

Promoting Learning and Patient Care Through Shared Reflection: A Conceptual Framework for Team Reflexivity in Health Care

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Abstract

Health care teams are groups of highly skilled experts who may often form inexperienced teams because of a lack of collective competence. Because teamwork and collaboration form the foundation of effective clinical practice, factors that promote collective competence demand exploration. The authors review team reflexivity (TR), a concept from the psychology and management literatures, and how it could contribute to the collective competence of health care teams. TR captures a team's ability to reflect collectively on group objectives,

strategies, goals, processes, and outcomes of past, current, and future performance to process key information and adapt accordingly. As an overarching process that promotes team functioning, TR builds shared mental models as well as triggering team adaptation and learning.

The authors present a conceptual framework for TR in health care, describing three phases in which TR may occur: pre-action TR (briefing *before* patient care), in-action TR (deliberations *during* active patient care), and post-action TR (debriefing *after* patient care).

Depending on the phase, TR targets either goals, taskwork, teamwork, or resources and leads to different outcomes (e.g., optimal preparation, a shared mental model, adaptation, or learning). This novel conceptual framework incorporates various constructs related to reflection and unites them under the umbrella of TR. Viewing reflection through a team lens may guide future research about team functioning, optimize training efforts, and elucidate mechanisms for workplace learning, with better patient care as the ultimate goal.

Although health care teams usually represent collections of highly skilled individual experts, such teams are not necessarily competent¹ or expert.² Indeed, communication breakdowns can occur, which threaten both patient safety^{3,4} and learning.⁵ These findings highlight the complex social environments of clinical medicine, in which teamwork, collaboration, and interprofessional collaborative practice⁶ are essential elements.^{7–10} In other words, competence in complex clinical settings is not only an individual but also a collective

phenomenon.^{1,11} However, mechanisms for promoting collective competence are poorly understood.

Reflective practice is one such mechanism.¹² Indeed, the discourse of reflection looms large for competent professional practice and lifelong learning^{13,14} within medicine and health professions education.^{15,16} Most literature, however, focuses on individual reflection¹⁴ and highlights competence as an individual construct. Unfortunately, a focus on reflection at an *individual* level neglects inadvertent gaps in patient care due to inadequate *team*-level reflection.

Team reflexivity (TR), a concept from psychology and management literatures, may contribute to collective competence and expert team performance, since health care providers reflect not only individually but collectively as well. TR (defined in the next section) captures a team's ability to reflect on group objectives, strategies, goals, processes, and outcomes of past and current performance and to adapt accordingly.¹⁷ As an overarching process, TR promotes good team functioning and learning.^{17,18} Therefore, in this article, we have three aims: (1) to explore TR as a driver for

optimal health care team functioning and learning, (2) to develop a conceptual framework that illustrates mechanisms and moderating factors for TR in health care, and (3) to discuss areas for future TR research to delineate its mechanisms and potential impact on learning and health care delivery.

Definition of TR

Reflection and adaptation are central to the concept of TR.¹⁹ Reflection at the team level involves several key behaviors through which the team's reality is constantly renegotiated. Some TR behaviors mentioned in the literature¹⁹ include

- questioning,
- planning,
- analyzing,
- exploring alternatives,
- using knowledge explicitly,
- reviewing past events with self-awareness, and
- digesting and incorporating new information.

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TR is a team-level construct, which has been defined as

the extent to which group members overtly reflect upon and communicate about the group's objectives, strategies (e.g., decision making) and processes (e.g., communication), and adapt them to current or anticipated circumstances.¹⁷

In contrast, nonreflexivity denotes a state of acting without awareness.²⁰ Nonreflexive teams show little collective awareness of team objectives, of strategies about how to collaborate, and of the environment in which they operate.²¹

TR holds particular promise when clinicians are faced with uncertain and complex tasks demanding adaptation (e.g., nonroutine activities),²² which makes sense because information processing is an essential element of TR. TR becomes less important when team goals are clear and all tasks are coordinated on the basis of prelearned routines (e.g., routine elective surgery). With increasing ambiguity (e.g., complicated diagnostic tasks or unexpected complications), teams must process new information and use all available resources. Although TR has relevance beyond acute care settings, for clarity we locate our examples mainly in that domain.

