Research Square

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Registered Nurses' Contributions to Diagnostic Safety Across the Diagnostic Process: A Scoping Review

Xin Sun
Nanchang University
Xinyi Lin
Nanchang University
Yankang Wang
Nanchang University
Gaoleer Yang
Nanchang University
Jing Deng
Nanchang University
Hongyan Li
janet_lhy@163.com

Nanchang University
Huimin Yin
Jiangxi Provincial People's Hospital

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Abstract

Background

Registered nurses (RNs) contribute clinical information and coordination to team diagnosis, although the relevant studies are dispersed across several research fields.

Objective

To describe RN activities within the diagnostic process, the conditions shaping participation, and the interventions and outcomes reported in the literature.

Methods

We searched PubMed, CINAHL, Scopus, Web of Science and Embase from inception to 24 October 2026 and followed relevant references and citations. Empirical reports were charted by diagnostic domain, evidence type, RN attribution and outcome. Linked publications were examined together in a descriptive overlap check.

Results

The current synthesis comprises 24 reports representing approximately 22 analytic study units. RN-related evidence concerned information acquisition, interpretation or diagnostic concern, communication, testing and stewardship, and result review or reassessment. Studies described professional experiences and diagnostic failures as well as intervention outcomes. Testing interventions addressed both overuse and possible under-testing, but few studies directly evaluated diagnostic accuracy, timeliness or patient harm. Effects of nursing components could seldom be separated from wider team interventions.

Conclusions

RN involvement in diagnosis is documented, but evidence that strengthening this involvement improves patient-level outcomes remains limited. Future studies should follow nursing concerns through the team response and subsequent diagnostic action, assess appropriate testing in both directions, and report RN-specific findings.

1. Introduction

Diagnostic safety is not simply about assigning the right disease label at the first visit. A diagnosis may need to be revised when symptoms change, new results become available, or treatment does not produce the expected response. Communicating such revisions promptly matters just as much as the initial judgement. The National Academies therefore frames diagnosis as an ongoing, collaborative process involving clinicians, patients and families [1]. Physicians generally remain responsible for establishing the medical diagnosis, but they rely partly on information gathered by other professionals, including registered nurses (RNs) [2, 3].

During routine care, RNs frequently identify discrepancies that challenge a working diagnosis. These include persistent symptoms, unexpected changes in vital signs, or test results that fail to reach the treating clinician. Such observations are typically categorized as surveillance or care coordination, rather than direct participation in the diagnostic process [3, 4].. However, identifying a problem does not guarantee its integration into clinical decision-making. A survey of 430 Japanese nurses revealed that 61.2% had experienced concerns regarding a physician's diagnosis within the previous month. Yet, more than half of these concerned nurses did not raise the issue with the physician [5]. Reports from diagnostic incident databases and malpractice claims also highlight vulnerabilities in assessment, communication, and response. Because these datasets are highly selective, however, they cannot estimate the actual frequency of such failures in routine clinical practice [6, 7].

The contribution of nurses to the diagnostic process is well established. Gleason et al. described diagnostic triage, interprofessional teamwork, and patient empowerment, while Agency for Healthcare Research and Quality (AHRQ) reports have explored surveillance and the distribution of diagnostic information among clinicians [3, 4, 7]. A recent editorial reiterated the need for clearer terminology and professional responsibilities, cautioning against conflating participation in diagnosis with independent diagnostic authority [8]. A more significant challenge lies in determining the empirical evidence available for these distinct nursing roles. Studies addressing diagnostic concerns, electronic health records, laboratory testing, and nursing education rarely investigate comparable questions or assess consistent outcomes. For instance, while Bowler and Brown reviewed nurses' roles in diagnostic stewardship, this represents only a fraction of the broader diagnostic process [9]. Synthesizing these disparate literatures necessitates caution. It is critical to avoid conflating descriptive accounts of RN practice with evidence of systemic failures or with data demonstrating that a specific intervention improved diagnostic outcomes.

This scoping review examines how RNs contribute to medical and team-based diagnosis across different clinical settings. We focused on four questions: what nurses were reported to do; how these activities connected to diagnostic safety; which aspects of the clinical environment influenced their participation; and how interventions and outcomes had been evaluated. Our interest lay in the RN's role within a shared diagnostic process, not in shifting final medical diagnostic responsibility to bedside nurses.

2. Methods

2.1 Study design and reporting

This scoping review followed JBI methodological guidance, and the findings are reported in line with the PRISMA extension for scoping reviews [10, 11]. The protocol was registered with the Open Science Framework (https://osf.io/du8t7). The review focuses on RN involvement in medical or team-based diagnosis. Standardized nursing diagnoses, autonomous medical diagnosis by advanced-practice nurses, and routine care with no clear diagnostic link were not included.

2.2 Eligibility criteria

We developed the eligibility criteria based on the Population-Concept-Context framework (Table 1). Reports were eligible if they met the following criteria: (1) the study described an RN activity within medical or team-based diagnosis, or presented findings specifically relevant to RNs and diagnostic safety; (2) routine actions, such as observation, handover, or escalation of deterioration, were only counted if the report explicitly linked them to diagnostic processes. This included using information for diagnosis, reconsidering a working explanation, making testing decisions, addressing diagnostic delays or errors, or following up on unresolved findings; and (3) in studies of diagnostic stewardship, the RN role directly involved test indications, specimen suitability, testing decisions, or result handling.

Table 1
Population–Concept–Context eligibility criteria.

PCC component	Inclusion criteria	Exclusion criteria
Population	Registered nurses (RNs), bedside nurses, staff nurses, clinical nurses, or multidisciplinary samples in which RN-specific activities or findings could be identified.	Studies exclusively involving nurse practitioners, advanced practice nurses, or other advanced-practice clinicians acting as independent diagnostic providers; multidisciplinary studies with no extractable RN-specific contribution.
Concept	RN participation in medical/team-based diagnosis or diagnostic safety, including diagnostic error or delay, missed diagnosis, diagnostic concern, diagnostic excellence, diagnostic reassessment, diagnostic testing/stewardship, result follow-up, or diagnostic closure.	Nursing diagnosis; generic clinical reasoning/assessment without an explicit link to medical diagnosis or diagnostic safety; deterioration recognition without diagnostic reconsideration; antimicrobial stewardship without an identifiable diagnostic component.
Context	Any clinical setting in which a diagnostic process occurs, including inpatient wards, emergency departments, intensive care units, primary care, and outpatient settings.	Non-clinical contexts without a diagnostic process.
Evidence source	Primary empirical quantitative, qualitative, mixed-methods, observational, quasi-experimental, implementation, quality-improvement, or database studies.	Reviews, editorials, commentaries, guidelines, protocols, conceptual papers, and conference abstracts with insufficient methodological or outcome detail.
PCC = Population, Concept, Context; RNs = Registered nurses.		

Table 1. Population–Concept–Context eligibility criteria.

We excluded conference abstracts lacking sufficient methodological detail or outcome data.

The assessment of eligibility and the attribution of findings to RNs were conducted independently. Where a study sample included nursing students, assistants, or advanced-practice nurses, we recorded this distinction and avoided presenting combined data as strictly RN-specific. Multiprofessional studies were retained only if nursing actions, experiences, or subgroup outcomes could be clearly delineated.

2.3 Information sources and search strategy

A search was conducted across five major databases (PubMed, CINAHL, Scopus, Web of Science, and Embase) from their inception dates up to 24 October 2026. The search strategy integrated nurse-specific subject headings and free-text terms alongside key concepts of diagnostic safety. Search terms encompassed diagnostic error, delay, missed diagnosis, diagnostic concerns, diagnostic timeouts, and stewardship. To accommodate the distinct architecture of each platform, search syntax was individually customized. To supplement the electronic results, manual screening of reference lists and forward citation tracking were performed. This approach ensured the capture of multidisciplinary studies where nurse involvement was not explicitly evident in the title or abstract. Full search strings for each database are detailed in Supplementary Table S1.

