



Fall Management Solution

Whitepaper

Fall Prevention Interventions

A Comprehensive Comparison
of Fall Detection Technologies

How to Decrease Fall Rates, Time on the Ground and False Alerts at Your Senior Living Facility

THE FULL COST OF FALLS

Falls are the leading cause of injuries among people ages 65 and older, with annual estimated direct medical costs of US \$754 million for fatal falls and US \$50 billion for nonfatal falls.¹ Direct costs include fees for hospital and nursing home care, doctors, rehabilitation, community-based services, use of medical equipment, prescription drugs and insurance processing.²

About 36 million falls are reported among seniors annually, resulting in 3 million ER visits and 32,000 annual deaths.³ In other words, a senior is treated in the ER for a fall-related injury every 13 seconds, and a fatal fall occurs every 20 minutes.¹ For individuals over 75 who reported more than one fall in the last three months, the average mortality rate is 16.4% in the next year and 40.5% over three years, compared to 8.5% in one year and 25.7% over three years for non-fallers.⁴

Older adults with cognitive impairments like Alzheimer's and dementia are two to three times more likely to fall than cognitively healthy older adults due to the role cognition plays in gait control.⁵ Falls can lead to severe injury and death, an increased fear of falling, depression and social isolation as the fear may keep seniors from engaging in activities. History of a fall is associated with a two- to six-time increased risk of a future fall.⁶

Beyond the personal and medical implications of falls, they cost long-term care facilities an average of \$6,200 per faller per year, according to 2008 data.⁷ Taking into account 35.8% cumulative inflation, that is \$8,417 per faller per year in 2022. They can lead to extremely expensive lawsuits, decreased occupancy rates, and high staff turnover as falls are one of the biggest challenges for frontline workers.⁸



**20
min**

Every **20 minutes** a senior in the U.S. has a fatal fall.



1/5

One out of five senior falls causes a serious injury requiring emergency hospitalization.



**36
mil**

About **36 million** falls are reported among seniors each year.



28%

28 percent of seniors fall each year.

Existing Fall Detection & Prevention Solutions Fall Short

The evidence is clear – prevention is critical. Twenty to 30% of falls in long-term care facilities are preventable⁹, and implementing fall prevention tactics reduces falls by 25%.¹⁰ Selecting the proper fall prevention system is essential. Despite three-fourths of residential care communities using formal fall prevention techniques, 20% of those facilities still report a fall from one in every four residents annually.¹⁰ One reason for the discrepancy between fall prevention systems and positive outcomes is many facilities still use outdated solutions like wearables and medical alert buttons. To prevent falls, you must first understand what caused them. Understanding their cause begins with detection.

1. MEDICAL ALERT SYSTEMS. These include buttons and bed alert systems placed under the mattress to detect when a senior gets out of bed. They can also be worn on the body or placed around a living space and require the resident to push a button to call for help. They are typically part of a nurse call system in assisted living.

They rely on the individual's cognitive ability and physical proximity to the button to receive care. Therefore a person experiencing a seizure or stroke or individuals with a cognitive impairment like Alzheimer's and dementia may be unable to press the button. Constant false alarms due to rolling over on them in bed or accidentally pressing buttons are reported to desensitize care staff to the frequent noise and could make them less responsive when there is a real emergency.¹¹

2. FALL DETECTION WEARABLES. Worn on the body as a necklace or bracelet, these sensors automatically generate fall detection alerts. They can be standalone or part of the nurse call system. Wearable devices can break, lose their battery charge or be misused. Seniors often forget or refuse to wear them, or choose not to due to stigma or other reasons.

3. RADAR SENSORS ON WALLS. These include doppler radar systems that use electromagnetic waves, infrared technology or a combination of both. They track shifts in electromagnetic waves to measure the velocity of a person's body parts which may indicate a fall. They are typically associated with a high number of false alerts triggering an alarm when there wasn't a fall. Plus, they are often more expensive than alert buttons and wearables.

4. CAMERAS. Security cameras monitor residents' body movements and track positioning. While accurate and practical, these systems are often associated with expensive up-front installation costs and expensive long-term maintenance. Before deploying these solutions, carefully consider resident privacy and look for features like video blurring.