During the care of a patient with asthma and severe respiratory distress, the team leader might initiate TR by saying, "At this point the patient is not responding to our treatments and the oxygen saturation remains borderline. Are we missing anything?" Similarly, the team may actively reflect on escalating treatment and question planned interventions—for instance, "Bronchodilators are having minimal effect. Should we try noninvasive ventilation strategies or do we need to move straight to endotracheal intubation?"

In addition, teams can reflect on team processes themselves to adapt them to current or anticipated circumstances—for instance, "Things seem a bit loud and chaotic at the moment; can we regroup and make sure we are clear about our priorities?" Through TR, the entire team may provide input through collective reflection about objectives, processes, or strategies. A related concept called *leader inclusiveness* denotes words and actions leaders exhibit that invite and show

appreciation for others' contributions.²³ Whereas leader inclusiveness focuses on leaders, TR encompasses communication between team members as well. Expressions that mirror certain behaviors in the team with the intention to invite team members to reflect (e.g., orders) are not considered as TR (e.g., "I have the feeling we are uncoordinated here; can we omit unnecessary talk, please?").

Team-level reflexivity differentiates itself from individual reflexivity, since TR necessarily requires communication (including nonverbal communication); TR is a relational behavior whose explicit interactions can be observed. Originally, West¹⁹ described TR as a construct comprising three parts—namely, reflection, planning, and action/adaptation. However, recent work^{21,24,25} views TR in a more uniform fashion, with information processing as an essential element of team reflection. Schippers et al²⁵ conceptualize TR as an explicit information-processing activity in teams that precedes adaptation in rapidly changing situations and contributes to team learning. Also, Konradt et al¹⁸ present a dynamic framework where feedback represents a situational factor, triggering TR and adaptation to reduce discrepancies between a current and desired state.

Studies in other domains link TR with team effectiveness in TV production teams,²⁶ innovation in organizational teams from the private sector,²⁷ better communication and shared mental models (SMMs),²⁸ and improved learning in student teams.²⁴ To date, however, studies about TR in health care are scarce. Aspects of TR can be found in tools^{29,30} and frameworks for interprofessional collaboration.³¹ However, interprofessional collaboration is conceptualized more broadly (e.g., sharing, partnership, power, interdependency, process³¹) than are the explicit observable behaviors of TR. Collaboration itself includes more than reflection on a team level. Because of space limitations, we have not included an extensive literature review on interprofessional education or team training models. However, see Lapkin et al³² for a review on this topic.

Here we present a framework in which TR occurs not only *after* team actions as

a deliberate team learning process but also as a deliberate team process *before*, *during*, and *after* task execution. On the basis of preliminary findings from other domains, we suspect potentially significant benefits for team functioning, immediate and future patient care, and learning (see Chart 1).

A Conceptual Framework for Health Care Teams Using TR

Over time, teams pass through different phases, each focusing on different tasks. In action phases, teams engage in activities that directly contribute to goal achievement (e.g., providing patient care), whereas in transition phases, teams focus on evaluation and/or planning activities occurring before and after action phases.³³ Compared with more stable teams in other industries, health care teams often change composition and exist only briefly with a strong emphasis on the action phase, hence the descriptor *action teams*.³⁴ In action teams, essential transition phases are likely to suffer.

Most of the literature has viewed TR as a process occurring in transition phases with the purpose of evaluating the action process (e.g., debriefing).²⁵ However, in line with others,^{18,35} we conceptualize TR as a beneficial team process in transition phases not only before and after task execution *but also during action phases*. Outcomes and targets of TR processes differ according to the temporal focus of reflection (i.e., past events, current actions, future activities). Depending on the situation, teams can reflect upon five elements: their *goals*, the available *resources*, *taskwork*, *teamwork*, and *outcomes* (see Chart 1).

