Case Study:
Preventing Falls in Skilled Nursing using AI and Machine Vision Technologies

VIRTUSENSE™

United Methodist Communities
Abundant Life for Seniors

leadingage.org/cast

Categories:

- ◆ Reduced Response Time, Incidences, and Costs
- ◆ Increased Safety, Peace of Mind, and Satisfaction
- ◆ Improved Regulatory Compliance and Outcomes

About the Organization

Organization Name:
United Methodist Communities (UMC)

Main Contributor:
Larry Carlson, CEO

Organization Type:
Skilled Nursing Facilities

Organization Description:
UMC is a faith-based, nonprofit organization that has operated for more than 112 years in New Jersey, offering its residents an array of spiritual, health, and social services. Each of UMC's full-service campuses has been designed as a continuum to allow residents to access multiple services under one roof. UMC customizes and scales services to accommodate residents' needs. Transforming the health care residences from traditional nursing into household models, where residents can experience greater autonomy and satisfaction, represents one innovation.

Project Description

As with most senior care communities, falls have been a problem at UMC, and more so when the COVID-19 pandemic hit and residents were quarantined in their rooms. Monitoring residents with a higher risk of falling became challenging amid the efforts to prevent the spread of the virus. The Federal Communications Commission (FCC) recently awarded UMC a COVID-19 telehealth grant to implement VSTAlert for remote patient monitoring in its skilled nursing residences.

Safety Technology Category

Fall Detection and Prevention

System Embodiment

Sensors mounted on the wall or ceiling directly across from the patient's headboard that provide infrared motion analysis that continuously monitors the patient in the room.

Business Model

Standard of Care

Implementation Approach

VSTAlert combines artificial intelligence, machine vision, and Internet of Things (IoT) devices to create a comprehensive remote monitoring platform for skilled nursing facilities. IoT sensors are mounted in resident rooms to monitor for bed exits and facilitate two-way video calls. When a resident attempts to get up, an alert is sent to the nurses assigned to that room via a smartphone app—available for iOS and Android devices. Sending an alert after a bed-exit is not fast enough. That's why VSTAlert uses artificial intelligence and 1.5 million hours of machine learning data to recognize the body language and movements associated with exiting a bed, effectively predicting intent, to give your staff more time to address a bed exit before it becomes a fall. Alerts are also sent to a central monitoring dashboard where the status of the entire wing can be monitored.

The mobile app connects nurses directly to their patients. In addition to receiving alerts, the app enables nurses and physicians to initiate two-way video calls with residents from anywhere.

Administrators can use the Admin Dashboard to optimize their fall prevention program with data. It identifies where falls are happening, when they're happening, and how the staff is responding.

In addition to saving time and energy upfront, the preventative measures of the technology eliminate the extensive documentation required by nurses after a fall that takes them away from resident care.

Prior to implementation, VST's Client Success Consultants (CSC) met with frontline workers virtually to identify their roles and answer questions. Virtual courses are provided to staff to familiarize themselves with the equipment and how it works, with tips on interacting with residents when the VSTAlert is activated. Once onsite, the CSCs set up the VSTAlert systems and work with staff to ensure the technology is working the way it's intended, including accompanying them on calls to resident rooms.

As for the residents themselves, the technology became part of their environment and didn't affect their day-to-day lives.

Outcomes

VSTAlert platform was developed with over 1.5 million hours of machine learning data with a goal of replacing bed alarms and extending room monitoring capabilities without the need for someone to continuously watch a video monitoring screen. These algorithms can accurately determine movements attributed to a bed exit versus the patient shifting positions in bed, thus reducing false alarms. VSTAlert's technology is integrated with end-point devices and nurse workstations to alert the clinicians in real-time so they can respond to bed/chair exits and prevent a potential fall.

Prior to VSTAlert, UMC had 226 total falls in 16,171 patient days, or 13.98 falls per 1,000 patient days from April 1 to June 30, 2020. Since implementation, UMC rooms with VSTAlert have had 13 falls in 5,145 patient days, or 2.53 falls per 1,000 patient days from July 14 to October 13, 2020 ,in all four communities. That is an 82% decrease in falls.

◆ **Reduced Response Time**: VSTAlert notifies staff at least 30-60 seconds before a resident exits their bed, allowing ample time for CNAs to get to them.
◆ **Improved Outcomes/Reduced Incidences:** Falls decreased by 82%.

Challenges and Pitfalls to Avoid

As with any new technology, there is a learning period and adoption can be slow for some staff members as they adjust to the workflow. In most cases, it takes about four weeks for healthcare communities to get the best results from VSTAlert. Typically, there are still falls in the early stages of implementation as staff get used to the technology's features, which is normal in any organization adapting to new processes.

Lessons Learned/Advice to Share with Others

Approximately half of the 1.6 million nursing home residents in the United States fall each year, and nearly 10% of Medicare skilled nursing facility residents experienced a fall resulting in significant injury. Of those who fall, one in three will fall two or more times in a year.[1] The average hospital cost for fall-related injuries is $30,000.[2]

Solutions on the market today are often reactive, not proactive. Bed sensors set off an average of 15-20 false alarms per day and only detect falls 20% of the time. Video cameras capture a fall as it is happening, which is not only too late, but can open you up to possible negligence lawsuits if the video is reviewed by attorneys. Neither of these solutions are effective in preventing falls.

At VirtuSense, we believe the best approach to stopping a fall is to prevent a bed exit altogether. VSTAlert has a 98% detection accuracy rate and has 95% fewer false alarms than other devices on the market. VSTAlert uses artificial intelligence and machine vision to predict intent, recognizing when a resident is about to get out of their bed or chair and sending alerts 30 to 65 seconds before they get up. This gives nurses and staff more time—up to two minutes in many cases—to protect those under their care from a life-altering fall.

2020 was an especially challenging year for skilled nursing facilities as caregivers were short-staffed and running out of PPE in the midst of a deadly pandemic. With VSTAlert, less rounding is required, only alerting nurses when a patient intends to get up, allowing them to care for more patients with fewer resources and potential exposure to COVID-19.

1 https://psnet.ahrq.gov/primer/falls
2 https://healthjournalism.org/blog/2018/05/study-documents-the-high-cost-of-falling-for-older-adults/

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