2.4 Study selection

Rayyan was used for initial deduplication, and two reviewers then manually checked for any duplicates that remained. The same two reviewers independently screened titles and abstracts, and later assessed full texts against the same criteria. Any disagreement was discussed between the two reviewers, and a third reviewer was consulted when needed. Reasons for full-text exclusion were recorded on a standardized form.

2.5 Data charting and extraction

We used a structured charting form to record country, setting, design, sample composition, identifiable RN participation, diagnostic focus, nursing activities, relevant diagnostic domains, barriers and facilitators, intervention components and outcomes. Related publications were linked. We also recorded how each finding had been generated through interviews, surveys, incident or claims data, intervention measures or knowledge testing, and whether it could be attributed specifically to RNs.

Reports could be assigned more than one diagnostic domain, provided each assignment had an explicit basis in the source. For example, knowledge of how to interpret a laboratory report was not treated as evidence of clinical result follow-up. We kept evidence type and RN attribution with each code so that we did not treat survey perceptions, selected adverse-event records and measured process outcomes as equivalent findings.

2.6 Multiple reports from the same study

The included publications were evaluated for potential overlap regarding research projects, source data, and participant cohorts. Specifically, Barwise et al. and Redmond et al. described different phases of a single sequential mixed-methods programme [12, 13]. Meanwhile, Mangus et al. and James et al. appear to have analyzed substantially overlapping emergency department interviews [14, 15]. Both articles within each pair were retained, given that their specific analyses provided distinct information. To perform a descriptive overlap assessment, each pair was combined into a single analytic study unit using the combined union of their domain codes. Consequently, the resulting 22 units do not represent completely independent participant cohorts..

2.7 Data synthesis

Given the considerable heterogeneity in study designs, populations, and outcomes, conducting a meta-analysis was deemed inappropriate. Our analytical process started with mapping the diagnostic activities detailed in each report, followed by a cross-study comparison of the initial codes. This comparison revealed five primary domains. These domains included the acquisition and updating of information, interpretation of findings or voicing diagnostic concerns, communication and coordination, testing and diagnostic stewardship, as well as the review of results, follow-up, and the reassessment of diagnostic questions. We subsequently categorized the reported barriers and facilitators across individual, team, organizational, and technological levels. The distribution of overlapping report-level codes by study design is depicted in Fig. 2. Figure 3 illustrates the relationships that emerged across the synthesized evidence. However, these relationships are intended to map potential connections rather than to assert a verified causal pathway.

We first counted at the report level; a report could contribute to more than one domain. To check the effect of linked publications, we subsequently collapsed the Barwise–Redmond and Mangus–James pairs and compared the resulting 22-unit distribution with the original 24-report map. This was a descriptive check on publication overlap, not an analysis of intervention effect.

2.8 Critical appraisal

We did not undertake a formal risk-of-bias assessment or use study quality to determine eligibility. In interpreting findings, we considered design, the extent to which RN contributions could be distinguished and whether an outcome measured knowledge, testing processes, diagnostic events or patient harm. These judgments should not be taken as a formal appraisal of methodological quality.

3. Results

3.1 Study selection

The searches identified 5,471 records. After duplicates were removed, 3,958 records remained for title and abstract screening, which left 33 reports for full-text review. Full texts were unavailable for three reports, so 30 were assessed. Of these, six were excluded: two had no findings specific to RNs, one overlapped substantially with a fuller publication, and for three the nursing contribution to a diagnostic finding could not be identified. The final synthesis comprised 24 reports. Two pairs of the included reports drew on the same research programmes.

Figure 1. Study-selection flow based on the current search and screening records.

3.2 Characteristics of the included evidence

The 24 reports appeared between 2014 and 2026, and 14 were from the United States. The others came from Japan, the United Kingdom, Australia, Italy, Poland and India. Emergency departments, inpatient wards and intensive care units were common settings, and primary care studies and analyses of incident or malpractice databases were also represented. By design, ten reports were qualitative studies, five were surveys, six were intervention or quality-improvement evaluations, and three were retrospective record analyses (Table 2).

Table 2
Characteristics of included reports

Study	Country	Design	Setting	Sample / nursing subgroup	Diagnostic-safety focus
Thomas et al.[24]	Australia	Qualitative semi-structured interviews	Three regional/remote emergency departments (Western Australia)	24 clinicians (16 doctors, 8 nurses)	Blood culture practice and diagnostic stewardship
James et al.[15]	United States	Qualitative descriptive interview study; hybrid thematic analysis of semistructured interviews (a subaim of a larger study).	Four emergency departments across two health systems	10 physicians, 15 nurses, 8 patients RN sample: 15 ED nurses	EHR effects on the emergency-department diagnostic process
Shimizu et al.[6]	Japan	Retrospective database study with expert diagnostic-error review	National adverse-event database from 1,631 hospitals	147,654 adverse-event reports; 445 identified diagnostic-error cases. Nurses were involved in 19.3% of the diagnostic-error cases (approximately 86); not a sample of recruited RNs.	Profession-specific contributing factors to diagnostic error
Mangus et al. [14]	United States	Qualitative semistructured interviews	Four emergency departments across two health systems	10 ED physicians, 15 ED nurses, 9 patients/caregivers	Vulnerabilities and interventions for ED diagnostic safety
Sasaki et al.[23]	Japan	Before-after / interrupted time-series diagnostic-stewardship study	Small community hospital	Hospital patients/testing data; physicians, nurses and pharmacists involved RN sample: Not separately reported	Diagnostic stewardship for *Clostridioides difficile* infection
Gibas et al.[26]	United States	Prospective multiple-choice surveys (cross-sectional responses).	Inpatient units and the emergency department at Rhode Island Hospital, Providence, Rhode Island, USA.	70 medical providers and 178 nursing staff (168 registered nurses and 10 certified nursing assistants).	Drivers of excessive fever workups / 'panculturing'
Miyagami et al.[5]	Japan	Cross-sectional survey	Web-based survey of nurses registered on a large national online media site	430 nurses	Nurse diagnostic concern and reasons for silence
Bussell et al.[22]	United States	Multidisciplinary quality-improvement / retrospective before-after evaluation	Inpatient acute-care and intensive-care units in a single hospital	Hospital-wide testing data; multidisciplinary staff RN sample: Not separately reported	*C. difficile* diagnostic stewardship using 'ticket to test'
Schnock et al.[19]	United States	Qualitative mixed-methods study (provider interviews + patient-advisor focus groups)	Acute-care hospital	17 providers + 7 patient advisors RN sample: 7 nurses (41.2% of providers)	Causes and potential solutions for diagnostic errors in acute care
Manetti et al.[31]	Italy	Qualitative semi-structured interviews / implementation study	Hospital sepsis pathway at a target site plus interviews across other Italian hospitals	25 professionals RN sample: 16 nurses	Adoption of biomarker + machine-learning system for early sepsis diagnosis
Redmond et al.[13]	United States	Cross-sectional survey; quantitative phase of sequential exploratory mixed-methods project	Acute-care units (ICU, ED and inpatient wards), primarily Mayo Clinic Rochester, Minnesota; five respondents reported other Mayo Clinic sites/locations.	220 clinical stakeholders RN sample: 114 nurses	Perceived contributors to diagnostic error or delay (DEOD)
Gleason et al.[7]	United States	Retrospective claims analysis	National malpractice-claims repository; inpatient, ED and ambulatory settings	139 diagnosis-related claims and 647 failure-to-monitor claims naming nursing as the primary responsible service; claim counts, not numbers of participating RNs.	Nursing responsibility and contributing factors in diagnosis-related harm
Barwise et al.[12]	United States	Multisite qualitative focus groups	ED, hospital floor and ICU across four acute-care sites	64 clinicians across 11 focus groups RN sample: Dedicated bedside-nurse group (n = 6), charge-nurse/RRT group (n = 5), plus nurses in a mixed allied-health group	Organizational, clinician and patient contributors to diagnostic error/delay

ED = Emergency department; EHR = Electronic health record; ICU = Intensive care unit; RNs = Registered nurses; *C. difficile* = *Clostridioides difficile*.