Goals include main goals as well as subgoals. Defining goals and subgoals facilitates target-oriented actions during the process. However, inaccurate goals (e.g., in cases of incorrect working diagnoses) can lead teams down erroneous paths and prevent appropriate prioritization. In a patient with severe respiratory distress and hypoxia (as in the case illustrated in Chart 2), goals might include ensuring adequate oxygenation, with the following subgoals:

- initiate effective bag-mask ventilation with 100% oxygen,
- prepare supplies for intubation,

Chart 1
A Conceptual Framework for Team Reflexivity in Health Care

	Transition phase		Action phase		Transition phase	
	Pre-action team reflexivity		In-action team reflexivity		Post-action team reflexivity	
Situation	<p>Ad hoc briefing Unstructured reflection about upcoming patient care (e.g., unstructured handover of patient)</p> <p>• Future-oriented (focused on upcoming care needs); optimize upcoming patient care.</p> <p>• Goals^a</p> <p>• Taskwork</p> <p>• Teamwork</p> <p>• Resources^c</p>	<p>Structured briefing Organized reflection according to checklist or guidelines (e.g., patient safety checklist)</p>	<p>Concurrent reflection Reflective behavior during patient care</p> <p>• Present-oriented; optimize immediate patient care.</p>	<p>Team reflexivity time-out Pause and regroup during process while maintaining lifesaving interventions as needed</p>	<p>Ad hoc debriefing Unstructured reflection of action phase</p> <p>• Past-oriented; focus on delivered care.</p> <p>• Future-oriented; optimize future patient care.</p>	<p>Guided debriefing Planned and deliberate debriefing with a facilitator</p>
Temporal focus & main goal						
Target of reflection	<p>• Goals^a</p> <p>• Taskwork</p> <p>• Teamwork</p> <p>• Resources^c</p>		<p>• Goals</p> <p>• Taskwork</p> <p>• Teamwork</p> <p>• Resources</p>		<p>• Outcome(s)^b</p> <p>• Taskwork</p> <p>• Teamwork</p> <p>• Resources</p>	
Examples for team reflexivity behaviors	<p>• Recap upcoming event and define goals.</p> <p>• Discuss potential difficulties, anticipate complications.</p> <p>• Summarize team resources (e.g., experience and capabilities of team members).</p> <p>• Frame teamwork and taskwork.</p>		<p>• Evaluate ongoing performance and strategies.</p> <p>• Identify and explore for alternatives.</p> <p>• Question and affirm decisions.</p>		<p>• Evaluate past performance and strategies.</p> <p>• Discuss alternatives to task management.</p> <p>• Discuss outcome of treatment.</p> <p>• Delineate behavior change for teamwork in future patient care.</p>	
Main (team) outcome ^a	<p>• Situation awareness</p> <p>• SMM: building an SMM about upcoming process as well as an SMM about the resources present in the team</p> <p>• Optimal preparation</p> <p>• Learning: implicit or nonformal and formal learning as a by-product of preparing for patient care</p>		<p>• Situation awareness</p> <p>• SMM: maintain or adapt SMMs</p> <p>• Adaptation: adapt processes to task/teamwork or goals according to dynamically changing situations</p> <p>• Learning: trial-and-error; expert modeling of thought processes around decision making, responding to situations dynamically as a team; implicit or nonformal and formal learning as a by-product of providing patient care</p>		<p>• Implicit or nonformal learning: Acquiring tacit knowledge without conscious effort; difficult to articulate or explain, i.e., impact of hierarchy, institutional culture; shared understanding about “how we do things here”</p> <p>• Formal learning: Codified knowledge about patient care issues (e.g., pathophysiology, management guidelines; “what to do, how to do it, and why”). Also how to optimize team composition, teamwork, resources, systems issues</p>	

Abbreviation: SMM indicates shared mental model.

^aIncluding goals and subgoals.

