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The "Diagnostic Timeout": A Scoping Review of Interprofessional Huddles to Prevent Diagnostic Error in Complex Hospitalized Patients

Munirah Ahmed Almodeer [(1)] , Jamila J Sultan Almoriry [(2)] , Nora Soud Almotairi [(3)] , Saad Hamoud Qahtan Alshehri [(4)] , Sultan Mohammed Khormi [(5)] , Sami Khalaf Mulfi Alsharari [(6)] , Kasam Mohammad S Alsharari [(7)] , Aisha Amzaidy Assiry [(8)] , Samiah Saleh Alanazi [(9)] , Ali Dhifallah Bakheet Alzahrani [(10)] , Metad Abdulaziz Almotery [(11)] , Nouf Shargi Alenezi [(12)]

(1) Jazan General Hospital,Ministry of Health, Saudi Arabia,
(2) Musharraf Health Center,Ministry of Health, Saudi Arabia,
(3) Ministry of Health (Riyadh Second Health Cluster), Saudi Arabia,
(4) Riyadh branch Ministry of Health, Saudi Arabia,
(5) Al-Baha Health Cluster - Al-Qura General Hospital,Ministry of Health, Saudi Arabia,
(6) Tabarjal General Hospital,Ministry of Health, Saudi Arabia,
(7) Disaster and Crisis Management in Qurayyat,Ministry of Health, Saudi Arabia,
(8) Muhayel Health Sector - Muhayel Asir, Ministry of Health, Saudi Arabia,
(9) Al-Narjis PHC,Ministry of Health, Saudi Arabia,
(10) The Assistant Department for Compliance with the Ministry of Health Branch in Riyadh Region, Saudi Arabia,
(11) Artawiya General Hospital,Ministry of Health, Saudi Arabia,
(12) Riyadh,Ministry of Health, Saudi Arabia

Abstract

Background: Diagnostic error, a major patient safety threat, often arises from fragmented data and cognitive bias, not information lack. Critical patient information is siloed among nurses, lab scientists, radiologists, and pharmacists without a proactive synthesis mechanism.

Aim: This scoping review maps evidence (2015-2024) on structured "diagnostic timeout" huddles designed to integrate dispersed data and prevent errors in complex hospitalized patients.

Methods: Employing systematic scoping methodology, five databases were searched for literature on structured, proactive meetings involving nursing, pharmacy, laboratory, and radiology professionals addressing diagnostic uncertainty.

Results: Analysis of 42 sources identified four primary models (e.g., Safety Huddles, Diagnostic Management Teams). Core processes involve structured triggers, disciplined communication (e.g., adapted SBAR), and closed-loop accountability. Enablers include strong leadership, protected time, and psychological safety. Outcomes suggest reduced diagnostic delays and improved team awareness.

Conclusion: The diagnostic timeout formalizes interprofessional consultation into a replicable safety strategy, requiring deliberate design and leadership. Future research should standardize outcomes and assess the cost-effectiveness of these interventions.

Keywords: diagnostic error, interprofessional huddle, situation awareness, cognitive bias, patient safety

Introduction

Diagnostic error—defined as the failure to establish an accurate and timely explanation of a patient's health problem or to communicate that explanation to the patient—constitutes a critical, yet stubbornly persistent, flaw in modern healthcare systems. It is estimated to affect at least one in every twenty US adults and contributes to approximately 10% of patient deaths (Phillips et al., 2020). Nowhere is this risk more acute than in the care of complex hospitalized patients, whose illness trajectories are dynamic and whose clinical pictures are often obscured by multiple comorbidities, polypharmacy, and atypical presentations (Bhise et al., 2018). In this environment, the cognitive burden on any single clinician is immense.

The diagnostic process is not a linear exercise performed by an isolated physician but a distributed cognitive task, reliant on the synthesis of data streams curated and interpreted by a team of professionals (Graber et al., 2017). The nurse observes subtle changes in mentation and vital signs. The laboratory scientist identifies a dangerous trend in lactate or creatinine. The radiologist detects a subtle finding incongruent with the working diagnosis. The pharmacist flags a potential adverse drug event

*Corresponding author e-mail: maalmudyir@moh.gov.sa (Munirah Ahmed Almodeer).