Study	Country	Design	Setting	Sample / nursing subgroup	Diagnostic-safety focus
Fabre et al.[20]	United States	Before-after pilot diagnostic-stewardship study with control unit	24-bed general medicine unit in a large academic hospital	Adult inpatients / urine-culture episodes RN sample: Nurse count not reported	Nurse-driven urine culture stewardship
Kavazovic et al.[29]	United States	12-month nurse-driven protocol implementation / brief report	Single tertiary academic medical center; hospital-wide	Hospital-wide *C. difficile* testing episodes RN sample: Nurse count not reported	Nurse-driven *C. difficile* diagnostic protocol
Woods-Hill et al. [25]	United States	National cross-sectional electronic survey	15 pediatric intensive-care units	347 respondents RN sample: 114 bedside registered nurses	Blood-culture practices and beliefs in critically ill children
Kang et al. [21]	United States	Single-center quasi-experimental diagnostic-stewardship study	University of California San Diego Health, two campuses (799 beds)	Hospital testing and HO-CDI rates, 2016–2019 RN sample: Nurse count not reported	*C. difficile* diagnostic stewardship
Bhat et al. [28]	United States	Multicenter cross-sectional survey	Three tertiary pediatric cardiac ICUs	200 practitioners RN sample: 124 bedside registered nurses	Frequency, types and contributors to diagnostic errors in pediatric cardiac ICU
Shefer et al.[18]	United Kingdom	Qualitative interviews	EDs and psychiatric liaison teams in four London hospitals	39 clinicians (18 doctors, 21 nurses)	Diagnostic overshadowing and delayed/missed physical diagnosis in patients with mental illness
Birken et al.[30]	United States	Observational qualitative framework-development study	20 hospitals across four states and two health systems; interviews from 13 hospitals	41 key informants, including 2 nurses, 10 nurse managers/administrators and 6 sepsis coordinators/nurse educators; the latter categories were not all identified as bedside RNs.	Sepsis Diagnostic Excellence (SepsisDx) framework for accurate, timely diagnosis
Valasaki et al.[16]	England	Qualitative interviews using thematic analysis / critical realist approach	Primary-care practices across England	75 patients + 28 primary-care professionals RN sample: 12 nurses (plus 16 GPs)	Consultation dynamics and timeliness of potential cancer diagnosis in patients with long-term conditions
Akindele et al.[17]	Scotland	Qualitative semi-structured interviews	Primary care practices in NHS Lothian	15 clinicians: 10 GPs and 5 nurses (4 practice nurses and 1 nurse practitioner); outcomes are not uniformly RN-specific.	Clinical practices and challenges in making an asthma diagnosis
Rorat et al.[32]	Poland	Retrospective medico-legal review	Medico-legal cases from multiple Polish clinical settings	66 medico-legal opinions; errors confirmed in 55. Eight nurses were among implicated professionals (medico-legal cases, not an RN cohort).	Medical errors in sepsis
Gupta et al.[27]	India	Quasi-experimental pre-post educational intervention	National online diagnostic-stewardship education program for nurses across India	Phase 1: 310 of 517 respondents completed a knowledge assessment. Phase 2: 228 of 613 completed paired pre/post tests; the paired sample included 25 nursing students, and an RN-only effect was not reported.	Diagnostic-stewardship knowledge and short-term change following online education (not measured clinical practice).

ED = Emergency department; EHR = Electronic health record; ICU = Intensive care unit; RNs = Registered nurses; *C. difficile* = *Clostridioides difficile*.

Table 2.Characteristics of included reports

Nursing involvement was identified either through the direct recruitment of RNs or by extracting specific nursing accounts from multidisciplinary studies. At the report level, information acquisition or surveillance was the focus of 20 reports, followed closely by communication or coordination, which was also addressed in 20. Meanwhile, 12 reports focused on interpretation or concern, 13 on testing or stewardship, and 10 on review, follow-up, or reassessment (Fig. 2; Table 3). Since these domains frequently overlapped, we also analyzed the data after merging companion reports. The resulting frequencies across the 22 analytic study units were 18, 11, 18, 13, and 8. Despite these adjustments, the overall distribution pattern remained essentially consistent (Supplementary Table S2).

Table 3
RN activities and diagnostic domains

Study	RN contribution / activity	Diagnostic stage(s)	Main finding / outcome	Reported barriers / constraints	Supports or proposals
Thomas et al.[24]	Blood-culture collection; potential nurse-initiated cultures; specimen-quality practices; participation in workflow design and local clinical-champion roles.	Diagnostic testing/stewardship; Communication/team coordination	Clinicians described hierarchy, authority and workflow as influencing nurse involvement in blood-culture practice; no nursing-specific diagnostic outcome effect was measured.	Hierarchical barriers; workforce turnover; variable training; inconsistent guideline use; equipment/logistics; delayed laboratory processing; limited feedback on contamination/volume.	Interviewees described trust, clear criteria, training, local champions, reliable supplies and feedback as possible supports; their individual effects were not evaluated.
James et al.[15]	Use EHR for diagnostic workup support, order acknowledgement, team communication, and monitoring availability of laboratory results.	Information acquisition; Communication/team coordination; Result follow-up/closed loop	Nurses described active responsibility for checking orders/results and compensating for gaps in asynchronous communication.	Asynchronous communication; lack of automatic notification for noncritical results; workflow burden; EHR-driven protocols; fragmented information.	Participants described customized EHR functions and direct communication as useful; suggested improvements to EHR usability and notification were not experimentally evaluated.
Shimizu et al.[6]	Nurse-associated diagnostic-error reports involved assessment of presentation/history, observation, reporting and related process failures; these are errors or vulnerabilities rather than observed beneficial RN activities.	Information acquisition; Diagnostic interpretation/concern; Communication/team coordination; Result follow-up/closed loop	Of 445 identified diagnostic-error reports, nurses were involved in 19.3%. Nurse-associated events more often involved initial clinical information, observation and reporting; the database cannot estimate population incidence or an RN treatment effect.	Observation/reporting failures; training gaps; communication failures; system/process weaknesses.	Training and structured information exchange are possible responses discussed by the authors, not interventions evaluated in the dataset.
Mangus et al. [14]	Frontline information gathering, team communication, handoff participation, patient education, and identification of workflow/EHR vulnerabilities.	Information acquisition; Communication/team coordination; Result follow-up/closed loop	Interviews with ED clinicians, including nurses, and patient advisors identified perceived vulnerabilities and possible improvements in communication, information gathering and EHR use. These were not tests of intervention effectiveness.	Participants described communication, handoff, ED workflow, EHR and patient-information vulnerabilities; nurse-only themes were not always separable.	Standardized communication; better information transfer; optimized EHR tools; patient engagement; workflow redesign.
Sasaki et al.[23]	Assess stool consistency and need for *C. difficile* testing in nosocomial diarrhea; recommend testing to physicians.	Information acquisition; Diagnostic testing/stewardship; Communication/team coordination	A multifaceted programme addressing possible under-testing was followed by higher testing rates and reported CDI case-detection indicators. Changes in staff practice and diagnostic methodology	Suspected under-testing and challenges in test use provided the intervention rationale; concurrent changes in laboratory methods limit attribution.	Implemented components: testing criteria, education, pharmacist/nurse assessment and audit feedback; individual components were not separately evaluated.

EHR = Electronic health record; ED = Emergency department; RN = Registered nurse.