^bOutcomes include patient outcomes (e.g., infection rate) as well as team outcomes (e.g., team member satisfaction, burnout).

^cResources include personnel resources (e.g., team members’ skills/experience or fatigue levels) and system resources (e.g., available equipment, layout of ward).

Chart 2

Clinical Vignette to Illustrate Team Reflexivity Moments in an Acute Care Setting

Clinical situation

Setting: Emergency Department

Taylor, a 16-year-old male with known severe asthma, referred by a primary care provider to the emergency department (ED) with two days of coughing, progressive wheeze, and shortness of breath, not relieved by beta-agonists. He has been admitted three times in the past year, including once to the intensive care unit for noninvasive ventilation three months ago.

Opportunity for team reflexivity

Pre-action TR. Team gathers while awaiting the patient and does an ad hoc briefing to discuss the patient's history, needed resources, roles and tasks, possible complications during the upcoming treatment, and the primary goals, e.g.:

- "Our first priority with Taylor will be rapid initial assessment and ensuring adequate oxygenation; everyone agrees?"
- "Let's review escalating asthma treatment and ensuring oxygen saturation to make sure we don't miss anything when Taylor arrives."
- "Periodically, let's pause and summarize our management to make sure we are on the same page. Anything else to help us work well together?"
- "Let's think about what/who we might need to be ready."

On arrival in the ED, the patient is afebrile, heart rate 120/min, blood pressure 92/60, breathing 28/min with oxygen saturation 85% on room air. He appears tired and diaphoretic, and has severely labored breathing. He speaks in single words only. On auscultation, air entry is poor with markedly prolonged expiratory phase and wheeze. Back-to-back nebulizer bronchodilators driven by 100% oxygen lead to slight initial improvement, bringing saturations to 89%. IV access is obtained, and the patient receives a normal saline fluid bolus, IV steroids, and magnesium.

In-action TR. Possible etiologies for the persistent hypoxia remain broad. The team reflects on the task of ensuring adequate oxygenation and on the working diagnosis, respectively:

- "Oxygenation and work of breathing are not improving despite maximal therapy. Any ideas?"
- "Is this all asthma or are we missing something here?"

In-action TR. Reflection on next steps:

- "We'd like to intubate a patient with asthma only as a last resort; other ideas? Anything else we could try?"
- "If we intubate, we want to succeed on the first attempt: Who is intubating? Who is drawing up meds?"

In-action TR. Reflection on teamwork and resources:

- "We seem uncoordinated; any ideas to divide up the work better right now?"
- "It's taking a lot of time to draw up and give meds; should we get more people or reallocate others?"

In-action TR. Reflection on unexpected deterioration:

- "The patient became more tachycardic and hypotensive and lost his pulse. Let's work through the reversible causes of PEA together!"

Pre-action TR. The ICU team engages in pre-action reflexivity prior to accepting the very sick intubated asthma patient. A structured handover is conducted where the ED and ICU teams reflect about the patient's condition.

Post-action TR. The ICU team contends that intubation and the ensuing complication of cardiac arrest might have been avoided with earlier initiation of noninvasive ventilation and use of IV beta-agonists. The ED and ICU teams review timing of ED management with an eye to improving future patient care. Further, the teams discuss the uncoordinated state before the intubation and how they could have distributed tasks within the team more clearly to avoid misunderstandings and increase team effectiveness.

DIAGNOSIS: status asthmaticus complicated by respiratory failure and cardiac arrest

Abbreviations: ED indicates emergency department; TR, team reflexivity; ICU, intensive care unit; IV, intravenous; PEA, pulseless electrical activity.

- perform intubation and confirm airway placement,
- implement post-intubation management to ensure adequate oxygen saturation, and
- diagnose underlying condition and provide targeted therapy.

Resources include personnel resources (e.g., team members' skills, experience, or fatigue levels) and system resources (e.g., available equipment, layout of ward).