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mimicking disease progression. Yet, in traditional hospital workflows, these insights often reside in parallel silos, communicated passively through the electronic health record (EHR) or via fragmented, asynchronous messages. This systemic fragmentation creates the perfect conditions for collective diagnostic failure, where the "right answer" exists within the system but is never assembled (Singh et al., 2019).

In response to similar systemic vulnerabilities in other high-risk domains, healthcare has successfully borrowed and adapted safety tools from aviation and emergency management. The surgical safety checklist and its cornerstone, the "timeout," have demonstrably reduced wrong-site surgery and improved team communication (WHO, 2022). Similarly, the disciplined "huddle" or "situation briefing" is a cornerstone of crisis and disaster management, ensuring shared situational awareness before action (Bigley & Roberts, 2001). These tools share a core principle: interrupting automatic workflow to deliberately cross-check assumptions, integrate disparate information, and align the team around a common plan.

This review proposes and examines the concept of the "Diagnostic Timeout"—a structured, interprofessional huddle explicitly designed to prevent diagnostic error. It is defined as a scheduled or triggered meeting of core team members—including nursing, pharmacy, laboratory, and radiology professionals, facilitated by clinical leadership—to collaboratively synthesize data, challenge cognitive assumptions, and formulate or refine a differential diagnosis for a patient with unexplained clinical deterioration or persistent diagnostic uncertainty. The rationale is to create a formal space for the cognitive work of diagnosis that mirrors the formal space created for procedural safety. By leveraging the unique perspectives of each profession, the timeout seeks to mitigate cognitive biases like anchoring (fixating on an initial diagnosis) and confirmation bias (favoring data that supports the initial hypothesis) (Croskerry, 2003).

Therefore, this scoping review asks: What models of interprofessional diagnostic huddles ("diagnostic timeouts") are described in the recent literature? How are they structured, triggered, and conducted? What roles do the various professions (nursing, laboratory, radiology, pharmacy, leadership) play? What are the reported outcomes and implementation challenges? By mapping this emerging landscape, this review aims to inform healthcare systems seeking to build more reliable, team-based diagnostic processes for their most vulnerable patients.

Methodology

This study employed a systematic scoping review methodology, chosen to map the breadth of concepts, models, and evidence related to an emerging, heterogeneous practice not yet ripe for a definitive systematic review (Arksey & O'Malley, 2005; Levac et al., 2010).

Search Strategy and Selection Criteria

A systematic search of five databases (PubMed, CINAHL, Scopus, Web of Science, PsycINFO) was conducted in July 2024 for literature published from January 2015 to June 2024. The search combined terms for diagnostic error, interprofessional collaboration, safety huddles, and relevant clinical settings/professions. Included studies were peer-reviewed articles describing structured interprofessional meetings aimed at diagnosing complex inpatients, with active involvement from at least three core professions (nursing, pharmacy, laboratory, radiology) alongside physicians. Editorials, retrospective mortality conferences, general ward rounds, and non-English publications were excluded.

Data Extraction

Data were extracted using a standardized form capturing: study design, setting, professions involved, huddle model name/description, trigger mechanisms, communication structure, role descriptions, measured outcomes (process, clinical, cultural), and reported barriers/facilitators.

Data Synthesis and Analysis

Given the methodological and descriptive diversity of included sources, a thematic narrative synthesis was conducted. Data were analyzed iteratively. First, descriptive accounts of the huddle models were categorized. Second, the processes of the timeout—from initiation to follow-up—were coded. Third, cross-cutting themes regarding implementation success and professional roles were developed. This process generated the organizing framework for the results: Model Typology, Core Processes, and Enabling Ecosystems.

Results

The included literature reveals a growing, though heterogeneous, field of practice. Diagnostic timeouts are known by various names and are implemented in diverse forms, but share a common goal: leveraging collective intelligence to solve diagnostic puzzles.

A Typology of Diagnostic Timeout Models

Four primary model archetypes were identified, summarized in Table 1.