Study	RN contribution / activity	Diagnostic stage(s)	Main finding / outcome	Reported barriers / constraints	Supports or proposals
			occurred together; the nursing-specific effect cannot be isolated.		
Gibas et al.[26]	Nursing staff reported perceptions of fever evaluation, bedside examination and full-workup practices; the study did not observe testing decisions or establish an RN-specific intervention effect.	Information acquisition; Diagnostic testing/stewardship; Communication/team coordination	In prospective surveys, nursing staff more often reported reflexive full fever workups and less frequent physician bedside assessment than physicians reported themselves. Responses were perceptions; no diagnostic outcomes were evaluated.	Survey-reported drivers included handoff instructions and customary full fever workups; the study did not directly measure causes of excessive testing.	Suggested targets, not tested facilitators: more selective testing, bedside reassessment and clearer handoffs.
Miyagami et al.[5]	Recognize discordance with a physician's diagnosis and decide whether to communicate the concern.	Diagnostic interpretation/concern; Communication/team coordination	In a survey of 430 nurses, 61.2% reported concern about a physician's diagnosis during the preceding month; more than half of those reporting concern did not communicate it. These were self-reported experiences, not verified diagnostic errors.	Concern about physician pride; fear of being ignored; belief that diagnosis is not the nurse's role; hierarchy/low psychological safety.	Psychological safety, role clarification and education are proposed avenues for improvement; they were not tested in this survey.
Bussell et al.[22]	Complete testing checklist; visually review stool; charge nurses can reject inappropriate specimens; participate in daily CDI huddles and provider dialogue.	Information acquisition; Diagnostic testing/stewardship; Communication/team coordination	After implementation of a multidisciplinary ticket-to-test process, recorded HO-CDI cases decreased from 57 to 32 per comparison period and the proportion of suitable samples increased from 41–65% to 71–91%. The nursing-specific contribution to the overall change was not isolated.	Initial nursing buy-in; added workload; hesitancy to challenge provider orders.	Implemented or reported supports included testing criteria, daily huddles, nursing leadership and authority for nursing/laboratory staff to reject unsuitable specimens.
Schnock et al.[19]	Contribute perspectives on diagnostic uncertainty, clinical evaluation, communication failures, test selection/timing and team hierarchy.	Information acquisition; Diagnostic interpretation/concern; Communication/team coordination; Diagnostic testing/stewardship	Interviews and patient-advisor groups described perceived sources of diagnostic error, including uncertainty, communication problems and test-related vulnerabilities. Multidisciplinary themes cannot	Premature closure; discomfort with uncertainty; communication failures; incomplete histories/exams; wrong/tardy tests; hierarchy; workload/cognitive load.	Suggested strategies discussed by participants/researchers, not validated intervention effects: improved communication, teamwork, nontechnical workflow changes and patient engagement.

EHR = Electronic health record; ED = Emergency department; RN = Registered nurse.

Study	RN contribution / activity	Diagnostic stage(s)	Main finding / outcome	Reported barriers / constraints	Supports or proposals
			all be attributed specifically to RNs.		
Manetti et al.[31]	Enter vital signs, observations and history; interact with algorithm outputs; integrate technology with bedside judgment and physician communication.	Information acquisition; Diagnostic interpretation/concern; Communication/team coordination	Among 16 nurses and 9 other professionals interviewed, staff described the implementation demands of a biomarker–machine-learning sepsis pathway. Nurses anticipated additional algorithm-related workload, while standardization supported acceptability; diagnostic accuracy was not assessed.	Additional data-entry workload; training needs; technical support; data-integration problems; risk of overreliance on algorithm output.	Reported or proposed adoption conditions: interprofessional integration, infrastructure and data integration, staff training and early nursing involvement in technology design; clinical efficacy was not tested.
Redmond et al.[13]	Nurses evaluate care-team, system/process, patient, provider and cognitive contributors to DEOD and propose system solutions.	Information acquisition; Diagnostic interpretation/concern; Communication/team coordination; Result follow-up/closed loop	In a survey of 220 stakeholders (including 114 nurses), respondents rated care-team, system/process, patient, provider and cognitive contributors to diagnostic error or delay. Results describe perceived causes, not observed error mechanisms.	Care-team interactions; systems/process problems; patient factors; provider/cognitive factors.	Solutions proposed in free-text responses included technical changes, organizational redesign and stronger collaboration; these were not evaluated as interventions.
Gleason et al.[7]	Nursing-attributed malpractice claims included deficiencies in assessment, communication, documentation, monitoring and response; these are selected alleged or adjudicated care failures rather than a representative sample of RN diagnostic activities.	Information acquisition; Diagnostic interpretation/concern; Communication/team coordination; Result follow-up/closed loop	Selected diagnosis-related malpractice claims naming nursing as the primary responsible service frequently involved communication and assessment failures. Claims data cannot establish the population frequency or independent causal contribution of RN activities.	Communication failures; inadequate assessment; documentation failures; failure to respond; training gaps; failure to establish differential diagnosis.	Improved diagnostic education, role clarity and team communication are implications for practice; they were not tested in this claims analysis.
Barwise et al.[12]	Information gathering; ongoing observation; coordination; communication during transfers/handoffs; recognition of patient/context factors that alter diagnosis.	Information acquisition; Diagnostic interpretation/concern; Communication/team coordination; Result follow-up/closed loop	In 11 focus groups with 64 clinicians, participants described organizational, team, clinician and patient factors that may contribute to diagnostic error/delay. The findings are	Organizational constraints; communication/coordination failures; EHR problems; time; workload; clinician experience/knowledge; patient complexity and language barriers.	Potential measures arising from participants' accounts included workflow and information-transfer changes; none was evaluated as an intervention in this study.

EHR = Electronic health record; ED = Emergency department; RN = Registered nurse.

Study	RN contribution / activity	Diagnostic stage(s)	Main finding / outcome	Reported barriers / constraints	Supports or proposals
			multidisciplinary perceptions, not an isolated RN effect.		
Fabre et al.[20]	Use an algorithm to assess whether urine culture is needed; discuss questionable cultures with hospitalists; nurse champion links nursing with stewardship team.	Information acquisition; Diagnostic testing/stewardship; Communication/team coordination	Urine-culture use decreased from 2.30 to 1.52 per 100 patient-days (IRR 0.66, 95% CI 0.50–0.87; $p < 0.01$). Change in inappropriate cultures was not statistically significant (IRR 0.88, 95% CI 0.58–1.33; $p = 0.55$). No improvement in diagnostic accuracy was established.	Not formally assessed; the study did not collect implementation-barrier data.	Programme components (not independently measured facilitators): nurse education, a nurse champion, an algorithm and nurse–hospitalist discussion.
Kavazovic et al.[29]	Apply four explicit testing criteria, identify suspected community-onset CDI, and initiate associated isolation/testing workflow.	Information acquisition; Diagnostic testing/stewardship; Communication/team coordination	A 12-month nurse-driven *C. difficile* testing/isolation protocol had poor implementation fidelity and no significant effect on the reported infection rate. Feasibility or mechanisms were not established by comparative testing.	Poor protocol fidelity; implementation burden; competing workflow priorities.	Education and implementation support were used or discussed; their separate effects were not measured.
Woods-Hill et al. [25]	Participate in blood-culture decision processes and collection practices; provide bedside perspective on reflexive testing and barriers to reducing low-value cultures.	Diagnostic testing/stewardship; Diagnostic interpretation/concern	A multicenter survey of pediatric critical-care clinicians, including 114 bedside RNs, found variation in reported blood-culture beliefs and practices. The survey did not establish the effect of RN-led stewardship or directly observe culture decisions.	Fear of missing sepsis; reflexive culture ordering; difficulty standardizing behavior; limited bedside examination before cultures.	Possible stewardship approaches, not evaluated interventions: team agreement on testing criteria and shared reassessment before culturing.
Kang et al.[21]	Document stool form/frequency; use Bristol Stool Scale; withhold nondiarrheal specimens and inactivate orders that fail testing criteria.	Information acquisition; Diagnostic testing/stewardship	Testing rates changed across successive electronic-record, nursing and alert interventions. Nursing assessment of stool eligibility was one component; effects cannot be attributed solely to nurses.	Implementation required education and consistent application of stool eligibility criteria; nursing-specific barriers were not evaluated separately.	Implemented components: nursing education, stool review and EHR decision support; their individual contributions were not isolated.
Bhat et al. [28]	Identify diagnostic-process breakdowns, missed/misdiagnosed conditions, care-coordination failures,	Information acquisition; Diagnostic testing/stewardship; Communication/team	RN and other provider responses were broadly concordant, with	Inadequate care coordination; inadequate data assessment; anchoring; workload; interruptions.	Respondents ranked teamwork, feedback about diagnostic changes, follow-up and second opinions as