Taskwork denotes a team's "interaction with tasks, tools, machines and systems"³⁶ and represents *what* a team is doing (e.g., administering medications for rapid sequence intubation), whereas *teamwork* is *how* the members of a team are doing it with each other (e.g., giving a clear order, using closed loop communication). Thus, teamwork helps direct, align, and monitor taskwork.³⁶

Finally, *outcomes* describe work outputs from the action phase. These include both *patient* and *team* outcomes (e.g., improved oxygenation, time to key interventions, team member satisfaction, burnout).³⁷ By definition, reflection about outcomes occurs only after task completion. Depending on when a team reflects, TR varies in scope and purpose, enabling different outcomes. In Chart 1 we present our TR framework with three types of TR—namely pre-action, in-action, and post-action TR. In addition, Chart 2 provides representative examples of behaviors that initiate TR from a patient's health care journey.

In the following and in Chart 2, we explain and illustrate the three stages of TR by discussing the case of Taylor (not his real name), a 16-year-old patient with severe asthma presenting to the emergency department (ED). TR is also relevant for non-acute care settings and educational environments, although in these settings, the distinction between action and transition phases is less clear. Such uses of TR also reflect the collaborative practice among team members in less leader-centered environments. Although these uses of TR are not the focus of our article, we discuss TR in team training in the Discussion section and also have provided two supplemental digital appendices to illustrate the potential of TR in a variety of settings and to present models of TR that are less "leader centered."

(See Supplemental Digital Appendix 1 and Supplemental Digital Appendix 2 at <http://links.lww.com/ACADMED/A445>.) The first of these appendices illustrates the use of TR in a rehabilitation clinic; the second appendix shows TR during a simulation training course.

Pre-action TR

Pre-action TR focuses on upcoming care needs and occurs *before* the action phase. Teams can reflect upon goals, upcoming taskwork, teamwork, and personnel and system resources. Examples from Chart 2 include:

- Goals: "Our first priority with Taylor will be rapid initial assessment and ensuring adequate oxygenation; everyone agrees?"
- Taskwork: "Let's review escalating asthma treatment and ensuring oxygen saturation to make sure we don't miss anything when Taylor arrives."
- Teamwork: "Periodically, let's pause and summarize management to ensure we are on the same page. Anything else to help us work well together?"
- Resources: "Let's think about what/who we might need to be ready?"

Pre-action TR focuses on the future by *collectively* anticipating upcoming activities if leaders frame the team reflection episode as such. Framing refers to the process of creating meaning that is not a necessary or factual aspect of the current situation^{12,38} by explicitly stating why the discussion is happening, what dilemma needs solving, or what assumptions underlie decision making.³⁹ Shared reflection before patient contact prepares teams for upcoming events and increases situational awareness, since all team members may not understand upcoming taskwork and teamwork in the same way. Leaders should collaborate with team members to frame expectations actively and provide opportunities to ask questions, clarify understanding, and give input, all of which also facilitates both individual and team learning. In addition, pre-action TR might promote a positive team climate and encourage speaking up about safety concerns because team members feel valued.⁴⁰ Similarly, establishing a "safe

container" before training events can maximize learning outcomes.⁴¹

Pre-action TR primes teams to deliver excellent care and sets the stage for optimal team functioning. It builds SMMs about upcoming tasks as well as knowledge and skills within teams. SMMs predict good team performance⁴² and provide a cognitive foundation for teamwork.⁴³ Pre-action reflection may occur in ad hoc briefings—in some cases called *huddle moments*⁴⁴—without a predefined structure or following a checklist, as is usual before incision in operative procedures.⁴⁵ Perioperative checklists promote development of SMMs by focusing teams on patients and upcoming taskwork. However, perioperative checklists underemphasize teamwork aspects that might promote TR behaviors. This omission fails to address a potentially important predictor for improved patient care.

