

How Nursing Informatics Are Used In Clinical Practice

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Clinical Nursing Informatics

Nursing informatics is often described as the use of computers in nursing, but that description is too narrow. The American Nurses Association defines nursing informatics as a specialty that integrates nursing science with information and analytical sciences so that data, information, knowledge, and wisdom can support nursing practice (ANA, 2022). In everyday clinical work, this integration begins whenever a nurse records an assessment, verifies a medication, reviews a trend, responds to an alert, communicates through the electronic health record (EHR), teaches a patient to use a portal, or helps redesign a workflow. The technology is visible, but the real subject is information: what is collected, how accurately it is represented, how quickly it becomes available, and whether it helps clinicians make safer decisions. HIMSS emphasizes that nurse informaticists bridge clinical and operational needs with technology and often influence training, data management, quality improvement, system implementation, policy, and investment decisions (HIMSS, 2024a). This is why informatics competency is relevant to every nurse even when only some nurses hold formal informatics roles.

Clinical Data and Knowledge

A nurse's shift produces hundreds of data points: temperature, blood pressure, oxygen saturation, pain score, intake, medication administration, wound characteristics, mobility, mental status, and patient-reported symptoms. Data become useful only when they are interpreted in context. A temperature of 39°C is a data point. Seeing that the temperature has risen over four hours while heart rate increases and blood pressure falls creates clinically meaningful information. Connecting that trend with infection risk and the patient's history creates knowledge. Deciding to reassess, escalate concern, follow sepsis protocols when appropriate, and monitor the response requires professional judgment. Informatics supports each stage by making data retrievable, comparable, and visible, but it does not replace nursing reasoning.

This distinction is important because poorly designed systems can create the illusion of certainty. Auto-populated fields, copied notes, default values, and old problem lists may make the chart appear complete while preserving inaccurate information. Nurses therefore need to understand data provenance: who entered a value, when it was recorded, whether it was measured or copied, and

whether the current clinical situation still supports it. ANA's current standards emphasize competent nursing practice across changing technologies, while the 2026 edition of the broader Nursing Scope and Standards continues to position safe, evidence-informed, accountable care as a responsibility of every registered nurse regardless of setting (ANA, 2026). Informatics is therefore not permission to trust the screen automatically; it is the discipline required to use digital information critically.

Electronic Health Records

The electronic health record is the most visible informatics tool in clinical practice because it organizes orders, medications, laboratory results, notes, care plans, imaging, allergies, and communication across professions. Well-designed EHRs reduce dependence on paper charts and make information available to multiple clinicians at the same time. They can support continuity when a patient moves from the emergency department to an inpatient unit or from hospital care to another setting. Structured fields can also create data used for quality improvement, reimbursement, research, and public-health reporting. The same documentation therefore serves several audiences beyond the nurse who enters it.

The downside is that documentation can become burdensome or disconnected from care. Excessive clicking, duplicate fields, poorly organized flowsheets, and alerts that appear too often can increase cognitive workload. HIMSS notes that clinical informaticists are important precisely because technology must be fitted to actual clinical functions rather than adding frustration and burden (HIMSS, 2024b). Nurses should be involved in system design, testing, and optimization because they understand bedside workflow and can identify where a technically correct interface creates practical risk. For example, moving a critical medication field several screens away from the normal workflow may make information harder to find even though the data still exist somewhere in the system.

Decision Support and Safety

Clinical decision support can turn stored data into timely prompts. Drug-allergy alerts, renal-dose warnings, duplicate-therapy checks, sepsis screening tools, fall-risk scores, pressure-injury assessments, and reminders about overdue care are common examples. Barcode medication administration adds another layer by comparing the patient, medication, dose, route, and time with the electronic order. Smart infusion pumps can use drug libraries and dose limits to reduce programming errors. These systems can prevent mistakes, but only when configuration is accurate and clinicians use them correctly.

Alert fatigue is a major informatics problem because clinicians who receive too many low-value warnings may begin dismissing even important alerts. Decision support should therefore be monitored for sensitivity, specificity, workflow placement, and override patterns rather than treated as safe simply because it is automated. Connected devices create similar challenges. Vital-sign

monitors, pumps, glucose devices, and wearable technologies can transmit data automatically, reducing manual transcription, but integration errors or device mismatches can still occur. Nursing informatics helps identify which data should flow automatically, which require verification, and how abnormalities should be displayed so that the system supports rather than overwhelms clinical attention.