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Study	RN contribution / activity	Diagnostic stage(s)	Main finding / outcome	Reported barriers / constraints	Supports or proposals
	data-assessment problems and preventive strategies.	coordination; Result follow-up/closed loop	differences for selected items. Sepsis was selected by 21% of RNs versus 9% of other providers as a commonly misdiagnosed condition. Inadequate care coordination and data assessment were recurring perceived contributors; these were not verified error rates.		possible solutions; none was experimentally evaluated.
Shefer et al.[18]	Identify possible physical causes; challenge assumptions; request further examination/testing; bridge ED and psychiatric teams; support reassessment.	Information acquisition; Diagnostic interpretation/concern; Communication/team coordination; Reassessment	Interviewees described diagnostic overshadowing and differing confidence in assessing physical symptoms, including among dual-trained nurses. These qualitative accounts did not measure a causal effect of role clarity or training on diagnostic reassessment.	Stigma; chaotic ED environment; time pressure; unclear responsibility boundaries; low confidence among psychiatric nurses without general-nursing training.	Participants discussed access to liaison support and broader general/mental-health nursing skills; these were not tested as interventions.
Birken et al.[30]	Nursing and leadership informants discussed organizational conditions relevant to sepsis diagnosis, including attention, staffing and examples of nurse-driven protocols. The analysis did not isolate bedside-RN diagnostic effects.	Information acquisition; Diagnostic interpretation/concern; Communication/team coordination	Multiprofessional interviews informed a Sepsis Diagnostic Excellence framework emphasizing attention and interacting organizational conditions. Findings are contextual rather than evidence that an RN intervention improved diagnostic accuracy.	Multiprofessional accounts described ambiguous presentations, competing demands, staffing constraints and organizational attention; RN-specific barriers were not isolated.	Nurse-driven protocols, monitoring/feedback and workflow strategies were described within a broader organizational framework; no nursing-specific intervention effect was tested.
Valasaki et al.[16]	In primary-care qualitative interviews, nurses described or were identified in triage and consultation decisions about whether reported symptoms warranted further investigation. Individual RN effects on cancer diagnostic time were not quantified.	Information acquisition; Diagnostic interpretation/concern; Communication/team coordination	Interview accounts identified symptom legitimacy, gatekeeping and pre-existing conditions as influences on access to further investigation. The study did not quantify nurse-attributable differences in diagnostic timing.	Stigma; attribution to pre-existing conditions; subjective gatekeeping; unclear/poor symptom narratives; access barriers.	Authors recommended more explicit assessments of symptom legitimacy, reducing stigma and standardized triage; these proposals were not tested.

EHR = Electronic health record; ED = Emergency department; RN = Registered nurse.

Study	RN contribution / activity	Diagnostic stage(s)	Main finding / outcome	Reported barriers / constraints	Supports or proposals
Akindele et al.[17]	Take/interpret history; estimate clinical probability; select/use peak-flow or spirometry; use trial of treatment; monitor response and follow-up.	Information acquisition; Diagnostic interpretation/concern; Diagnostic testing/stewardship; Result follow-up/closed loop	Practice nurses and GPs described estimating asthma probability from clinical history and objective tests (including peak flow and spirometry) and considering treatment trials. Interviews did not measure diagnostic accuracy or RN-specific effects.	Time pressure; variable/intermittent symptoms; overlap with other diseases; limited access to objective tests; missed follow-up.	Participants suggested education, improved test access, decision-support tools and diagnostic hubs; these were not evaluated as interventions.
Rorat et al.[32]	Monitor vital signs/condition; report distressing symptoms; execute urgent diagnostic/treatment orders; seek physician review rather than refusing help.	Information acquisition; Communication/team coordination; Diagnostic testing/stewardship; Result follow-up/closed loop	Medico-legal cases described nurses implicated in monitoring, reporting or urgent-order failures alongside sepsis diagnostic errors. The records do not establish a separate nurse-attributable effect on diagnostic delay.	Case-recorded failures included incomplete monitoring/reporting and delayed urgent orders; inferred explanations involving workload or assertiveness were not independently measured.	Practice recommendations included clearer sepsis standards, timely escalation and appropriate sampling; these were not evaluated in the case review.
Gupta et al.[27]	Questionnaire knowledge about indications for microbiology tests, specimen selection/handling, report interpretation and critical alerts; the study did not observe subsequent RN diagnostic actions.	Diagnostic testing/stewardship; knowledge of result interpretation (not clinical follow-up)	Among 228 paired participants (including 25 nursing students), mean knowledge scores increased from 4.69/15 to 6.22/15. Some items improved and others did not. The study did not measure subsequent clinical testing or diagnostic outcomes.	Low baseline and persistent topic-specific knowledge scores in this educational sample; not evidence of widespread bedside clinical errors.	The online training was the evaluated educational component; longer-term induction, refresher training and curriculum changes were suggested rather than tested.

EHR = Electronic health record; ED = Emergency department; RN = Registered nurse.

Table 3. RN activities and diagnostic domains

Figure 2. Report-level map of studies addressing nurses' diagnostic activities or diagnostic-safety vulnerabilities by study design. Bubble sizes do not represent demonstrated benefit. Linked reports are counted separately here; review and follow-up do not imply formal nurse-initiated reassessment.

These counts show where the literature has focused, not how many studies found better diagnostic outcomes. We therefore treated participant accounts, error records and intervention evaluations as different forms of evidence (Supplementary Table S3).

3.3 RN contributions across the diagnostic process

Rather than describing one uniform 'diagnostic nursing role,' the reports covered different types of involvement at different points in care. In some, nurses undertook a defined task; in others, participants described perceived responsibilities, or investigators examined failures in a diagnostic process. We use five domains to organize these findings and note the different evidentiary basis of each.

3.3.1 Information acquisition and surveillance

Reports repeatedly described nurses taking histories, assessing symptoms, recording physiological observations and reviewing clinical information. In a Japanese national adverse-event database, Shimizu et al. found nursing involvement in 19.3% of diagnostic-error reports, often connected with assessment or information transfer [6]. That figure concerns selected reports only; it does not describe patients or all diagnostic errors. Nurses in primary care described taking part in decisions about further investigation for possible cancer [16]. Practice nurses working in asthma diagnosis also drew on histories and measures such as peak expiratory flow to inform clinical assessment [17].

3.3.2 Interpretation and formation of diagnostic concern

Nurses in several studies questioned whether the current working diagnosis fully explained a patient's symptoms. Miyagami et al. surveyed 430 nurses and found that 61.2% had experienced such doubts in the previous month. Despite this, many never voiced their concerns to a physician [5]. These results capture perceived clinical concerns rather than an objective measure of diagnostic accuracy. Other work on asthma care and diagnostic overshadowing also describes how nurses interpret clinical findings [17, 18]. In multiprofessional interviews, Schnock et al. further identified diagnostic uncertainties. Still, it remains difficult to separate what nurses specifically contributed from the overall team perspectives [19].

3.3.3 Communication and interprofessional coordination

Whether nurses raised a concern depended heavily on working relationships. In Miyagami et al., nurses cited hierarchy, expected dismissal and uncertainty about their remit as reasons for not speaking up [5]. A separate analysis of malpractice claims found that communication between providers contributed to 55% of diagnosis-related claims in which nursing was named as the primary responsible service; within that selected sample, such problems were linked to higher odds of death [7]. These claims cannot be used to estimate risk in the general patient population. Emergency department nurses also described checking orders in the electronic record and contacting clinicians when the plan or communication was unclear [14, 15].

