

characteristics such as frailty, cognitive impairment, mobility limitation, and functional decline, and risk stratification and risk adjustment should be incorporated based on illness severity and nursing dependency to enhance interpretability and managerial utility (Connolly et al., 2025).

3.2 Key nursing-sensitive indicators closely related to adverse events in older patients

In older populations, NSIs largely concentrate on nursing-sensitive adverse events and functional outcomes that are closely tied to nursing surveillance, prevention, and coordination. Major reviews and concept analyses repeatedly identify the most commonly used core NSIs in inpatient settings as falls, pressure injuries, healthcare-associated infections, medication administration errors, length of stay, and patient satisfaction. Among these, fall rates reflect the combined effectiveness of nursing practice in risk assessment, environmental management, rounds and observation, medication-risk identification, and safety education. Continuous monitoring of fall incidence and injury severity helps identify high-risk subgroups and time periods and evaluate the implementation of multifactorial prevention bundles. Similarly, pressure injury incidence and the proportion of newly acquired pressure injuries are important indicators of geriatric nursing quality because they are strongly associated with nursing processes such as repositioning, skin assessment, pressure-relieving interventions, and nutritional support. Linking outcome indicators with process indicators (e.g., repositioning adherence rates and completion rates of pressure injury risk assessment) enables a more comprehensive evaluation of intervention effectiveness.

In response to the risk profile of older adults, contextualized studies have further expanded the scope of inpatient NSIs to include delirium, frailty, functional decline, malnutrition, bladder overdistension, and readmission, given their high prevalence and substantial preventability under high-quality nursing care (Connolly et al., 2025). For example, in older surgical patients, frailty is significantly associated with the incidence of nursing-sensitive indicators such as in-hospital falls, delirium, pneumonia, and pressure injuries, suggesting that integrating “frailty assessment + NSI monitoring” may trigger earlier individualized preventive nursing care. In older trauma patients, nursing-sensitive adverse events (e.g., healthcare-associated infections, pressure injuries, malnutrition, and urinary retention) occur frequently and are significantly associated with advanced age, frailty, greater injury severity, and longer length of stay, further indicating that these indicators are highly sensitive to nursing care processes (Järbrink et al., 2025).

In addition, in long-term care and residential aged care settings, consensus studies emphasize prioritizing systematic medication review, pressure injuries, pain, dehydration, urinary tract infections, fecal impaction, behavioral symptoms, depression, weight loss, decline in activities of daily living (ADL), falls, and restraint use as nursing-sensitive quality indicators for frail older residents (Tevik et al., 2023). Community nursing and home-care research further highlights that “positive outcomes” such as autonomy, participation in decision-making, level of activity participation, quality of end-of-life care, and adherence to care are also important nursing-sensitive outcomes, moving beyond single adverse events to capture older patients’ overall experience and benefits from care (Goes et al., 2023). Overall, constructing multi-indicator portfolios helps more comprehensively cover the risk and outcome spectra of hospitalized older patients and jointly incorporate adverse event prevention and functional preservation into the nursing quality evaluation framework (Gormley et al., 2024).

3.3 Value of nursing-sensitive indicators for risk early warning and quality management

NSIs have important value for early warning of adverse event risks in older patients by translating patterns of nursing-sensitive adverse events into actionable risk signals. Indicators such as falls, pressure injuries, delirium, pneumonia, urinary tract infections, malnutrition, and bladder overdistension can conceptually be regarded as manifestations of “failure to maintain,” signaling potential missed nursing care, insufficient allocation of nursing resources, or deterioration of the care environment; thus, they can be used to identify high-risk subgroups and trigger preventive measures in advance (Järbrink et al., 2025; McCauley et al., 2025). For example, when a ward shows an abnormal increase in fall rates or unplanned device removal, or when process indicators (e.g., completion of risk assessment and adherence to prevention bundles) decline, root-cause analysis and targeted interventions can be initiated, enabling a shift from “post-event response” to “pre-event prevention”.