The
effectiveness
of physical
security solutions
A systematic review

Video monitoring and analytics offer the capability for healthcare professionals to *continuously observe and aid patients*, even when they cannot be physically present in their rooms *at all times*

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Introduction

Undoubtedly, patient safety is the number one priority for most healthcare facilities. As troubling risks can considerably affect the health and integrity of patients, building a culture of safety, that starts at the top of the organization, is an integral part of improving hospital conditions. The issues that need to be urgently addressed are medication, diagnostic, and patient discharge errors; hospital-acquired infections, and inpatient falls. This white paper will examine the latter cause of concern for hospitals and clinics.

Patient falls are a serious p atient safety issue, with falls resulting in fractures, subdural hematomas, excessive bleeding, and even death. Falls can result in several difficulties, not least of which include poor medical outcomes, an inferior patient experience, and increased healthcare costs. Accidental falls, about 14% of all falls, are unanticipated and difficult to prevent; however, by creating a safe environment that deliberately reduces injury, falls are less likely to occur.

Besides increasing observation, revising toilet routines, and being mindful of side effects from medications, such as confusion and impaired mobility; new technologies should be utilized to ensure patient safety. Most importantly, video monitoring and video analytics can help healthcare workers monitor and assist patients around the clock, even when they are physically unable to be in their room 24/7.

Enhancing medical capacity and ability

A patient fall is an unplanned descent to the floor, with or without injury to the patient. Falls and their resulting injuries continue to occur at unacceptable rates, in healthcare settings, with institutions averaging 3.3 to 11.5 falls per 1,000 patient days. The consequences of not actively preventing this issue are disastrous. These events result in re-hospitalization, loss of function and independence, increased morbidity, and for seniors, potential death.

Organizations are well aware of the toll impatient falls take on medical and financial outcomes. Clinical costs and fall-related injuries exceeded $50 billion in 2015, and continue to raise. Further, they are associated with longer length of stay and poorer health results. Although the repercussions are clear, there is still a deficit of specialized knowledge on fall prevention, assessment, and post-fall treatment.

Some healthcare facilities aim at creating a false sense of safety without really reevaluating their fall prevention programs or adopting effective physical security solutions. It is also common that the patients requiring the most protection from falls are severely underserved. These individuals are the elderly, frail, post-surgical, or those taking four or more prescription medications.

To enhance medical capacity and ability, hospitals must develop a robust fall prevention program and evaluate the effectiveness of their interventions on reducing falls in hospitalized adults. It is also necessary to incorporate interdisciplinary expertise, offer training and education on fall management, improve communication among staff, adhere rigorously to protocols and safety practices, promote adequate staffing levels, and have a strong and seasoned leadership.

MEASURING FALL RATES

Measuring fall and fall-related injury rates cannot be underestimated. In fact, they are a direct indicator of how well hospitals are succeeding in making patients safer. Fall rates can change based on the time of the year or from unit to unit. For instance, the numbers will differ in the geriatric psychiatry unit versus the intensive care unit.

During any fall prevention effort, it is important to regularly assess fall rates and prevention practices and specifically monitor the following criteria:

1. Outcome (how many falls per 1,000 occupied bed days)

2. Care processes (the actions taken to reduce the risk)

3. Infrastructure and technologies utilized.

Fall injuries can be categorized as:

- None — Patient shows no injuries, signs, or symptoms resulting from the fall.

- Minor — The fall resulted in application of a dressing, ice, cleaning of wound, limb elevation, topical medication, bruise, or abrasion.

- Moderate — The fall resulted in suturing, application of steri-strips/skin glue, splinting or muscle/joint strain.

- Major — The fall resulted in surgery, casting, traction, required consultation for neurological skull fracture or internal injury, such as rib fracture or liver laceration, or patients with coagulopathy who receive blood products.

- Death — The patient died as a result of injuries sustained from the fall, not from the physiologic events causing the fall.

Once data is meticulously collected, it is key to examine it closely to make the appropriate analysis and improvements to the fall prevention plan.

Consider the below reflective questions:

- Are the fall trends changing over time?

