



REPORT

Advancing hospital fall prevention strategies with sensor-driven insights

Executive summary

Inpatient falls remain a persistent and costly challenge for hospitals across the United States, contributing to lengthy stays, avoidable injuries, increased litigation, and financial penalties. Even with evidence-based practices and some established protocols, many hospitals struggle to sustain fall reduction. Among the tools that have demonstrated meaningful impact, fall prevention sensor technology has emerged as a critical tool. The following section presents new data on its effectiveness.

New real-world analysis using the **Vizient® Clinical Data Base (CDB)** and **MarketPulse tool** reveals what's possible when insight meets action. **Hospitals that invest in fall prevention sensor technologies, such as bed, chair, and toilet alarms, can see as much as a 30% reduction in patient falls.** This white paper examines the findings of how combining technology, real-world data, and clinical expertise can help hospitals shift from a reactive response to proactive prevention, **the ongoing challenge of falls in hospital settings.**

Hospital falls impact approximately 700,000 to 1 million patients annually in the U.S. Nearly one-third of these falls result in injury, averaging as much as \$36,776 in direct costs per fall.

The impacts extend beyond clinical outcomes. In nearly 50% of malpractice cases involving patient falls, rulings favor the patient. Additionally, as set out in the International Classification of Diseases, Tenth Revision (ICD-10) Hospital-Acquired Condition (HAC) list, the Centers for Medicare & Medicaid Services penalizes hospitals in the lowest quartile for fall-related injuries (HAC-05), costing those hospitals up to 1% of their Medicare reimbursements.

Despite fall prevention programs being implemented by hospitals for years, many hospitals struggle to reduce fall rates consistently or are unable to sustain improvement. Even when fall prevention programs are in place, lack of adherence or ineffective deployment can limit impact. Root causes often include insufficient staff training and patient education, inadequate environmental safety measures, an absence of a culture focused on safety, and a lack of patient-specific interventions.



Sensor technology: The data behind the impact

Sensor technology, such as bed, chair, and toilet sensors, are reshaping how hospitals approach fall prevention, putting real-time monitoring to use by detecting patient movement. These alarm monitors are connected to a sensor that detects a shift in a patient’s weight, triggering an alert to the caregiver for faster intervention. A 2017 study published in the *Joint Commission Journal on Quality and Patient Safety* by Potter and colleagues reported a 54.1% reduction in fall rates in one inpatient medical unit following the implementation of a depth and bed sensor system, highlighting the substantial impact of targeted sensor integration on patient outcomes.

A data-informed approach allows clinicians to proactively adjust care plans, mitigate risks, and better align interventions with patient needs. Through thoughtful integration with existing clinical workflows, sensor technology can serve as a more responsive and data-driven approach to patient safety.

To assess the use of sensor technology in fall prevention strategies, we undertook an analysis using data from 750 hospitals in the Vizient Clinical Database from Q4 2021 through Q3 2024. Results analyzed 30,484 falls across

158,344,570 bed days from CDB hospitals during this time frame to understand the scope of falls across different types of hospitals. This analysis considered the use of fall prevention sensor technology as determined from hospitals’ spending on sensor products and evaluated the rate of total falls and the rate of falls with injury.

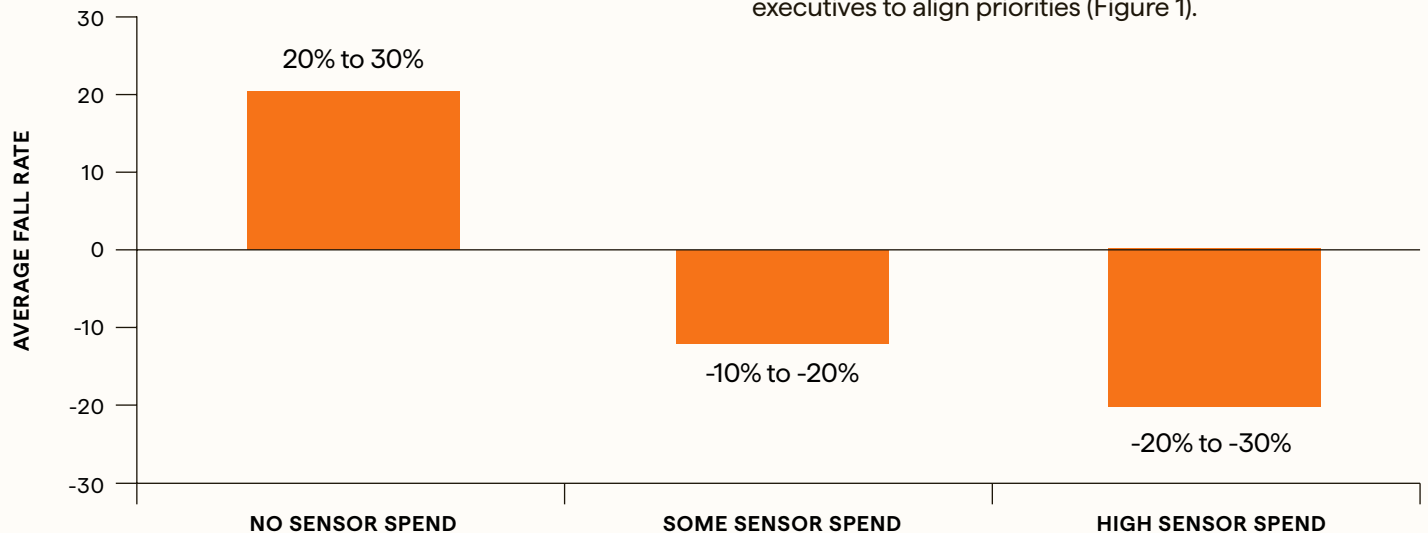
Hospitals that had invested in fall prevention sensors were segmented based on the overall clinical acuity of patients admitted and the level of spend. Hospitals with no evidence of sensor spend, which we refer to as hospitals without sensors, were also analyzed. Falls were determined from ICD-10 discharge diagnosis codes that weren’t present on admission.

