



Tech note

Fall Detection: Best Practices for Value Added Resellers

Introduction

For the best results, communities should be educated on the best practices for deployment and careful handling of the pendant.

The Inovonics fall detection solution sends an automatic alarm message when sensors indicate that a resident may have fallen, even if the resident is unable to press the alarm button.

This tech note will overview how Inovonics fall detection works for our value added resellers, and outline some best practices for implementation of this critical tool.

How Fall Detection Works

The Inovonics fall detection pendant determines potential resident falls by considering any height change greater than two-and-a-half feet, at an acceleration appropriate for a fall, combined with a rotation of at least 30 degrees.

The pendant then allows a 30-second calculation window for the system algorithm to rule out a recovery or a sensor fluctuation. After this window, a unique fall alarm message is sent to your emergency call system application via the Inovonics cloud. The pendant vibrates and a purple LED flashes to provide confirmation the alarm has been sent. Caregivers are then alerted to respond to the potential fall event.

All fall detection pendants produced and shipped after February 29, 2024 include an on-device configuration option that allows a system administrator to disable or enable the fall detection feature for an individual resident's pendant. Please refer to the installation manual for instructions. All configuration changes are confirmed via a time-stamped MQTT message to your application. All pendants are shipped from Inovonics with the fall detection feature enabled.

Fall Detection is a Balancing Act

Because missed falls are possible, residents should be instructed to push the pendant's button after a fall if they are able to do so.

Any fall detection solution must strike a balance between the accurate detection of falls and the minimization of false alarms. Because the Inovonics fall detection solution is a life-safety system, it is designed to prioritize accuracy, while eliminating as many false alarms as possible.

Fall Detection Accuracy

Initial field testing of the Inovonics fall detection solution suggests an accuracy of approximately 90%. This is consistent with both witnessed testing and data simulation.

Unfortunately, no fall detection solution will detect 100% of falls. A fall may be missed by the algorithm if the device doesn't see sensor data that meets the thresholds. If, for instance, the fall is from a low height of less than two-and-a-half feet, or there is a lack of rotation or a low acceleration. Likewise, device movement after the fall may be interpreted as a recovery by the resident.

Because missed falls are possible, caregivers should instruct residents to always press their button if they are able to do so.

False Alarms

False alarms may occur when the algorithm sees movement and acceleration that resemble a fall. Sometimes these can be the result of purposeful movements that may look like a fall, such as when:

- The pendant is thrown, dropped, bumped or jostled.
- The resident sits down quickly.
- The resident exercises.

Inovonics' initial field testing suggests an average of roughly one false alarm per pendant per week.

Expectations should be set with the community about accuracy and false alarms.

Best Practices for VARs

It is imperative to set expectations with the senior living community about system accuracy and potential false alarms. For this reason, on-screen alerts for a fall should use phrases such as "possible fall" or "potential fall." On-screen alerts should also clearly distinguish between button-press alarms and falls.

To support continuous improvement efforts to the Inovonics fall detection algorithm, mobile apps and desktop applications should include a mechanism for data collection, including the ability to:

- Mark fall event alarms as true or false.
- Mark true fall events based on their severity; whether a fall includes an injury, for instance.

To assist Inovonics in improving accuracy, a means for collecting data about performance is essential.

- Report a detailed description of the fall.

If there is no mobile app, incident reporting is still essential. A paper-based approach is useful at the outset of an installation effort.

Best Practices to Reduce False Alarms

The following best practices should be observed:

By the community

- Consider assigning fall detection pendants only to residents clinically assessed as being at risk of falling.
- Use configuration option to disable or enable fall detection for individual residents based on your risk assessment.
- Take into account staffing levels and response times to determine optimal deployment.
- Final decision for deployment resides with the community.

By individual residents

- Wear the pendant outside of the shirt.
- Wear the pendant at the sternum to minimize swinging or bumping.
- Be seated before removing the pendant or clothing, and handle the pendant carefully.
- Avoid dropping or throwing the pendant.
- Remove the pendant during supervised exercise activities.