- Are they improving or getting worse?

- Are changes in the fall rate attributable to changes in practices?

- Are changes in the fall rate attributable to the adoption of new technologies or lack thereof?

- What can be improved?

- Which are the possible reasons for failure?

- Are video monitoring and video analytics being utilized to mitigate fall rates?

SAFE PRACTICES

Although inpatient falls are more common and represent more liabilities than ever, new research-based strategies mean they are also more preventable. Effective fall prevention programs require predominantly skilled healthcare workers, the integration of patient-tonurse communication solutions, video surveillance technologies, and close collaboration with interprofessional teams, especially when caring for at-risk populations.

Core solutions:

1. **Risk assessment**
   A multifactorial and multidisciplinary approach must be implemented to conduct more holistic fall and injury risk assessments and to identify the underlying cause of identified risk factors, including age, diagnoses, and functional ability. Fall assessment and management must differentiate and segment vulnerable patients, most notably elderly and frail individuals, to protect them from injury.

2. **Safe toilet practices**
   Most inpatient injuries happen in or around tubs and showers, and on or near the toilet. This number increases with age, with individuals over 85 experiencing the highest rates. Therefore, this complex area should be prioritized by effectively managing patient limination protocols, personal hygiene, and toileting needs.

3. **Engage patients**
   It is vital to actively involve patients in their care. Thereby, fall prevention programs should provide healthcare workers with the skills to educate and engage patients, family members, and other caregivers. In addition, staff must be aware of patients' typical reactions after a fall, including apathy toward falls, self-blaming, risk-taking behavior, and reluctance to impose on busy nurses.

4. **Create individualized post-fall plans**
   Understanding the specific context of each fall is fundamental to preventing future occurrences. For instance, the type of fall (accidental, anticipated physiological, unanticipated physiological) , the source and severity of injuries sustained, and the characteristics of the environment that might have conduced to the fall.

Patient monitoring

As falls are an indispensable issue to prevent, patients are often provided with a multitude of interventions, such as bed alarms, chair alarms, low beds, fall mats, and sitters, none of which has been proven to prevent falls. In particular, the alarms have limited usefulness due to the high likelihood of frequent false alerts.

Video monitoring, on the other hand, is an efficacious way in fall prevention. It is being utilized for patient monitoring and fall mitigation across hospitals, urgent care centers, and clinics and as a way to rapidly respond to incidents, which can make a huge difference in the outcome of a fall.

Video is a foundational component of a safe environment for patients, who necessitate 24/7/365 vigilance and care. Only video surveillance can offer the uninterrupted attention that patients and family members expect from healthcare organizations.

REMOTE LIVE VIDEO

Video surveillance can be used to remotely monitor and ensure patient care. With remote access to live and historical video footage from a designated viewing station, computer, or mobile device, security teams and health professionals can have clear visibility into the realtime status of patients.

When fall incidents occur, response time is key to ensure the impact is minimal. With sophisticated, high-resolution video surveillance equipment, patient care and safety can be improved. An option is to have cameras installed in patient rooms and monitor screens placed in nurse stations.

The use of cameras in these areas might create privacy concerns, especially when under The Health Insurance Portability and Accountability Act (HIPAA) patient medical information, including visual information, must be protected. However, with education and the proper communication with patients and family members, this problem can be overcome.

For instance, letting families know that cameras are there to help in an emergency. Furthermore, having privacy LED on cameras to alert anyone in the room that someone from the security team has connected to the camera and is streaming video. It is important to give patients an opportunity to ask questions and provide them with written information about the value of cameras in their room and how their confidentiality will not be affected.

A more interactive way to observe patients is to have an expert security team monitor remotely multiple patients simultaneously, particularly those who are at most risk of falling or those with a mental impairment. With a 2-way audio communication platform, operators can verbally redirect patients, contact caregivers, and, if necessary, trigger an alarm.

Remote monitoring can document patient observation, interactions, and adverse events prevented within the system, as well as significantly reduce falls, falls with injuries, and one-to-one sitter costs. Modern solutions make it possible to share live footage with law enforcement, customize user permissions based on unit and/or role, and still protect patient data as per HIPAA.

