

## LEADERSHIP THINK TANK

### Research results: Technology tools and health care workplace violence prevention

#### Key Takeaways:

- Workplace violence is an ongoing challenge, and many technology solutions are in development to address it, but few studies have been done to validate particular technologies, especially from the perspective of nurse leaders.
- Few peer-reviewed studies focusing on new technology to be used by nurses to promote safety and prevent violence exist.
  - Of these studies available, two 2023 articles indicate that significant barriers in technology design, acceptance, and implementation, organizational culture, and other factors resulted in little or no reduction in workplace violence.
- Some studies indicate that predicting violence using EHR data may be effective in violence mitigation.

#### Prepared by Alyssa Vincent, Research Information Specialist, Resource Center at AHA, November 2023

- Questions:
  - What does the research show around technology tools being implemented to improve safety and prevent violence in health care systems and organizations?
    - As a sub-question, would any of the tools to prevent violence be implemented from a nurse leadership perspective?

#### Scholarly articles

- [“Rehabilitation professionals’ perspectives and experiences with the use of technologies for violence prevention: a qualitative study,”](#) *BMC Health Services Research*, August 2023
  - “There is growing public policy and research interest in the development and use of various technologies for managing violence in healthcare settings to protect the health and well-being of patients and workers. However, little research exists on the impact of technologies on violence prevention, and in particular in the context of rehabilitation settings...We found that participants used three types of technologies for violence prevention: an electronic patient flagging system, fixed and portable emergency alarms, and cameras. **All of these were perceived by participants as being largely ineffective for violence prevention due to poor design features, malfunction, limited resources, and incompatibility with the culture of care.**”
- “Staff Duress Alarms for Workplace Violence in the Emergency Department: A Mixed-Methods Evaluation,” *Journal of Emergency Nursing*, May 2023

## LEADERSHIP THINK TANK

- “Complex personal duress alarms may be implemented as part of a multicomponent approach to preventing and mitigating workplace violence in emergency departments. Evaluation of duress alarms after implementation has been identified as a gap in the literature. The purpose of this quality improvement project was to examine the impact of a duress alarm system on workplace violence and user experience in an urban emergency department...**Findings indicated that the duress system was not associated with a decrease in workplace violence, and that the majority of clinical staff did not even wear the duress alarm. Staff indicated that the primary barriers to use of the alarm were the bulky design of the alarm badge, inadequate education about the alarm device and process, and the lack of a reliable and timely response from security.**”
- “Predicting Workplace Violence in the Emergency Department Based on Electronic Health Record Data,” *Journal of Emergency Nursing*, May 2023
  - “Emergency departments are extremely vulnerable to workplace violence, and emergency nurses are frequently exposed to workplace violence. We developed workplace violence prediction models using machine learning methods based on data from electronic health records...**This study showed that workplace violence could be predicted with previous data regarding ED visits and stays documented in electronic health records.** Timely prediction and mitigation of workplace violence could improve the safety of emergency nurses and the quality of nursing care.”
- “[To End Workplace Violence, Integrate High-Tech With High-Touch](#),” *Journal of Nursing Administration*, March 2023 (abstract linked in the article title, [full-text available through RightFind for \\$58.50](#))
  - “A leader should create an environment in which everyone feels safe. Yet, there is a rising, deadly epidemic in healthcare on the heels of the COVID-19 pandemic: workplace violence. Healthcare workers, particularly nurses, are at a far higher risk of violence on the job compared with most other professions. Leaders have the power to reverse this trend by sounding the alarm, doubling down on their commitment to workplace safety organization-wide, and taking a comprehensive approach that integrates high-tech with high-touch strategies.”
- “Wearable Technology and Pulse Transit Time (PTT) Used to Assess Workplace Violence Incidents in Nursing,” Proceedings of the 2022 HFES 66<sup>th</sup> International Annual Meeting
  - Nurses are exposed to incidents of workplace violence involving patients and their family members, and also coworkers. Studies of occupational stressors generally rely on subjective self-reports, questionnaires, or biometric and biochemical markers in long-cycle time intervals, but such assessments offer little guidance to HF/E intervention efforts. **This study examined the viability of using wearable sensors**