In-action TR

In-action TR focuses on immediate patient care needs during action phases. As ongoing management unfolds, teams can again reflect upon:

- Goals and subgoals to ensure they are following appropriate courses of action (e.g., a junior team member may ask, "Is our first priority in this moment really XY or shouldn't we do YZ? Can you clarify?"). In response, a team leader might initiate an opportunity for the team to reflect: "Okay, let us quickly summarize what we have here, our priorities, and management options."
- Specific taskwork (e.g., consider the necessity and timing of a procedure).
- Teamwork (e.g., "We seem uncoordinated; any ideas about how to divide up the work better right now?").
- Team resources to achieve their patient care objectives (e.g., from team member: "It's taking a lot of time to draw up and give meds; should we get more people or reallocate team members?").

In-action reflection serves to maintain or adapt SMMs, making it especially valuable when pre-action reflection

was minimal or nonexistent or when additional team members arrive. TR catalyzes team adaptation in evolving and dynamic situations that require shifting focus and/or priorities during treatment¹⁹ (e.g., when unanticipated complications arise or key information emerges), thus promoting team situational awareness. Further, through explicit TR and building SMMs in specific situations—a form of situated learning⁴⁶—less experienced team members may achieve deeper understanding of highly context-dependent patient care issues.

In-action TR achieves maximum impact particularly for *complex tasks* with high degrees of uncertainty.²⁷ In these instances, teams may engage in a form of trial and error, going down one path that proves erroneous, but self-correcting through episodes of TR. Effective teams “organize to learn”⁴⁷; collective trial and error including TR would be an example. However, for *routine tasks* with established team roles and division of labor, unnecessary or excessive in-action team reflection may distract or even impede care.

The primary goal of in-action TR is optimizing immediate patient care. This explicit team process may occur in two ways: (1) concurrently while providers execute patient care tasks, or (2) by briefly pausing the process through a TR time-out. During bursts of concurrent reflection, team members refine SMMs and establish clear immediate-term management priorities. However, some team members may miss relevant information during ongoing patient care (e.g., nurses focused on drawing up medications and who are not at the bedside). Thus, team leaders and/or team members may also trigger an explicit TR time-out to regroup, reevaluate, and summarize to get everyone on the same page.⁴⁸ By pausing all but lifesaving resuscitative measures in highly dynamic and complex situations, this deliberate TR process ensures that most if not all team members listen; ideally, the process creates space for team members to contribute their perspectives.

A patient in cardiac arrest with pulseless electrical activity represents a classic example of this TR time-out approach: During ongoing resuscitation, the team must actively consider and search for

possible reversible causes. Team input may not only be desirable but lifesaving. A brief pause gives teams critical time to evaluate their efforts, build or adapt an SMM, and avoid going down potentially wrong paths,⁴⁸ highlighting the value of investing periodic short bursts of shared reflection to promote effective teamwork and minimize errors.

No empirical study has yet to explore the potential beneficial effect of in-action TR, but evidence from the expert judgment literature supports this notion. Expert clinicians know when to rely on either intuitive or deliberate, analytical approaches.⁴⁹ Moulton et al⁵⁰ refer to experts’ ability to “slow down when you should” and shift to a more reflective, deliberative state. Similarly, this same assertion applies for teams. Truly expert teams heed cues when situations deteriorate, which allows them to adapt dynamically. In these moments, teams should actively shift into a brief reflective state through concurrent TR or, as needed, into a TR time-out. While team leaders most likely initiate TR, all team members must feel empowered to prompt reflection during suboptimal team coordination or to clarify shared understanding about what is going on or the priorities for care. As an example, in complex critical situations, a nurse may ask, “I don’t think we are all on the same page here. What is our working diagnosis?” This triggers the team leader to say, “Yes, let’s summarize all of what is going on and what our priorities are,” to review the process.

Team leaders should invite collective reflective behavior, explicitly encouraging pauses in action if someone perceives that team actions are not yielding desired outcomes in terms of taskwork.⁵¹ Yet for team leaders, moments of TR prompted by team members may be especially helpful in situations with high cognitive load (e.g., complicated diagnostic situations with high time pressure). In such cases, leaders focused on integrating many sources of information may not recognize progressively uncoordinated team activity.