Interoperability

Nurses increasingly care for patients whose information is distributed across hospitals, clinics, pharmacies, laboratories, home-health agencies, and patient-generated devices. Interoperability is the ability of systems to exchange and meaningfully use that information. When it works well, a nurse can see recent medication changes, laboratory results, discharge instructions, and prior diagnoses without reconstructing the history entirely from memory. When it fails, patients may be asked to repeat information, duplicate tests may occur, or critical changes may be missed. Informatics therefore supports continuity of care as much as documentation inside one facility.

Patient portals and telehealth also change the relationship between professional information systems and the patient. Portals may allow patients to view test results, request refills, schedule appointments, send messages, and download parts of the health record. Telehealth can extend assessment and follow-up beyond the physical clinic. Nurses need to understand how these systems affect access and equity because not every patient has the same device, internet connection, digital literacy, language support, or ability to navigate portals. A digital option can improve access for one person while creating a new barrier for another. Nursing informatics should therefore evaluate who benefits from a technology and who may be excluded.

Cybersecurity

Digital nursing practice creates privacy and cybersecurity responsibilities. Nurses may access records from workstations, mobile devices, secure messaging systems, or approved remote platforms. [Bring-your-own-device](#) programs can improve communication and convenience, but personal devices create additional risks involving lost phones, weak passwords, unapproved applications, screenshots, local storage, and mixing clinical information with personal accounts. Organizations need clear policies on encryption, authentication, remote wiping, software updates, secure messaging, and what information may be stored or transmitted.

Cybersecurity is not only an IT problem because ransomware or system downtime can disrupt medication administration, laboratory access, documentation, and communication. Nurses should know downtime procedures, avoid sharing credentials, recognize phishing attempts, and report suspicious activity quickly. Informaticists can help design workflows that remain safe when systems are unavailable and can ensure that security controls do not create workarounds that are even less

secure. Strong security works best when clinicians can realistically follow the policy during actual care.

One of the most powerful uses of nursing informatics occurs after individual care has been documented. Aggregated data can reveal falls, medication errors, infection trends, pressure injuries, readmissions, delayed discharges, staffing patterns, or differences in outcomes among patient groups. Nurse informaticists can help define measures, validate data, build dashboards, and determine whether an apparent trend reflects actual clinical change or merely a change in documentation. HIMSS describes nurse informaticists as important participants in quality improvement because they understand both the clinical meaning of the data and the technical systems producing it (HIMSS, 2024a).

Data quality is critical. If nurses document the same concept inconsistently, the organization may not be able to measure it reliably. Standard terminology and structured documentation can improve comparability, but overly rigid fields can also omit clinically meaningful nuance. The goal is therefore to create data that are both usable for analysis and faithful to patient care. A good dashboard should lead to questions and improvement work, not simply produce attractive charts. Nursing informatics connects the bedside with organizational learning by showing how thousands of individual care events form patterns that can be improved.

Artificial Intelligence

Artificial intelligence is becoming an increasingly important part of nursing informatics. Current research includes predictive analytics, natural-language processing, generative AI, clinical decision support, staffing tools, image analysis, and systems that summarize or classify health information. A 2025 review describes nursing informatics as a central bridge between AI capabilities and nursing practice, while also emphasizing ethical, educational, governance, and policy concerns (Nashwan & Khedr, 2025). The 2024 nursing-informatics literature likewise showed strong growth in AI, data science, mobile health, and technology integration (JMIR Nursing, 2025).

AI can reduce repetitive work or identify patterns that are difficult to see manually, but it can also introduce bias, hallucination, automation bias, privacy problems, and unclear accountability. A nurse should not assume that an algorithm is correct because it produces a confident score or polished paragraph. Clinical use requires validation, understanding of intended purpose, monitoring for performance changes, and a defined process for human review. The informatics role is therefore becoming more important rather than less important as AI expands. Healthcare organizations need professionals who can translate between technical developers and clinical users, ask whether a model solves the right problem, and evaluate whether it improves care without creating new harm.

Conclusion

Nursing informatics is used throughout clinical practice because modern nursing depends on reliable information as much as it depends on physical assessment and technical skill. EHR documentation, decision support, medication technologies, connected devices, interoperability, portals, telehealth, cybersecurity, analytics, and AI all influence how nurses receive information and how their actions become information for others. The core professional responsibility remains unchanged: nurses must interpret data in context and use judgment to protect the patient. Current ANA and HIMSS guidance shows that informatics is not a narrow technical specialty isolated from bedside care. It is a bridge connecting nursing science, workflow, technology, quality improvement, and organizational learning. As AI and digital health continue to expand, the most valuable informatics systems will not be those with the most features. They will be the systems that provide the right information at the right time, reduce unnecessary cognitive burden, protect privacy, support equitable access, and help nurses make safer decisions while preserving human accountability.

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