3.3.4 Diagnostic testing and stewardship

Diagnostic stewardship studies gave some of the most concrete accounts of specific nursing tasks, although the problems they tackled varied. In Fabre et al., urine-culture use fell from 2.30 to 1.52 per 100 patient-days after education and an algorithm-supported intervention [20].Kang et al. and Bussell et al. reported nurses applying stool-testing criteria and judging specimen suitability as part of wider improvement programmes [21, 22]. Sasaki et al. looked instead at possible under-testing for *Clostridioides difficile* (*C. difficile*); testing and reported case-detection measures both rose after changes that included nursing and pharmacist assessment, education and diagnostic methods [23]. Those combined interventions do not allow an independent nursing effect to be inferred. Studies on blood cultures and fever workups have reported issues with collection practices, training, and workflow [24, 25]. They also noted a common habit of ordering blanket "pancultures" without actually examining the patient at the bedside [26]. The measures reported mainly reflect testing processes rather than verified reductions in diagnostic error or harm.

Gupta et al. examined another kind of intervention, namely education on diagnostic stewardship [27]. After an online programme, the investigators obtained 310 baseline gap-analysis responses and paired before-and-after assessments from 228 participants, including nursing students. Mean scores increased from 4.69 to 6.22 out of 15, though improvement differed by topic. These findings came from questionnaires; the study did not look at later ordering behaviour, diagnostic delay or patient outcomes.

3.3.5 Review, follow-up and diagnostic reassessment

Ten reports fell within this domain, yet only a few assessed formal diagnostic reassessment. More commonly, the activity involved checking a result, clarifying a plan or passing on information that remained unresolved. In interviews conducted in emergency departments, nurses described tracking orders and results in the electronic record and contacting physicians when follow-up was unclear [15]. Bhat et al. focused on feedback about changes in diagnosis, and Shefer et al. described cases in which physical explanations for symptoms had to be reconsidered [18, 28]. In Gupta et al., knowledge of how to interpret laboratory reports was not treated as clinical follow-up [27].

3.4 Barriers and facilitators

Nurses also spoke about individual-level uncertainty over where their diagnostic role ended and, in some settings, about gaps in the knowledge needed to select tests or handle specimens. Miyagami et al. associated diagnostic concerns that nurses did not voice with expected dismissal and with doubt over whether it was appropriate to challenge a diagnosis [5]. In the mixed educational sample in Gupta et al., the mean baseline diagnostic-stewardship score was 6.59/20; this should not be read as an estimate for RNs generally [27]. Such findings reflect reported experience or measured knowledge, not observed failures in clinical diagnostic performance.

Team relationships shaped whether nurses could raise diagnostic concerns or questions about testing. Hierarchy, reluctance to challenge a physician’s order and the prospect of being ignored came through in survey and interview accounts [5, 22, 24]. Participants saw interprofessional trust, support from senior clinicians and opportunities for shared discussion as helpful, although these facilitators were not tested as standalone interventions [12, 24].

Organizational conditions also shaped participation, including staffing, workload, leadership, access to education and how well testing protocols fitted routine work. In one improvement project, the extra steps required for *C. difficile* testing felt burdensome, and another nurse-driven protocol was followed with limited fidelity [22, 29]. Birken et al. used multiprofessional interviews to examine organizational attention and staffing in sepsis

diagnosis; their findings offer context rather than an RN-specific intervention effect [30]. Digital systems introduced further conditions. Emergency department nurses described checking orders and results to bridge gaps in asynchronous electronic health record (EHR) communication [15], while nurses involved in adopting a biomarker-based sepsis tool reported demands related to data entry and integration [31]. Overall, studies described conditions that may support participation but seldom tested how changing any single condition affected diagnostic outcomes.

3.5 Interventions and outcome measures

Six reports examined interventions or quality-improvement activities, although success was defined differently from one programme to another. Fabre et al., Kang et al. and Bussell et al. aimed to reduce potentially unnecessary testing or improve specimen eligibility [20–22]. Sasaki et al. focused instead on suspected under-testing; testing and reported *Clostridioides difficile* infection (CDI) indicators increased after several concurrent changes, one of which was a change to diagnostic methods [23]. The programme effect cannot be attributed to the nursing component. Kavazovic et al. found poor adherence to a nurse-driven *C. difficile* protocol and no significant improvement in the reported infection outcome [29]. Gupta et al. measured knowledge after training rather than clinical performance [27].

Across these evaluations, whether testing was appropriate was more informative than whether test use rose or fell. In one setting, this might mean fewer low-value cultures; in another, more indicated investigations. Few studies assessed both missed necessary tests and avoidable testing. Measures of testing volume, specimen eligibility, reported case detection or knowledge cannot substitute for diagnostic accuracy, timeliness or patient harm. Nursing effects were also difficult to separate from other intervention components. The outcomes across the included evidence were not interchangeable. Knowledge scores do not show changed bedside behaviour [27]. Test utilisation and specimen-process measures may reflect other intervention components or changes in test methods, and they are not direct measures of diagnostic accuracy [20–23]. Incident and malpractice records capture selected events rather than population-level effects [6, 7]. Self-reported concerns and qualitative accounts of result checking describe experience or perception, not observed diagnostic resolution [5, 15].

The included studies showed nurses collecting and interpreting bedside information. They then shared these findings with colleagues to prompt testing or rethink a diagnosis. Nurses often returned to this information when new clinical evidence appeared. These actions did not always happen in a strict order. They could occur together or in different sequences. Figure 3 uses bidirectional arrows to show possible information exchanges and feedback. These arrows do not imply mandatory steps or proven causal links. The studies also identified several contextual factors that influenced these processes. These factors included role clarity, workplace hierarchy, workload, leadership support, access to education, existing protocols, and EHR design [12, 13, 30].

Figure 3. Conceptual framework of registered nurses' contributions to diagnostic safety. Two-way connectors and the return path indicate potential interaction and feedback between domains, not a fixed sequence or tested causal relationship.

4. Discussion

4.1 Main findings

The review shows that nurses take part in several parts of team diagnosis, yet the literature seldom frames these activities as one formal role. Nurses collect and interpret information, voice concerns, contribute to testing decisions and help teams return to unresolved findings. Diagnosis relies on information passing between people and across time. These activities do not imply that bedside RNs assume responsibility for the final medical diagnosis [1, 2]. The evidence is more uneven than this overview might suggest. Observation and communication feature in many reports, whereas intervention evaluations cluster around microbiological diagnostic stewardship. Only a few retrieved studies directly examined structured nurse-initiated reassessment or patient-level diagnostic outcomes. As a result, the literature tells us more about what RNs do and the barriers they perceive than about whether wider participation improves diagnostic accuracy or prevents harm.

4.2 Surveillance, diagnostic concern, and team response

The diagnostic value of nursing surveillance lies partly in timing. When a clinician reassesses a patient hours after an initial decision, symptoms, test results or treatment responses may have emerged that were not available earlier. Qualitative studies of asthma and possible cancer diagnosis give examples of nurses contributing to decisions about further investigation [16, 17]. Incident reports show what can happen when observations are poorly recorded or conveyed [6]. Still, not every instance of surveillance for deterioration is diagnostic. What matters is whether a new finding prompts someone to reconsider the working explanation, rather than simply react to instability.

Whether anyone acts on a possible diagnostic discrepancy after a nurse spots it is another matter. Miyagami et al. found that many concerns went unvoiced, often against a backdrop of hierarchy or expected dismissal [5]. Malpractice claims point to communication failures in a different and highly selected setting [7], but these studies cannot show that silence caused particular adverse outcomes. Future work should trace what happens once a concern is raised: whether it is acknowledged, whether the working diagnosis is revisited, and whether the decision is fed back to the nurse and, where relevant, to the patient. Encouraging staff to speak up will achieve little without a reliable team response.

4.3 Diagnostic stewardship, education, and the work system

These stewardship studies demonstrate that nurse-led protocols should not be simply equated with reduced testing volume, as the primary objective is clinical appropriateness. While certain interventions aimed to curb cultures with equivocal indications [20–22], Sasaki et al. addressed the converse risk of potential under-testing [23]. Following a broader multifaceted programme that included changes to diagnostic methods, Sasaki et al. observed increases in both testing rates and CDI case indicators. However, the specific nursing effect cannot be isolated from the other intervention elements. Taken collectively, these studies establish that RNs are involved in decisions regarding whether testing is warranted, but they do not provide evidence that nursing participation consistently alters overall test-ordering rates. Consequently, future evaluations should be designed to assess both unnecessary testing and missed indicated investigations within a unified framework.