Post-action TR

Post-action TR centers both on past team activity related to delivered care and also on opportunities to improve future care. As post-action TR by

its nature is deeper than pre-action or in-action TR and encompasses a whole discussion, we have provided no concrete examples here. Teams typically evaluate their taskwork (e.g., appropriateness and timeliness of clinical management). However, post-action TR should also include evaluation of teamwork. What aspects of teamwork went well, and why? What aspects of teamwork need improvement, and why? If the team seemed uncoordinated at times, what contributed to that? Such questions initiate the reflective process about teamwork and improve future teamwork by evaluating past actions.

Increasingly strong evidence exists^{52–54} that post-action reflexivity also helps crystalize learning, either as a by-product or an explicit goal. This collective learning—a main goal of post-action reflexivity—serves to enhance future patient care by improving taskwork (e.g., clinical management) and teamwork (e.g., behaviors that improve team coordination). For example, the ICU team flags Taylor’s case for a departmental morbidity and mortality (M&M) conference because he suffered cardiac arrest during ED management. During the M&M, clinical decision making, treatment strategies, and alternative treatment methods are discussed (e.g., “Earlier initiation of noninvasive ventilation and IV beta-agonists may have prevented intubation and the ensuing complication of cardiac arrest”). With skilled facilitators and a supportive learning culture, M&Ms represent a form of post-event debriefing, creating a space for TR behaviors. Post-action reflexivity among interdisciplinary team members after in-hospital cardiac arrests can improve the quality of basic and advanced life support and positively impact survival outcomes.⁵⁵

Post-action TR can be planned and deliberate or occur ad hoc, without structure. Planned debriefings commonly occur after specific, often simulated, scenarios^{56,57} with trained facilitators who establish and maintain a supportive climate that promotes honest and critical reflection. Such debriefings are, however, time- and resource-intensive for busy clinical environments.

Spontaneous ad hoc debriefings on breaks or over lunch—also called post

“huddles”⁵⁸—may offer at least some team members the opportunity to talk about a case and to review management, taskwork, and teamwork, and may benefit team functioning.^{44,58} Because they are ad hoc, these spontaneous and emergent discussions may not include critical team members. Further, they may occur in professional silos in a manner that hampers interprofessional collaboration.¹⁰ Finally, such ad hoc debriefings may also lack a safe, supportive, nonblaming climate needed for the degree of reflexivity that fosters team learning. Nonetheless, we maintain that—especially for teams that become practiced and regularly engage in structured post-event debriefings—such ad hoc debriefings may contribute to improved taskwork and teamwork. By deliberately reflecting about past situations and evaluating their actions, teams can minimize similar future mistakes and expressly identify and reinforce positive behaviors. Ideally, debriefings that promote post-action reflexivity will become integrated in the health care workplace. Guidelines exist to promote these discussions in an evidence-based fashion.^{56,59,60}

Discussion

We have outlined a novel conceptual framework for TR in health care that incorporates various constructs related to reflection and unites them under the umbrella of TR. Thus, we hope to advance the understanding of what processes allow expert teams to function competently in the collective. Our framework integrates three essential phases of patient care with opportunities for TR: pre-action, in-action, and post-action.

Most literature about pre-action TR focuses on structured briefings (e.g., preoperative briefings, handovers^{61,62}), although other reflective pre-action processes like planning or framing³⁸ are equally essential. Many clinicians potentially underestimate the value of ad hoc pre-action reflection and do not devote time for quick briefings. However, here we emphasize the importance of pre-action TR because it aligns and prepares the team, increases situational awareness through developing an SMM, and sets the stage for optimal teamwork.

Most research focusing on post-action TR (i.e., debriefings) that guides practice stems mainly from the education and simulation literature. As post-event debriefings in clinical environments gain traction,⁵⁹ the role of ad hoc post-action debriefings also demands further investigation. Short informal post-action reviews after actual patient management (e.g., during a break) or after shift change likely enhances both team functioning *and* workplace learning.⁵ Reviewing actions after team events fosters not only individual but also team learning while reinforcing effective behaviors and identifying aspects to change in the future. In addition, deliberate reflection about past cases may help identify helpful or harmful system factors (including equipment and personnel resources). As a result, teams can improve system factors to provide conditions for optimal patient care (e.g., location of key equipment or accessing help in emergency situations).