## LEADERSHIP THINK TANK

- to detect workplace violence incidents, and included measurement of pulse transit time (PTT) as a biomarker of continuous blood pressure.** Six nurses were monitored over seven days. The electrocardiogram, PTT, and activity level were measured using a custom-designed armband. Participants used a wristwatch (Empatica E4) to log incidents, and a smartphone survey app to rate incident severity. **Results show PTT was a more reliable indicator of workplace incidents than low- to high-frequency (LF/LH) ratio heart rate variability, offering a more robust way to continuously monitor critical events noninvasively over long periods in demanding work environments.”**
- [“Mitigating staff risk in the workplace: the use of RFID technology during a COVID-19 pandemic and beyond,”](#) *BMJ Health & Care Informatics*, November 2020
    - “Radiofrequency identification (RFID) technology uses electromagnetic fields to automatically identify and track tags attached to persons or objects to create a real-time location system. There are a variety of previously described use cases in healthcare that involve tagging patients, hospital personnel, medications and equipment in order to optimise clinical workflow and expenditure. **In our opinion, such functionality can further be exploited to identify risks to staff safety and implement preventative mechanisms to address possible high-risk events through real-time alerts and accurate location information.”**
  - [“Violence Prevention: Technology-Enabled Therapeutic Intervention,”](#) *Nursing Leadership*, 2019
    - “The aim of the study was to explore the experiences of nurses regarding the implementation of technology-based violence prevention interventions... Three themes were identified: reassurance of safety, an increase in proactive measures and limitations of technology. **Nurses held positive perceptions of the impact of technology-based interventions on violent incidents. The interventions were regarded as effective for the detection of potentially violent patients as well as for providing assistance from security staff when a violent incident occurs or appears imminent. However, nurses also acknowledged that patient-related violence was ‘unavoidable’ and that technology cannot fully prevent violence from occurring.”**
- News stories**
- [“AI can help keep healthcare employees safe,”](#) *Healthcare IT News*, June 2023
    - “Northwell Health is using an AI-enabled security system, its CEO explains, and its Center for Gun Violence Prevention is researching other hospital-based violence intervention strategies...In fact, AI has quite literally changed our lives and how we go about our day. From the machines we exercise on, to our voice-activated home systems and work productivity tools. This same powerful AI technology can help us protect our people and the visiting public by using advanced sensors, cameras, and

## LEADERSHIP THINK TANK

machine learning models to create safer zones. With this type of AI weapons security system, security becomes a frictionless experience that lets the majority of foot traffic keep flowing—while stopping bad actors with guns from entering our buildings.”

- “Multi-layered security solutions protect nurses from workplace violence,” *Security Magazine*, April 2023
  - “The following three layers of a comprehensive solution can work together to help security leaders create a safe and secure healthcare environment: visitor and patient management, duress alarms, and real-time location systems options.”
- [“Keep calm and carry on: Virtual reality helps medical and nursing students manage agitated patients with empathy,”](#) National University of Singapore News, May 2022
  - “To enhance education on managing incidences of agitation in the clinical setting, the NUS Yong Loo Lin School of Medicine (NUS Medicine) has developed a new virtual reality (VR) programme to teach medical and nursing students effective management of agitated patients using empathic means, in a safe, repeatable, and controlled manner. Titled “Virtual Reality in Agitation Management (VRAM)”, the programme helps students learn the skills while handling VR patients that reflect behaviour characteristics of patients often encountered by healthcare workers.”
- [“Could tech help to curb workplace violence in healthcare?,”](#) *MedCity News*, April 2022
  - “One company is addressing violence against healthcare workers with a panic button. Philadelphia-based ROAR for Good makes the AlwaysOn button that nurses wear to easily call for help when a situation seems to be escalating so the facility can deploy staff to the site quickly...The Behavioral Wellness Center in Philadelphia – a behavioral hospital that has psychiatric and addiction services – is already implementing AlwaysOn. Nurses clip the AlwaysOn button onto their scrubs. The quarter-sized button works via wireless alert technology and does not rely on the internet.”
- [“Combat workplace violence with security technology,”](#) *Security Magazine*, August 2022
  - Beyond access control and visitor management systems, some of the most fundamental workplace applications of technology begin with weapons detection, which expedites the passage of people without having to be frisked. These systems allow personnel to identify and confiscate a range of lethal instruments — such as firearms, knives, Tasers and more — before they can be carried into a facility. Artificial intelligence (AI) is now being applied to weapons detection, with the potential to greatly advance situational awareness. These software platforms can be integrated with an organization’s existing networked camera system and video analytics to detect weapons in real time and accelerate automated threat alerting.