Core Processes of the Effective Diagnostic Timeout

The efficacy of the diagnostic timeout hinges on the execution of three interdependent process phases: triggering, structured communication, and action with accountability. These phases transform the concept from an abstract ideal into a replicable, high-reliability practice. The initial phase, **triggering the timeout**, determines which patients benefit from this intensive cognitive resource. Mechanisms exist on a spectrum from subjective intuition to objective algorithms.

Table 1: Archetypes of Interprofessional Diagnostic Timeout Models

Model Name	Primary Trigger	Core Participants	Typical Frequency & Focus	Key Citations
1. Proactive Safety Huddle	Scheduled (e.g., daily). Often uses a screening tool to identify "high-risk" patients.	Bedside Nurse, Charge Nurse, Attending Physician, Clinical Pharmacist, and often a Case Manager.	**Daily.** Focuses on patients meeting specific "vulnerability" criteria (e.g., new organ dysfunction, diagnostic uncertainty >72h). Aims to preempt failure.	Aldawood et al., 2020; O'Leary et al., 2015
2. Diagnostic Management Team (DMT)	**Consultation-based.** Triggered by a treating clinician's request for diagnostic assistance.	**Core:** Pathologist, Radiologist, Specialist Physician (e.g., Infectious Disease). **Extended:** Pharmacist, Microbiologist, Bedside Nurse.	**As-needed.** In-depth review of complex cases, often with a focus on integrating pathological and radiological data. Academic medical center model.	Laposata, 2022; Verna et al., 2019
3. Patient Safety Rounds / "Diagnostic Safety Rounds."	Scheduled, often weekly, multidisciplinary forum.	Physician Lead (e.g., Chief Medical Officer), Nursing Leadership, Clinical Pharmacist, Risk Management, Quality/Safety Officer. May include lab/radiology reps.	**Weekly.** Reviews cases of actual or potential diagnostic harm, near-misses, or ongoing diagnostic challenges. More review-oriented but can drive real-time action.	Sacco et al., 2021 Schiff et al., 2013
4. Enhanced Rapid Response Team (RRT) with Diagnostic Mandate	**Physiologic trigger** (e.g., MET criteria) PLUS a trigger for "clinical concern" or diagnostic puzzlement.	**Standard RRT (Intensivist, RRT Nurse, Respiratory) +:** Bedside Nurse, Primary Pharmacist, on-call Radiologist (for image review).	**As-needed (acute).** Expands the traditional RRT mandate from "stabilize" to "diagnose," recognizing that deterioration often has an undiagnosed cause.	Custo & Trapani, 2020; Maharaj et al., 2015

The most commonly reported trigger is **clinician concern**, often described as the "gut feeling" of a nurse or physician that the clinical picture is incoherent or that the patient is on a concerning trajectory despite treatment (Motta et al., 2019). While this values professional expertise, its subjectivity can lead to inconsistent application. To enhance reliability, many systems implement **structured screening criteria** embedded into daily workflows. These objective criteria include persistent diagnostic uncertainty beyond 48-72 hours of admission, discordant findings between the clinical presentation and test results, unexplained clinical deterioration, or the onset of new, unexplained organ failure (O'Leary et al., 2015).

Some institutions combine early warning scores with a specific "diagnostic uncertainty" flag to standardize identification. The most advanced, emerging models utilize **automated Electronic Health Record (EHR) flags** via clinical decision support rules. These algorithms identify high-risk patterns suggestive of diagnostic drift, such as a patient accumulating consults across multiple specialties without a clear diagnosis, escalating biomarkers like lactate without a documented source, or temporal links between a medication change and the onset of new symptoms (Murphy et al., 2019). A hybrid approach that respects intuitive concern while mandating review for objective criteria appears most robust.

Once triggered, the success of the timeout depends on a **structured dialogue** that prevents the meeting from devolving into a meandering or hierarchical discussion. Successful models explicitly borrow communication frameworks from high-reliability fields like aviation and disaster management. One potent model is the **situation briefing**, adapted from crisis response protocols, which mandates a rapid, sequential "roll call" of facts from each professional vantage point (Avalos et al., 2021). In this format, nursing provides the **bedside narrative**, reporting the patient's trajectory over the preceding 12-24 hours—shifts in mentation, functional status, or pain that are rarely captured in discrete data fields.