Studies about in-action TR during active patient management are rare. Research about related constructs stems mostly from the coordination or leadership literature. This work explores elements of TR—or initiators for TR phases only—as isolated, detached team processes such as *situation assessment, planning, talking to the room, explicit reasoning, or speaking up*.^{63–67} These team processes are often investigated on a micro level tied to specific team and task characteristics, making generalization to other tasks difficult. Of course, good teamwork behaviors depend on both team *and* task characteristics. Although team research provides strong evidence about collective or work group effectiveness, no one specific teamwork behavior generally predicts effective team performance.⁶⁸ In fact, this line of research views team adaptability to specific tasks or changing circumstances within task work (e.g., sudden cardiac arrest of a patient during an operation) as a relevant performance variable.⁶⁹

Less clear is *which* team processes need to be adapted *when* and *by whom*. Empirical studies fail to answer these questions uniformly. Instead of focusing on micro processes, research must target overarching processes that promote collective competence through good team functioning, including effective teamwork and team adaptation in various

team constellations and situations. TR exemplifies one such overarching team process that manifests itself in observable behaviors. TR about upcoming, actual, or past situations enables teams to adapt current or future team processes. Future empirical studies should investigate the links between in-action TR and performance outcomes as well as the impact of TR on team functioning (e.g., adaptation) during the process. In addition to creating SMMs in the service of effective patient care, all forms of TR also promote highly contextualized workplace-based learning as an important by-product of authentic patient care experiences. Emergent and nonroutine situations serve as fodder for *reactive learning* tightly linked to ongoing work demands; *deliberative learning* occurs during post-action review.⁷⁰ Thus, we view episodes of TR not only as promoting team functioning but also as key elements of a guided workplace curriculum.^{71,72} Edmondson⁴⁷ highlights critical “teaming” behaviors that help teams “organize to learn”; for example, explicit, open communication forms the foundation of collaborative practice.⁶

Our TR framework provides a conceptual model for future research to help guide areas of focus. Significant research supports pre-action TR (e.g., team huddle,⁴⁴ briefing^{40,73}) and post-action TR (e.g., after-action reviews,⁷⁴ debriefings^{75,76}). In-action TR is mostly unexplored. Therefore, we propose observational studies to investigate TR in both simulation and real, clinical settings. Studies with pre–post intervention design focused on in-action TR might identify effects on relevant patient outcomes like treatment time or treatment quality (checklist-based assessment⁷⁷) as well as team outcomes (e.g., SMM, adaptation, psychological safety). So far, various self-report questionnaires for TR exist,^{21,26} but behavior marker systems or observation tools need to be developed. Further, research from a sociocultural perspective might shed important light on TR, such as exploring transition phases in transfer of care from one health care provider or one team to another, viewing handover as a time of co-constructing meaning⁷⁸ using TR as a sensitizing lens.

Future team training should incorporate the principles of TR, and especially in-action TR. For example, teams may

benefit from simple TR time-outs or concurrent reflection about ongoing processes using simulation-based methods. Brief reflective episodes during real-time patient care may prevent teams from working toward wrong goals or working diagnoses and promote adaptation to complex and changing health care environments.

Individual reflection is already a widespread topic in medical education.¹⁵ Within the discourse of interprofessional collaboration in health care, we must expand our thinking to include team-level reflection to exploit its positive effects on team functioning. Within health care teams, every team member represents a valuable resource; complex patient care requires that we tap this human potential. As a teamwork process, TR enables teams to optimize their capacity. Our framework will support future research to clarify the impact of TR behaviors on improved team functioning and enhanced workplace learning, with better patient care as the ultimate goal.

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