8 Things to Look For in a Fall Prevention System:

It is crucial to select a fall detection technology that fits your budget, with the highest accuracy, privacy and ease of use. Here's a quick checklist of what to look for in a fall-detection solution:



- ✔ **EASY TO INSTALL** - You can do it yourself. No professionals are required, minimal installation costs and short time from purchase to up and running.
- ✔ **EASY TO USE** - The solution should be intuitive without extensive staff training on how to use it. It should be easy to design response trees and set up alarms via SMS, phone and email.
- ✔ **EASY TO SCALE** - Look for solutions that can quickly grow as your organization grows and the needs of the business evolve. It is simple to add cameras and adjust schedules while maintaining a comfortable price point.
- ✔ **NO FALSE ALARMS** - False alarms are one of the biggest challenges with fall detection systems. Look for technology solutions with low false alarm rates.
- ✔ **REAL-TIME ALERTS** - Look for solutions that detect falls and transmit alerts to caregivers as they happen so that help is administered as quickly as possible and time on the ground is reduced.
- ✔ **PRIVACY PROTECTION** - To maintain the dignity and privacy of guests while still promising the medical help needed, look for technology solutions that ensure maximum privacy with features like encryption and blurred images and never share or sell the individual's private information.
- ✔ **BUDGET ALIGNED** - Solutions that bring the technology in-house without a large upfront investment or ongoing operating expense.
- ✔ **ACCEPTED BY SENIORS** - Seniors must feel comfortable with the fall management solution. It needs to make them feel safe without being intrusive or having a stigma of wearing a device.

The Future of Fall Management: Cameras with AI Technology

Cameras with AI technology, also known as computer vision, use artificial intelligence (AI) to convert video streams into meaningful information. Using technology to rethink the camera as an image sensor backed by intelligence, computer vision is analogous to a human eye and brain. As a result, it allows for a diverse range of use cases for computers to perform tasks that previously required human intelligence. In the most accurate use cases, computer vision is enhanced with human input to deliver maximum benefits, reduce errors and improve operational efficiency.

Cameras with AI technology offer a highly accurate way to manage, predict and prevent falls in senior living facilities and communities. Vision AI can identify a human body by mapping points on the resident and detecting sudden positional changes that occur with a fall. Capturing and reviewing the fall helps staff understand the cause – loss of balance, a trip over an object, or something else – and make critical changes to prevent future falls.

Vision AI can address many of the shortcomings of outdated fall management tools:

- Does not rely on the resident's cognitive ability or physical proximity to a button to call for help.
- Fewer false alarms as there is no risk of the person rolling over on a device or accidentally pressing a call button.
- Residents never have to worry about forgetting to wear a device, break it or charge it.

With maximum privacy in mind, it is critical that solutions combine image sensor technology with AI at the EDGE (AIoT). Edge computing makes it possible to run complex machine learning algorithms locally on the devices (cameras) rather than sending data to the cloud for inferencing. This not only ensures data security and privacy but also improves latency, reduces bandwidth costs and eventually the total cost of providing the service.



Introducing KamiCare, AI-Powered Fall Detection

KamiCare is the only fall detection and management solution with edge-based AI technology that detects falls with 99.9% accuracy and quickly alerts caregivers if a fall occurs.

FALL DETECTION

Using advanced vision AI, KamiCare sensors track up to 30+ points on the body, function without issues even at night (using infrared technology) and in partial view to accurately predict falls.

If a fall is detected, the video of the fall is sent to the KamiCare 24/7 response team for verification. The video of the patient's body is blurred before it is presented to the response team to maintain utmost privacy. Upon human confirmation, an alert is immediately sent to the designated caregiver(s) via email, SMS or a phone call for the appropriate course of action. Response escalation trees enable other caregivers to respond, in case the first caregiver is not able to respond. All of this happens within a maximum of 90 seconds to significantly shorten typical fall response time.

FALL PREVENTION

95% of falls go unwitnessed, giving care teams little insight into their causes and limited information to make preventative changes. KamiCare offers the ability to see and understand the root cause of falls, giving a voice to seniors, including those with cognitive impairments like dementia and Alzheimer's who can not advocate for themselves.

KamiCare significantly helps prevent falls by tracking the contributing factors that potentially lead to falls, including time of day and location, and by recording the activity that happened when the fall occurred. With video evidence of what happened before and after the fall, care teams can determine the root cause of the fall and improve fall prevention practices. It can also be used to determine how quickly caregivers attended to the fall.

KAMICARE OUTCOMES

- **99.9% ACCURATE:**

AI technology that detects falls combined with the KamiCare rapid human expert verification process eliminates false alerts, reducing the need for routine room visits and optimizing care efficiency.