Laboratory and pharmacy professionals then contribute **data trend analysis**, connecting timelines of medication administration with laboratory value shifts to identify potential adverse drug events or evolving pathologies. Radiology engages in **image re-contextualization**, re-examining prior studies in light of the newly synthesized clinical picture to identify

previously overlooked subtleties. An alternative or complementary framework is an **expanded SBAR (Situation, Background, Assessment, Recommendation) model**, where each profession contributes to a collective "Assessment," thereby building a multi-faceted hypothesis (Müller et al., 2018). The facilitator's role is critical in eliciting these distinct perspectives, explicitly asking, "What does your data suggest we might be missing?" to surface divergent views and counter confirmation bias (Rehm et al., 2021).

The final phase, **translating discussion into action and accountability**, ensures the timeout yields tangible results. The primary cognitive output is **refined hypothesis generation**, leading to a reprioritized differential diagnosis. This must be immediately coupled with a concrete **action plan** specifying assigned tasks for each team member, such as pharmacy recommending an alternative medication, nursing implementing enhanced monitoring, or laboratory processing a specific confirmatory test. Crucially, this plan requires **closed-loop accountability**. A single team member, often the attending physician or a designated resident, must be the designated owner for documenting the consensus and driving execution. A formal mechanism for follow-up, such as a note in the EHR problem list or a brief update at the next scheduled safety huddle, is essential to prevent the collaborative plan from dissolving amid the chaos of routine care, thereby completing the safety circuit (Singh et al., 2022). Figure 1 illustrates a structured huddle involving nursing, physicians, pharmacy, laboratory, and radiology professionals.

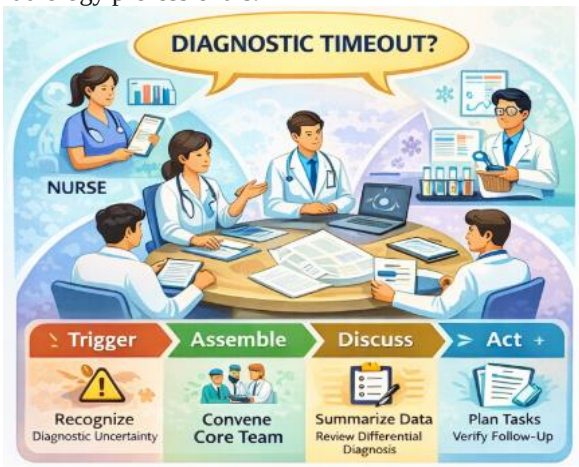

Figure 1: Interprofessional Diagnostic Timeout: Structure and Core Processes

The Enabling Ecosystem Roles, Culture, and Infrastructure

The effectiveness of these core processes is deeply contingent on a supportive ecosystem comprising clearly defined roles, a conducive culture, and enabling infrastructure. Each participating profession contributes a unique and essential diagnostic lens. **Nursing** acts as the **integrator of bedside context**, providing the longitudinal narrative of change—the subtle shifts in pain, cognition, or energy that are the earliest indicators of improvement or decline, yet are often poorly captured in the EHR (Gleason et al., 2017). **Pharmacy** serves as the **pharmacotherapeutic detective**, expertly correlating the timeline of medication administration—including new starts, dose changes, or discontinuations—with the onset or evolution of symptoms, thereby identifying adverse drug events that masterfully mimic primary disease (El-Kareh et al., 2013).

Laboratory and radiology professionals must function as **diagnostic consultants**, moving beyond their traditional roles as passive data reporters to active interpreters of patterns. Their expertise lies in explaining *why* a pattern exists ("this anion gap suggests lactic acidosis, not ketoacidosis") and suggesting the logical next diagnostic step ("consider checking a methanol level") (Laposata, 2022; Bruno et al., 2015). Finally, **clinical leadership**, informed by principles of **disaster and crisis management**, provides the essential facilitation and process discipline. Leaders are responsible for ensuring psychological safety—a climate where a nurse or junior resident can voice a concern without fear of reprisal—and for applying crisis management techniques to keep the huddle focused, time-bound, and oriented toward decisive action (Wawersik et al., 2023). This ecosystem, where each role is valued and psychological safety is prioritized, forms the necessary foundation upon which the structured processes of the diagnostic timeout can reliably produce safer patient outcomes.