Our analysis uncovered a strong correlation between fall reduction and the level of hospital spend on sensor technologies.

Notably, benefits related to total fall reduction were realized across all hospital sizes and types, with evidence of sensor spend indicating scalable value. High-acuity hospitals demonstrated the greatest improvement, likely due to their higher baseline risk.

These findings support more nuanced planning and enable supply chain leaders, clinical leaders, and C-suite executives to align priorities (Figure 1).

FIGURE 1. FALL RATE CHANGES BY SENSOR TECHNOLOGY SPEND LEVEL (OBSERVED RANGES ACROSS HOSPITALS)



Note: Observed ranges in patient fall rate changes are based on hospital investment in fall prevention sensor technology. Each bar and bar cap line reflects the range across multiple hospitals from Q4 2021 to Q3 2024. Source: Vizient Clinical Database. Irving, TX: Vizient, Inc.; 2025. <https://www.vizient.com>.

Building an effective fall prevention program

Fall prevention in hospitals is inherently multifaceted, requiring coordination across clinical practices, environmental safeguards, organizational culture, and staff and patient engagement. While this analysis focuses on the impact of sensor technology, there's no one driver to a fall prevention plan. Other critical factors, such as patient education, a strong culture of safety, and caregiver presence at the bedside, also play essential roles in determining program success. Drawing on established frameworks such as the Agency for Healthcare Research and Quality's *Preventing Falls in Hospitals* guide and the Fall TIPS Toolkit, the following section outlines the core, evidence-based elements that support a comprehensive and sustainable fall prevention strategy.

Patient and family engagement

Engagement between patients and family or caregivers plays a critical role in effective fall prevention, making a safety plan shared and actionable. The use of technology such as bed, chair, and toilet sensors can greatly make this engagement quicker and more responsive. For example, a shared responsibility for safety is enforced when a caregiver is informed and can call for help before moving a patient.

This engagement is most effective when personalized. Research shows that patient-specific risk assessments, incorporating clinically derived predictors such as mobility limitations, cognitive status, medication profiles, and patient-reported measures like fear of falling, are essential for developing personalized fall prevention plans. In a 2020 multisite study by Dykes and colleagues, a nurse-led, patient-centered fall prevention toolkit that translated individual risk factors into customized education and signage resulted in a 15% reduction in overall falls and a 34% decrease in injurious falls. These findings underscore the value of engaging patients and families directly in tailored fall prevention strategies that are visible and meaningful at the bedside.

Sensor alerts enable quicker staff response, which caregivers can trust, increasing their confidence in the care team's vigilance. In some cases, technology can even be integrated with patient education—through bedside displays or mobile apps—that shows activity trends or explains why certain precautions aren't only in place, but why they matter. Connecting real-time insight and technology helps translate clinical protocols into daily, relatable actions that support fall prevention.

Essential aspects of patient and family engagement

- Patient-specific risk assessments
- Visual cues at the bedside (eg, laminated posters, bedside monitors)
- Patient education on fall risk and prevention

Organizational alignment

Organizational alignment within a hospital's leadership is critical for planning fall prevention strategies through consistent prioritization, resource allocation, and accountability across all levels of care. This alignment by hospital leadership fosters empowerment from staff members who are responsible for patient outcomes.

