

At the level of nursing quality management, NSIs provide a structured framework for planning, implementing, and evaluating continuous quality improvement (QI). National and institutional practices show that developing nursing process indicators and indicator systems tailored to older-adult services can send “strong signals” regarding improvement priorities, guiding intervention design, staff training, and resource allocation (Baillie et al., 2025). Long-term care facilities and national indicator programs further demonstrate that consensus-based NSI portfolios covering medication review, pressure injury prevention, infection, pain, hydration, function, and social participation not only support inter-institutional benchmarking and system-level improvement, but also expose methodological and feasibility challenges in indicator development and implementation (Tevik et al., 2023). Therefore, NSI-driven quality management should not remain at the level of outcome reporting; rather, it should be integrated with governance structures (e.g., quality committees and risk management teams) and action mechanisms (feedback-review-improvement) to establish a sustainable closed-loop management cycle (Mohan et al., 2024) (Table 1).

4 Nursing Quality Analysis Based on Nursing-Sensitive Indicators

4.1 Data collection and analytical methods for nursing-sensitive indicators

Data collection for nursing-sensitive indicators (NSIs) constitutes the foundation of nursing quality analysis, and its scientific rigor and standardization directly determine the credibility and applicability of analytical findings. In the context of inpatient care for older adults, NSI data are typically derived from multiple sources, including nursing documentation and electronic health records (EHRs), adverse event/near-miss reporting systems, clinical quality registries, and standardized assessment tools. The literature indicates that retrospective medical record review remains an important approach for identifying nursing-sensitive adverse events (NSAEs). In particular, trigger tool-guided chart reviews enable systematic identification of events such as infections, pressure injuries, bladder overdistension, and malnutrition, and can be used to calculate incidence rates and compare vulnerability profiles between patients with and without events (Järbrink et al., 2025). At the macro level, regional or national quality registries allow for long-term, structured data accumulation. For example, Sweden’s Senior Alert continuously collects risk assessments and follow-up outcomes related to pressure injuries, malnutrition, falls, and oral health, providing a robust basis for inter-institutional benchmarking and longitudinal trend analysis. In both acute and long-term care settings, standardized outcome assessment tools (e.g., functional status or symptom scales) have demonstrated good reliability and sensitivity to change when routinely used by nurses, supporting nurse-led routine NSI data collection.

To ensure comparability across time periods, wards, and institutions, standardized indicator definitions, numerator and denominator rules, event adjudication criteria, and data dictionaries should be established at the organizational or system level. In addition, training nurses on indicator concepts and reporting standards is essential to reduce bias arising from subjective interpretation. With regard to incident reporting, studies suggest that punitive climates and fear of blame may lead to underreporting and undermine the value of data for learning and improvement; therefore, fostering a non-punitive reporting culture should be incorporated into data quality assurance systems (Huang et al., 2025; Wang et al., 2025).

Analytically, a stepwise approach combining descriptive epidemiology, multivariable modeling, and benchmarking enables progression “from description to explanation.” Descriptive statistics are used to present incidence rates, distributions, and trends of events such as falls, pressure injuries, infections, medication errors, and bladder overdistension, with stratification by age, frailty status, disease or injury severity, and care setting to identify risk clustering and vulnerable subgroups (Järbrink et al., 2025). Multivariable models (e.g., logistic or Cox regression) further identify patient- and institution-level predictors of serious adverse events and explore associations between NSIs and staffing levels or organizational characteristics, thereby providing more explanatory evidence for management decision-making. Importantly, cross-sectional nurse survey studies have linked missed or unfinished nursing care with increased frequencies of medication dosing errors, hospital-acquired infections, and injurious falls, demonstrating that process gaps can be quantified through NSIs and used to target quality improvement interventions.