Cultural and Infrastructural Prerequisites

Success depends on a culture of psychological safety and cognitive humility—the shared understanding that diagnosis is fallible and requires collective effort (Edmondson, 2018). Protected time and space are non-negotiable logistical challenges; huddles fail when participants are distracted or feel pulled to other tasks. Finally, technology can be a barrier or a bridge. While EHRs fragment data, purpose-built virtual huddle platforms or shared diagnostic dashboards that collate vital signs, lab trends, medications, and key images in one view can dramatically enhance efficiency (Wu et al., 2022).

Reported Outcomes and Challenges

Outcomes reported in the literature are primarily process-oriented but promising. Studies report increased detection of diagnostic discrepancies or ADEs (up to 30% in some DMT reviews), reduced time to definitive diagnosis, and decreased rates of unplanned ICU transfer for patients reviewed in proactive safety huddles (Verna et al., 2019; O'Leary et al., 2015). Qualitative studies highlight improved team situation awareness and nurse empowerment (Aldawood et al., 2020). Major barriers, synthesized in Table 2, include time

constraints, professional hierarchies, lack of reimbursement models, and the difficulty of integrating the practice into chaotic clinical workflows.

Table 2: Major Barriers and Facilitators to Implementing Diagnostic Timeouts

Domain	Barriers	Facilitators
Structural/Resource	- Lack of protected, dedicated time for all participants. - No clear billing/reimbursement model for interprofessional diagnostic consultation. - Physical or virtual colocation challenges.	- Leadership mandate with allocated resources (e.g., backfill for nurses). - Integration into existing, paid-for structures (e.g., daily safety huddle, RRT). - Use of efficient, brief formats (e.g., 10-minute huddle).
Cultural & Professional	- Hierarchical medical culture that discourages input from non-physicians. - Lack of psychological safety; fear of speaking up. - "Turf" concerns and ambiguous professional boundaries. - Perceived threat to physician autonomy and diagnostic authority.	- Strong, visible leadership endorsement and participation. - Explicit valuing of all contributions; facilitator ensures equal voice. - Clear articulation of shared purpose: patient safety over professional ego. - Education on cognitive bias and systems thinking for all staff.
Process & Workflow	- Unclear or inconsistent triggering mechanisms. - Lack of a structured communication framework leads to meandering discussions. - No closed-loop system for follow-up on action items. - Information overload; difficulty accessing synthesized data quickly.	- Simple, objective triggering criteria embedded in daily workflow. - Use of a strict, time-limited communication protocol (e.g., Situation Briefing). - Designation of an "owner" for the post-huddle plan and a follow-up check. - EHR tools or dashboards that pre-populate key data for the case.

Discussion

This scoping review elucidates the "diagnostic timeout" as an innovative, team-based intervention emerging at the intersection of patient safety, cognitive science, and high-reliability organization movements. The findings demonstrate that while models vary in name, frequency, and formality, they share a foundational premise: that the distributed nature of modern diagnosis demands a distributed, collaborative cognitive process to safeguard against error. By creating a structured interruption—a "timeout for thinking"—these huddles operationalize the National Academy of Medicine's recommendation to "improve teamwork in the diagnostic process" (Ball & Balogh, 2016).

A central insight is the critical, yet historically undervalued, diagnostic role of non-physician professions. The review confirms that nurses, pharmacists, and diagnosticians hold "diagnostic puzzle pieces" that are essential but often misshapen or lost when passed through traditional reporting channels. The nurse's narrative provides a temporal context that can distinguish chronic from acute. The pharmacist's timeline can reveal iatrogenic illness. The radiologist's reinterpretation can pivot the entire diagnostic trajectory. The timeout's power lies in creating a forum where these pieces are laid on the table simultaneously, allowing the team to see the whole picture. This aligns with the concept of "collective sensemaking" from organizational theory, where complex problems are best solved by integrating diverse perspectives (Dwyer et al., 2023).