Moreover, aligned leadership facilitates fall prevention into strategic planning and operational workflows, promoting system-wide adoption of best practices and evidence-based tools. An engaged leadership team enables cross-department collaboration among nursing, therapy, informatics, and supply chain, making technology implementation, staff training, and outcomes tracking more effective. This top-down approach drives sustainability, continuous improvement, and, ultimately, better patient outcomes.



Essential aspects of organizational alignment

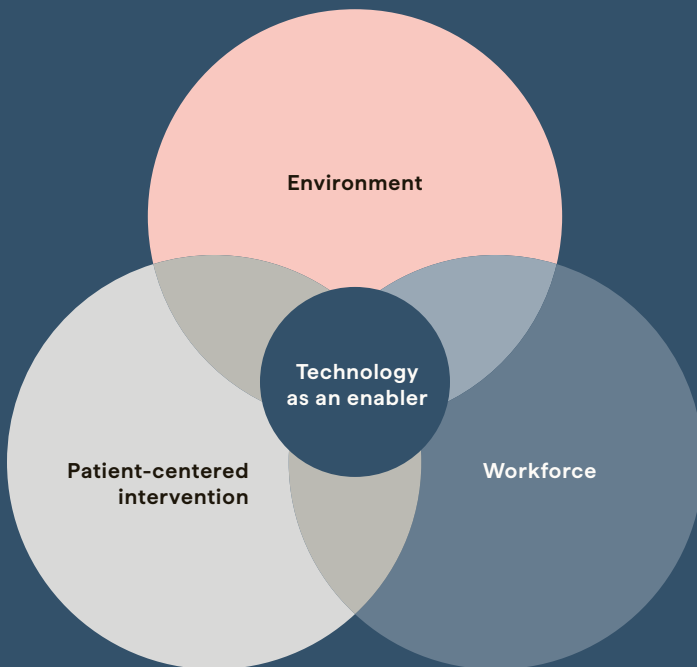
- Leadership buy-in and accountability
- Designation of unit-based fall prevention champions
- Routine training and consistent internal communication

Clinical and environmental foundations

A robust fall prevention strategy starts with foundational clinical and environmental practices that reduce risk and create a safer care environment. Standardized precautions and an optimized care environment form the baseline for consistent, system-wide improvement, and enable more advanced interventions to be planned and implemented over time.

Essential aspects of clinical and environmental foundations

- Universal fall precautions (eg, nonslip footwear, patient call bells within reach)
- Environmental design (eg, grab bars, proper lighting, nonslip flooring, adjustable beds)
- Post-fall management protocols and interdisciplinary debriefs
- Cord management (eg, wireless/wired options, uncluttered cords)



From data to deployment: Strategic recommendations for hospital leaders

To effectively integrate sensor technology into a hospital's overall fall prevention strategy, leaders should begin by aligning technology implementation with existing patient safety protocols and interdisciplinary care plans. This step involves engaging frontline staff—nurses, therapists, and patient safety officers—in the selection and deployment of sensor systems to ensure usability and clinical relevance. Training programs should be established to educate staff on interpreting sensor alerts and incorporating data insights into daily rounds and care decisions. Clear protocols for responding to sensor-generated alerts are essential to avoid alarm fatigue and ensure timely interventions.

To drive measurable impact and informed decision making, hospital leaders should leverage real-world data from sensors to identify high-risk patients and evaluate the effectiveness of fall prevention strategies. Clinical informatics team collaboration can help integrate sensor technologies with datasets, like the Vizient Clinical Database (CDB), into the electronic health record. This will enable more seamless documentation and enhance clinical decision support. Finally, a continuous improvement framework should be adopted, using sensor analytics to monitor trends, adjust practices, and inform quality improvement initiatives aimed at reducing fall rates and improving patient outcomes.



Next steps

- **Adopt a systems approach:** integrate training, environmental redesign, and technology.
- **Use data strategically:** benchmark performance using clinical outcomes databases like CDB, and monitor spend trends through tools like MarketPulse.
- **Justify with economics:** apply tools such as economic calculators to demonstrate return on investment and support decision making.
- **Engage the C-suite:** frame fall prevention as a clinical outcomes measure just as important to reputational, financial, and compliance issues.
- **Start with archetypes:** tailor interventions based on facility type and spend profile (Figure 2).