Putting these protocols into practice also comes with challenges. Bussell et al. found that staff faced heavier nursing workloads and were hesitant to question physician orders [22]. Kavazovic et al. similarly reported poor adherence to a nurse-driven *C. difficile* protocol and saw no meaningful improvement in infection outcomes [29]. Gupta et al. evaluated a two-day online course. While it boosted some knowledge scores, the cohort of 228 respondents included students, and researchers did not track their later clinical performance [27]. Most stewardship projects combine nursing algorithms with other strategies. These include decision support, clinician training, lab procedures, and team coordination. Therefore, the reported results reflect the success of the whole programme. They cannot be separated out as the independent effect of nursing alone.

Organizational factors help explain why knowledge and written protocols do not always translate into action. In interviews, staff described heavy workloads, unclear roles, and difficulties communicating across different professional teams [12, 24]. Birken et al. showed that staffing levels and hospital conditions shape how much attention sepsis diagnosis receives [30]. Interviews about electronic health records revealed more problems when orders and test results were sent at different times among team members [15]. A nurse might notice a diagnostic issue but lack the time, the right channel, or the authority to share it with the person who can actually fix it.

4.4 Relationship to existing frameworks and implications

These five domains align with prior research and expand on it. Gleason et al. previously identified diagnostic triage, interprofessional teamwork, and patient empowerment as key nursing roles [2]. A more recent editorial also discussed how to define and limit this participation [8]. Our review maps out what these published studies actually cover and which outcomes they measure. For example, communication with patients and families appears in both information gathering and follow-up. However, the available evidence focuses much less on this than on microbiological testing. Figure 3 simply organizes these observations. It is not intended to be the first framework for nursing involvement in diagnosis.

The framework connects diagnostic activities with the conditions that may support or obstruct them. For example, a new test result might immediately prompt a second look. On the other hand, a concern brought up during handover could trigger a reassessment even without any new tests. Figure 2 shows where the included reports cover these functions. However, it does not measure how strong the evidence is for positive effects. In practice, clinical teams should try to openly discuss if new findings still match the working diagnosis. They also need to agree on who is responsible for following up on unresolved results. However, the studies included in this review have not yet tested whether these practical steps actually improve patient outcomes.

4.5 Priorities for future research

Future work should trace a diagnostic concern from the point it is expressed through to its consequences, covering the RN's expression of uncertainty, whether the concern was acknowledged, whether it led to renewed assessment or investigation, and whether the decision was communicated back. Evaluations of testing programmes should capture inappropriate use and missed indicated investigations together and, where feasible, include timeliness, confirmed diagnostic error, completion of follow-up and patient harm. Multicomponent interventions also need clear reporting of implementation fidelity and of what nursing specifically contributed. Studies involving several professions should describe what nurses did and, where possible, report outcomes for the nursing subgroup. More research is needed outside well-resourced acute-care settings as well, since staffing, scope-of-practice rules, patient involvement and access to electronic systems may all change how these activities can be carried out.

4.6 Strengths and limitations

We started with the RN role rather than a particular diagnosis or intervention. This allowed us to examine work described separately in diagnostic-error research, communication, microbiological stewardship, education and organizational studies. Explicit boundaries around nursing diagnosis and advanced-practice autonomous diagnosis helped maintain that focus. We also linked companion publications to avoid interpreting related reports as independent evidence.

This review has several limitations. Much of the evidence relies on interviews, surveys, and selected incident or malpractice records. Some of these sources only suggest what roles nurses might play or where things went wrong. They do not provide direct observations of actual nursing practice. When studies involve mixed teams or student populations, it is difficult to draw conclusions specific to nurses. For example, Birken et al. [30]describe organizational factors in sepsis diagnosis. Rorat et al. [32] report failures in nursing monitoring and urgent orders alongside diagnostic errors. However, these studies do not prove that nursing issues directly caused the diagnostic delay. Interventions often combined nurse protocols with other changes. Most of them measured test numbers or knowledge rather than what actually happened to the patients. We could not retrieve three reports, and some of these dealt with reassessment or education. When checking for overlapping data, we grouped linked reports into single analytic units. However, we did not confirm that these units were truly independent cohorts.

5. Conclusion

RNs contribute to diagnosis by observing patients over time, recognising and communicating concerns, supporting appropriate testing and following up unresolved results. The included literature documents these activities and some changes in testing processes, but it has not yet shown that strengthening RN participation improves diagnostic accuracy, timeliness or patient harm. Before firm practice recommendations can be made, studies are needed that trace concerns through team response to diagnostic resolution and that separate nursing actions from wider programme effects.

Abbreviations

AHRQ
Agency for Healthcare Research and Quality
CDI
Clostridioides difficile infection
EHR
Electronic health record
RNs
Registered nurses.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

All authors consent to publication.

Competing interests

The authors of this manuscript have no conflicts of interest to disclose.

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Author Contribution

X.S. was responsible for conceptualization, writing the original draft, and data curation. X.L. contributed to validation and data curation. G.Y. and Y.W. performed the formal analysis. J.D. contributed to validation. H.L. and H.Y. contributed to writing, reviewing, and editing. All authors read and approved the final manuscript.

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Availability of data and materials