The role of video analytics and AI

Providing patients with good lighting, proper footwear, a tidy environment, and wearable technologies might not be enough to prevent a fall. Fortunately, there is now an advanced opportunity to boost a fall prevention program using video analytics to help healthcare workers respond immediately to safety concerns.

With video analytics and artificial intelligence, predictions can provide insights to help prevent falls from happening. The system identifies which patients are at a high risk by assessing their gender, age, surgeries, medications, mobility function, visual impairment, and pre-existing health conditions, among others, and calculating a score based on these conditions.

If a patient's score is ranked higher than others, then they are classified as being at a higher risk of experiencing a fall-related injury, and should be prioritized over others to receive the medical attention they require. Video analytics are a valuable tool to classify, rank, and focus on the needs of patients to successfully reduce the average fall count.

Through analytics, care teams can predict exactly which patients are at risk for an imminent fall. They can also be alerted in real-time of at risk-patients, which can reduce the chance of a fall happening. This is a powerful technology able to alleviate one of the most difficult patient-safety problems facing healthcare facilities today.
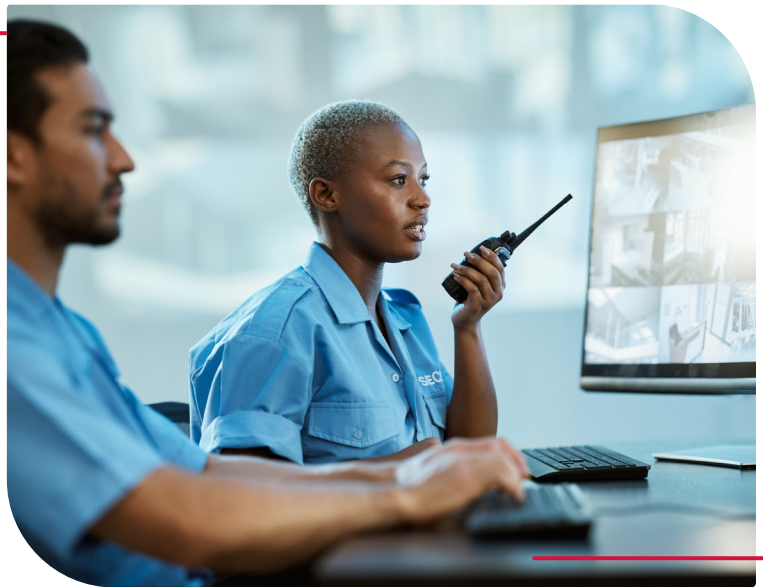
Conclusion

Using conservative estimates, there are more than 500,000 falls occurring each year in U.S. hospitals, resulting in 150,000 serious injuries. Moreover, falls often generate substantial medical expenditures to treat fall related injuries. In 2015, the estimated medical costs attributable to both fatal and nonfatal falls were approximately $50 billion. Overall, medical spending for fatal falls was estimated to be $754 million. Being aware of these figures helps us understand the magnitude of this growing public health problem and the potential benefit of implementing effective prevention strategies and security solutions.

Despite this and other data, inpatient fall prevention has yet to reach the rightful level of priority within healthcare organizations. Hence, it is recommended that leaders in hospitals and clinics promote extensive institutional training on fall prevention, carefully consider the epidemiology of patients with a higher risk of falling, and take a multidisciplinary approach that facilitate the collaboration of experts from different fields. In addition, it is eminent to conduct a comprehensive risk assessment to maximize the efficacy of a prevention program.

As healthcare organizations become more intentional about their efforts to reduce the incidence of falls at their premises, several best practices, such as improving toilet conditions, actively engaging patients in their care, and creating individualized post-fall plans, must be observed. However, technology plays a crucial role in preventing and detecting falls and assisting healthcare workers in responding immediately to an event, which can greatly reduce the consequences of an accident. With the tactical use of video monitoring and video analytics, patients can be provided with the safe environment they deserve.