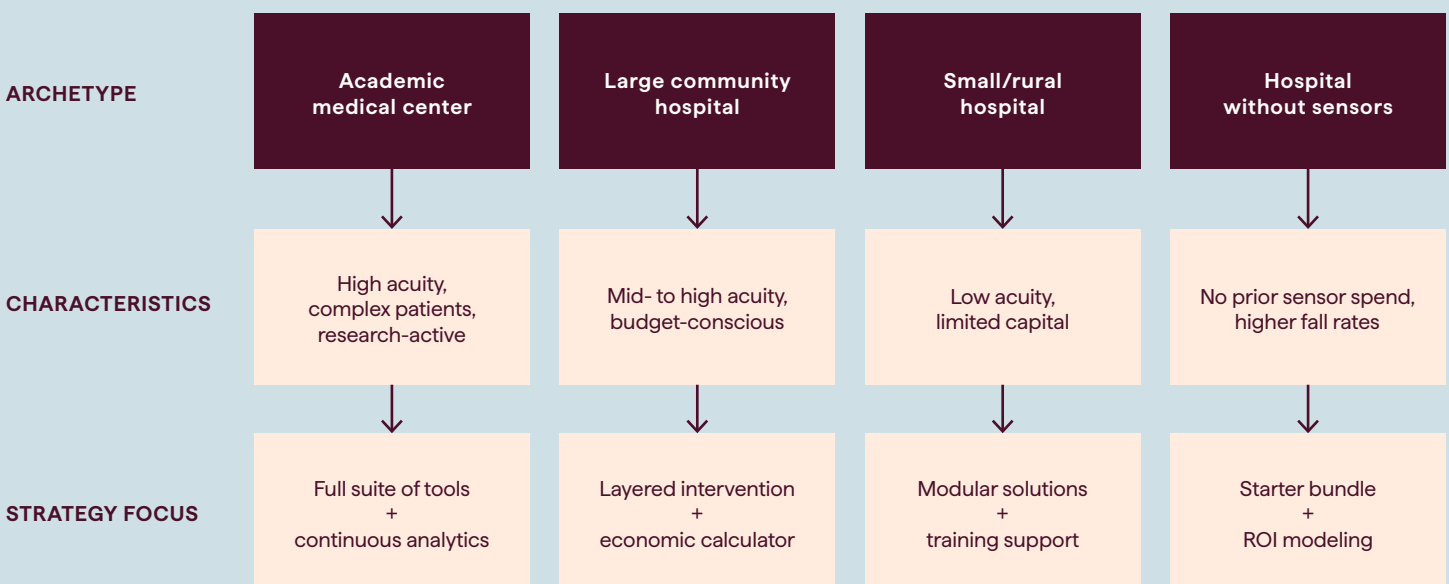
Conclusion: Building a safer future through data-informed design

Reducing inpatient falls is both a quality imperative and a financial necessity. Hospitals that embrace an integrated, data-driven approach—combining clinical best practices with bed, chair, and toilet sensors along with other sensor technologies—are better positioned to safeguard patients, protect reimbursements, lead in safety innovation, and improve trust. An effective fall prevention strategy can even garner \$14,600 in net avoided costs per 1,000 patient days.

While technology alone isn't a silver bullet, the evidence is clear: when embedded into a robust fall prevention program, it significantly amplifies impact. Hospitals that strategically deploy sensor technology as part of a systems-based fall prevention approach are well-positioned to achieve both clinical and economic gains.

Lead from the top. Empower from the bedside. Prevent from every angle.

Figure 2. Hospital archetypes for fall prevention strategy



SOURCE: VIZIENT ANALYSIS 2025

Sources

Vizient Clinical Database. Irving, TX: Vizient, Inc.; 2025. <https://www.vizient.com>; MarketPulse Analysis, 2025; Stocking J et al. Measure Justification Form: Falls With Major Injury—Task 2, Deliverable #3-4. IMPAQ International. May 2021; Dykes PC et al. JAMA Health Forum. 2023;4①:e225125; Mele F et al. Healthcare (Basel). 2023;11①:1290; CMS. Hospital-Acquired Condition Reduction Program. Updated September 10, 2024; Potter P et al. Jt Comm J Qual Patient Saf. 2017;43①:414–421; Agency for Healthcare Research and Quality. Fall TIPS: a patient-centered fall prevention toolkit. February 2021; Dykes PC et al. JAMA Netw Open. 2020;3(11):e2025889; Patient Safety Network. Preventing falls through patient and family engagement to create customized prevention plans. May 31, 2023.

About Vizient

Vizient, Inc. provides solutions and services that improve the delivery of high-value care by improving financial sustainability, system performance, and accelerating strategic growth for more than two-thirds of the nation's healthcare providers. Vizient provides expertise, analytics, consulting services, and a contract portfolio representing \$156 billion in annual client purchasing volume to improve patient outcomes and lower costs.

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