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Figures

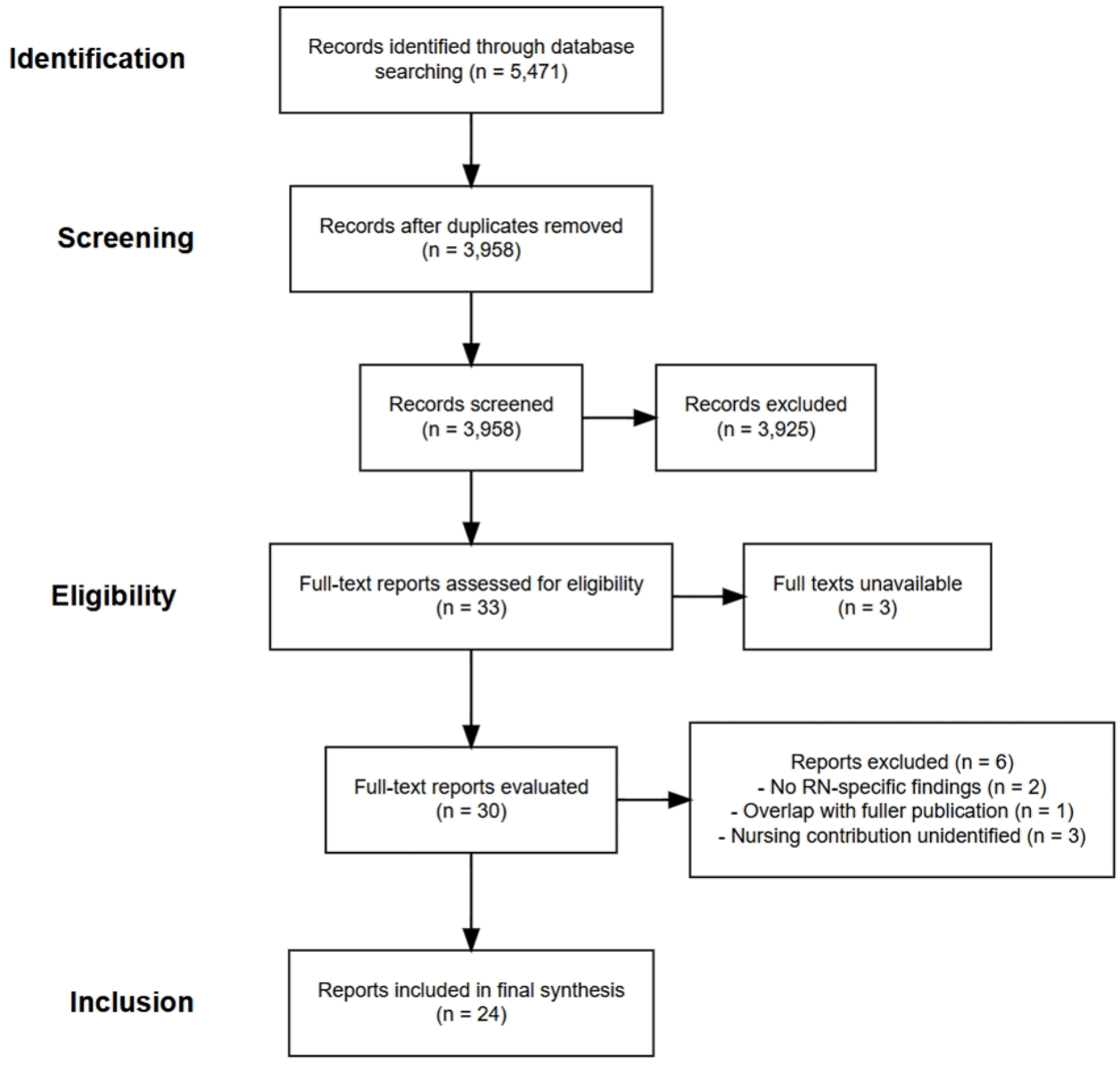


Figure 1

Study-selection flow based on the current search and screening records.

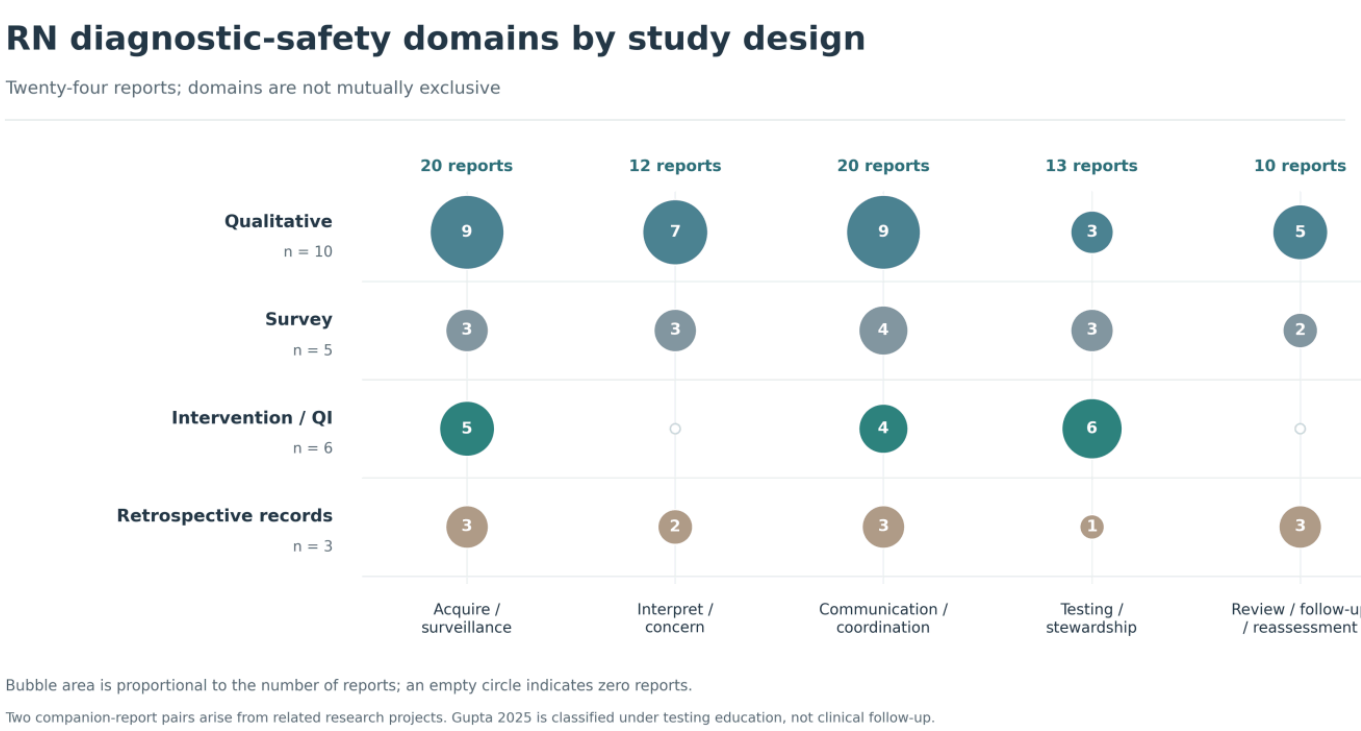


Figure 2

Report-level map of studies addressing nurses' diagnostic activities or diagnostic-safety vulnerabilities by study design. Bubble sizes do not represent demonstrated benefit. Linked reports are counted separately here; review and follow-up do not imply formal nurse-initiated reassessment.

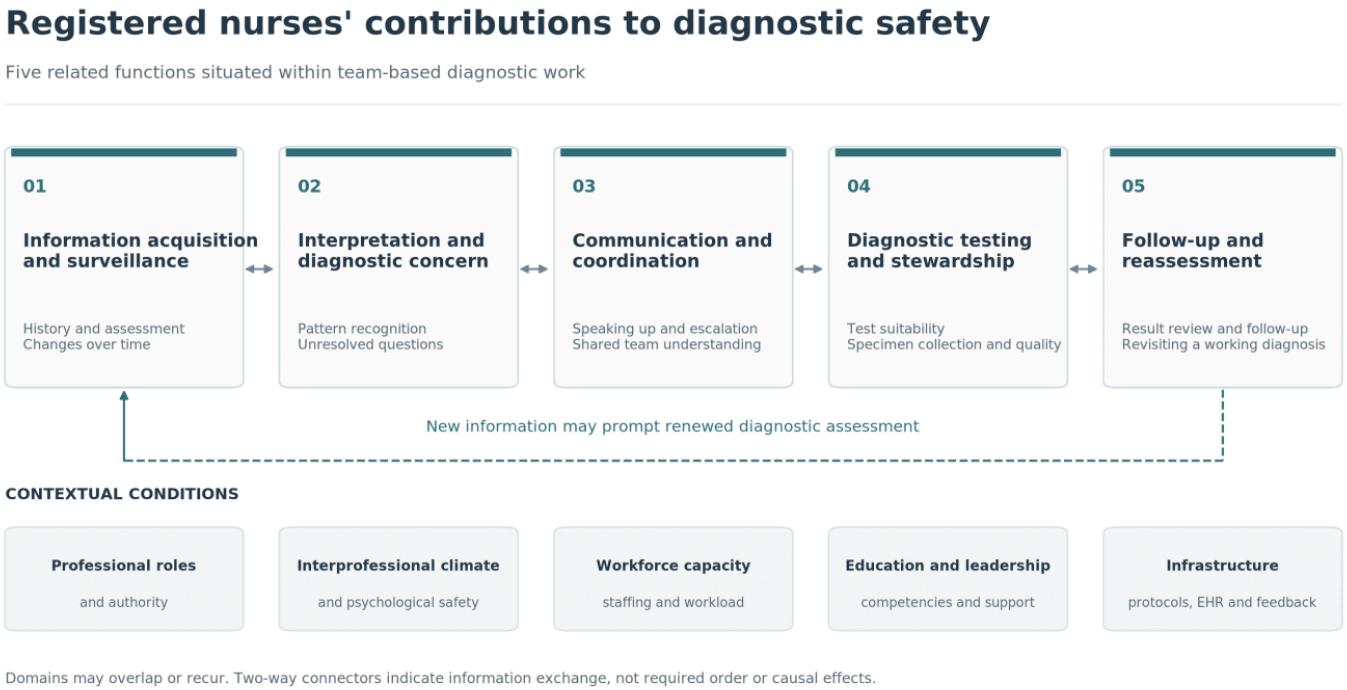


Figure 3

Conceptual framework of registered nurses' contributions to diagnostic safety. Two-way connectors and the return path indicate potential interaction and feedback between domains, not a fixed sequence or tested causal relationship.

Supplementary Files

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