential benefits, staff participation in co-design activities has been limited due to difficulties in reaching and engaging them. The Covid-19 pandemic has presented new challenges, but also opportunities for researchers to adapt and conduct co-design. The purpose of this study is to explore the experiences of healthcare staff during the pandemic and identify any barriers or facilitators that may have impacted their participation in co-design activities."
- "[Massachusetts General Hospital nurses help develop tech to alleviate frontline workers' burdens](#)," *Becker's Hospital Review*, May 2022

- o "Boston-based Massachusetts General Hospital partnered with infusion therapy and pain management company B. Braun Medical to create innovation teams to develop technologies that alleviate front-line workers' burdens and improve patient care."
- "Involvement of frontline clinicians in healthcare technology development: Lessons learned from a ventilator project," *Health and Technology*, 2022
  - o Abstract: "Co-development of healthcare technology with users helps produce user-friendly products, ensuring safe device usage and meeting patients' needs. For developers considering healthcare innovations, engaging user experience can reduce production time and cost while maximizing device application. The purpose of this paper is to report lessons learned from the development of a 3D printed origami ventilator prototype in response to the rise of ventilator demand due to the Coronavirus disease (COVID-19) pandemic. We conducted focus groups with frontline clinicians working in an Intensive Care Unit of a large urban hospital in Vancouver, British Columbia, Canada."
- "Editorial: Now more than ever, nurses need to be involved in technology design: lessons from the COVID-19 pandemic," *Journal of Clinical Nursing*, December 2020
  - o "While considerable attention is paid to the emerging health technologies being used during the crisis, utter disregard has been shown to the 'usual' poorly designed technologies that nurses used every day preceding the pandemic and will continue to use during and after the fact. The COVID-19 pandemic highlights the urgent need for nurses to become involved in technology design, acquisition and implementation, and to provide considerations for the complexities of technology use within all levels—micro, meso and macro—of the healthcare system. This editorial depicts how poorly designed technology negatively impacted patient care and nursing workflow before the pandemic and reveals how these insufficiencies have been amplified during the COVID-19 pandemic."
- "Clinician user involvement in the real world: Designing an electronic tool to improve interprofessional communication and collaboration in a hospital setting," *International Journal of Medical Informatics*, February 2018
  - o Abstract: "We designed and implemented an electronic clinical communication and collaboration platform in a large community teaching hospital. The design team consisted of both technical and healthcare professionals. Agile software development methodology was used to facilitate rapid iterative design and user input. We involved clinician users at all stages of the development lifecycle using a variety of user-centered, user co-design, and participatory design methods. Thirty-six software releases were delivered over 24 months. User involvement has resulted in improvement in user interface design, identification of software defects, creation of new modules that facilitated workflow, and identification of necessary changes to the scope of the project early on. A variety of user involvement methods were complementary and benefited the design and implementation of a complex health IT solution. Combining these methods with agile software development methodology can turn designs into functioning clinical system to support iterative improvement."

- "Guiding Healthcare Technology Implementation: A New Integrated Technology Implementation Model," *CIN: Computers, Informatics, Nursing*, March 2015
    o This article is a bit more general and focused on a new model for research, but seems to address the need to engage staff in technology implementation
    o Abstract: "Healthcare technology is used to improve delivery of safe patient care by providing tools for early diagnosis, ongoing monitoring, and treatment of patients. This technology includes bedside physiologic monitors, pulse oximetry devices, electrocardiogram machines, bedside telemetry, infusion pumps, ventilators, and electronic health records. Healthcare costs are a challenge for society, and hospitals are pushed to lower costs by discharging patients sooner. Healthcare technology is being used to facilitate these early discharges. There is little understanding of how healthcare facilities purchase, implement, and adopt technology. There are two areas of theories and models currently used when investigating technology: technology adoption and implementation science. Technology adoption focuses mainly on how the end users adopt technology, whereas implementation science describes methods, interventions, and variables that promote the use of evidence-based practice. These two approaches are not well informed by each other. In addition, amplifying the knowledge gap is the limited conceptualization of healthcare technology implementation frameworks. To bridge this gap, an all-encompassing model is needed. To understand the key technology implementation factors utilized by leading healthcare facilities, the prevailing technology adoption and implementation science theories and models were reviewed. From this review, an integrated technology implementation model will be set forth."
- "Involving hospital staff is key to implementing new technology," *The Guardian*, September 2014
    o "What has made UHL's approach so successful is the involvement of staff. Clinical engagement is imperative when implementing a major change to working practice. We achieved this by selecting five pioneering wards to work closely with our project team to provide suggestions and feedback in how best to use the software for their needs. You can never underestimate how good it makes people feel to be involved in projects that are going to make a fundamental difference to providing care."
- "Involving nurses in developing new technology," *Nursing Times*, November 2013 (abstract linked)
    o Abstract: "Throughout history, nurses have been accepting of change and adapted to new ways of working. Despite this, nursing has a reputation of being obstructive to change, particularly around technology. Healthcare technology implementation is not always successful and we argue that this is because nurses and other frontline workers are not involved enough in the change process. Nurse leaders need to be actively involved in the debate over appropriate technology and resources."