The successful implementation of these models, however, faces significant headwinds that are deeply embedded in healthcare's culture and structure. The lack of a financial model is a major impediment; while a surgeon is paid for a procedure with a built-in timeout, no equivalent payment exists for the cognitive labor of a 30-minute diagnostic huddle involving six highly trained professionals. This makes it a "cost" rather than a "value" in traditional accounting, despite its potential to prevent costly downstream complications (Schiff et al., 2013). Furthermore, the persistence of the medical hierarchy can stifle the open dialogue essential for success. The facilitator's skill in flattening these hierarchies, drawing out the quiet nurse or junior lab tech, is paramount and borrows directly from the non-hierarchical communication protocols (like "crew resource management") used in aviation and crisis response (O'Donovan & McAuliffe, 2020).

Limitations of this review include those inherent to scoping methodology: it maps the landscape but does not appraise the quality of evidence or perform meta-analysis. The field itself is young, dominated by single-site, pre-post studies and qualitative descriptions, limiting generalizability. Publication bias likely favors reports of successful implementations. Furthermore, the review's focus on specific professions may have excluded relevant literature from other team members (e.g., physical

therapists, speech-language pathologists) who also contribute diagnostic insights.

Implications for Practice, Policy, and Research

Healthcare organizations should pilot diagnostic timeout models tailored to their local context, starting with high-risk areas like medical ICUs, oncology, or general medicine wards. The Proactive Safety Huddle model is likely the most scalable starting point. Success depends on: 1) Executive sponsorship to allocate time and signal importance, 2) Co-design with frontline staff from all professions to develop feasible triggers and processes, and 3) Investment in facilitation training for clinical leaders to run effective, inclusive meetings. Leaders must also work to codify the outputs of these huddles in the EHR to build an institutional memory of diagnostic decision-making.

Policymakers and payers must explore alternative payment models that reward value-based, team-based cognitive care, potentially through bundled payments or quality metrics related to diagnostic safety. Accrediting bodies for nursing, pharmacy, medical laboratory science, and radiology should mandate interprofessional education (IPE) competencies that go beyond traditional roles to include explicit training in diagnostic reasoning and collaborative consultation. Simulation scenarios should recreate diagnostic timeouts, allowing trainees to practice contributing their unique perspective within a structured safety protocol.

The field requires maturation. Key research priorities include: 1) Standardizing core outcome measures (time to correct diagnosis, diagnostic error rate measured by validated tools), 2) Conducting multicenter, controlled studies to assess impact on hard clinical endpoints (mortality, length of stay), 3) Economic evaluations to determine cost-effectiveness, and 4) Qualitative studies exploring the longitudinal impact on professional identity, teamwork, and institutional safety culture. Research should also explore the integration of artificial intelligence as a triggering or data-synthesis tool within the human team framework. Figure 2 shows a schematic representation of the downstream effects of implementing interprofessional diagnostic timeouts in inpatient care.

Figure 2: Impact of Diagnostic Timeouts on Patient Safety and Clinical Outcomes

Conclusion

The "diagnostic timeout" represents a pragmatic and promising application of high-reliability principles to one of healthcare's most insidious problems. It acknowledges that in an era of superspecialization and data overload, the diagnostician is no longer an individual but a team, and the diagnostic instrument is not a stethoscope but a well-facilitated conversation. This review has mapped the nascent models, core processes, and critical success factors for these interprofessional huddles. While significant cultural, financial, and logistical barriers exist, the imperative is clear. As healthcare grapples with increasing complexity, building structured, respectful spaces where nurses, pharmacists, laboratory scientists, radiologists, and physicians can collectively "stop and think" may be one of the most potent strategies available to illuminate diagnostic blind spots, protect patients from harm, and honor the full depth of expertise residing within the modern healthcare team. The path forward requires deliberate design, courageous leadership, and a fundamental reevaluation of how we support the shared cognitive work of healing.

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