- **80% FEWER FALL-RELATED ER VISITS:**

With visual playback, caregivers can assess what caused a fall, lower the risk of severe injuries and improve fall prevention practices. As a result, it reduces ER visits by more than 80% and increases resident occupancy rates and length of stay.

- **60% REDUCTION IN FALL RISK:**

Thirty minutes of post-fall video enables staff to conduct a comprehensive quality assurance analysis. Review the fall, understand causes and care and train staff accordingly to reduce future falls by 60%.

- **60-SECOND RESPONSE TIME:**

95% of falls go unwitnessed, leaving seniors unattended for hours. We reduce response time to an average of 60 seconds with immediate alerts sent directly to designated caregivers.

- **24/7 SUPPORT TEAM:**

Your round-the-clock partner for fall monitoring and alerting. We add an extra human layer to advanced AI technology to ensure complete fall detection accuracy.

KamiCare Key Benefits

AFFORDABLE

- **Low Up-Front Costs:** No server or network installation is needed. Ninety percent lower upfront costs and 40% less recurring fees than other national providers.

EASY TO USE

- **Non-Invasive:** No wearable gadgets or charging required.
- **DIY Installation:** Easy-to-install in less than five minutes. Fall sensors can be mounted on the wall or ceiling of any room. The KamiCare application is intuitive to use.
- **Compatible with Existing Infrastructure:** Plugs into a standard electrical outlet and uses existing wi-fi. No batteries, ethernet wiring, recharging or special network installation is required.
- **Minimal Maintenance:** AI and camera sensor software are updated Over The Air.
- **Scalable for Any Facility:** Each sensor serves as a stand-alone system; therefore, no expensive servers are required. No minimum room requirements. Built to fit your facility needs, from one room to thousands.
- **Configurable Alert Delivery:** Alerts are sent via email, SMS or a phone call. Escalation trees can easily be implemented.

HIGHLY EFFECTIVE

- **No False Alerts:** AI technology plus human verification ensures 99.9% accuracy.
- **Future Injury Prevention:** Caregivers & doctors can see what led to the fall to help implement future preventative measures.
- **Privacy Protected:** Videos are sent only when a fall is detected, content is blurred and encrypted.

BUILT-IN PRIVACY FOR SAFETY, NOT SURVEILLANCE

KamiCare provides maximum privacy without compromising safety in multiple ways:

- The KamiCare sensor transmits the fall video clip for review only when a potential fall is detected.
- The transmitted videos are blurred to protect privacy.
- All videos are encrypted using bank-level encryption.
- By moving computing power closer to the data with edge-based AI, vulnerability to attacks is reduced.



KamiCare vs Other Fall Alert Systems

KamiCare provides the most comprehensive performance features, with the easiest installment, best value and strictest privacy protection.

Summary Table	Features	KamiCare	Radar Sensors	Wearables (Including Push Buttons)	Bed Alarms	Other Camera Based Systems
Performance	99.9% Accuracy	✔				
	No False Alarms	✔				
	Experts Verify Falls	✔				
	Artificial Intelligence	✔	✔			✔
	24-hour Monitoring	✔	✔	✔		✔
	Privacy Protection	✔	✔	✔	✔	
	Real-time Alerts	✔	✔	✔	✔	✔
	Night Coverage	✔	✔	✔	✔	✔
	Fall Prevention		✔			✔
Low Cost	DIY Installation	✔		✔	✔	
	Low Upfront Cost	✔		✔	✔	
	Low Maintenance	✔	✔	✔	✔	
	Low Sensor Cost	✔		✔	✔	


✔ All companies in this category offer this feature.
✔ Not all companies in this category offer this feature.

Falls cost senior living facilities a significant amount of time, resources and reputation damage and they are the leading cause of injuries among people ages 65 and older. They lead to decreased occupancy rates, high staff turnover and expensive lawsuits. Even the best care staff can not fully predict or prevent falls.

Existing solutions are outdated and bring a myriad of challenges. They rely on the individual’s cognitive ability and physical proximity to a device to receive care; Wearables break, lose their charge, are used incorrectly or seniors forget to wear them altogether; Other solutions are extremely costly or bring too many false alarms.

Reducing falls at your facility is a combined team effort. A blend of human and technology intervention, prevention and detection is proven most effective. Fall detection and prevention powered by AI provides peace of mind for busy care staff, privacy-first safety for residents and financial security for administrators. Ultimately, the senior living facilities that can provide the highest level of safety for residents will win.

SOURCES

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www.kamivision.com/kamicare

Email kamicaresales@kamivision.com

Call (888) 886-2263

