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TEAM-BASED HEALTHCARE: NURSING, RADIOLOGY, LABORATORIES, AND PHARMACY LEADING THE WAY

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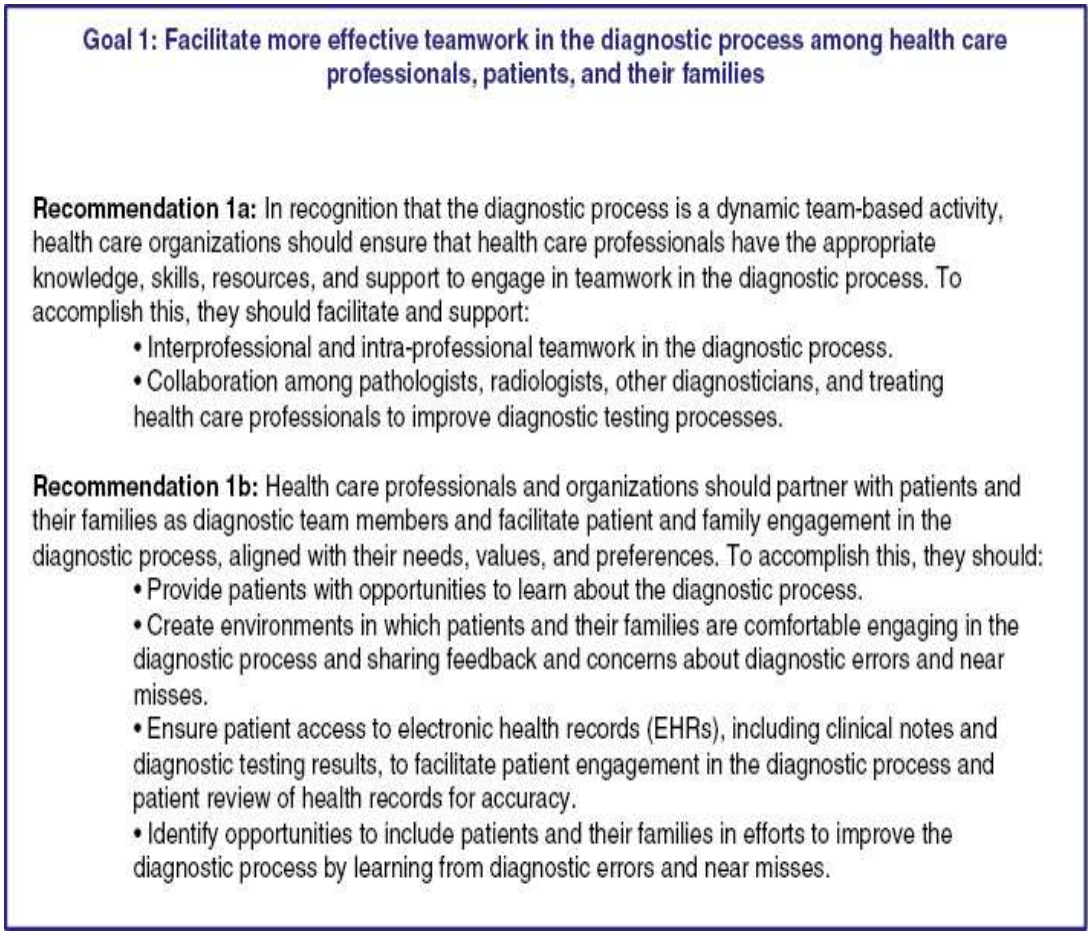
Abstract
Numerous obstacles stand in the way, starting with the issue of who will actually implement collaboration. Since both parties are hesitant to take ownership, many of the early recommendations to reduce diagnostic mistake have had limited implementation. These proposals typically center on physicians and healthcare systems. Healthcare organizations hold their physician personnel accountable for diagnostic errors, leading them to assume that they are practicing at a very high caliber. Physicians' underutilization of decision support tools, failure to participate in incident reporting systems, and overall inability to identify situations in which their clinical judgment was flawed are all signs of this problem.

Key words: Team-based healthcare, nursing, radiology, laboratories, pharmacy.

Introduction
In a newly released paper titled Improving Diagnosis in Health Care, the National Academy of Medicine (NAM) presented eight main suggestions to raise the standard and safety of diagnosis. The suggestion was to enhance collaboration within the diagnostic procedure. This is a significant change from the traditional method, in which the doctor is the only one who makes the diagnosis. The patient, the doctor, and the related nursing staff make up the core team under the new, patient-centric vision, and each actively participates in the process. Medical librarians, radiologists, pathologists, and other health care providers make up the enlarged diagnostic team. We go over the responsibilities that each of these new team members will need to fulfill and offer "first steps" that they can do to bring about

this new dynamic. A completely different diagnosis model is envisioned in the seminal report Improving Diagnosis in Health Care, which was released by the National Academy of Medicine (NAM) in 2015. This is primarily because the paternalistic model is linked to an unacceptable incidence of diagnostic error, most likely in the range of 10% or higher. According to the NAM report, effective diagnosis will depend more and more on teamwork in the twenty-first century and a new, patient-centric approach. In addition to involving the patient as an active team member, this team will make use of the expertise and abilities of all the interprofessional personnel working on the case (Balogh et al., 2015).

The NAM report prioritized this as its first recommendation because it believed that successful teams would have a significant impact on diagnosis quality (Figure 1). So, it is evident that creating and utilizing productive teams is mandated, but how does this actually work in reality? This article's objective is to offer potential next steps that people and organizations can take to put this new vision into practice (Balogh et al., 2015).



Goal 1: Facilitate more effective teamwork in the diagnostic process among health care professionals, patients, and their families

Recommendation 1a: In recognition that the diagnostic process is a dynamic team-based activity, health care organizations should ensure that health care professionals have the appropriate knowledge, skills, resources, and support to engage in teamwork in the diagnostic process. To accomplish this, they should facilitate and support:

- Interprofessional and intra-professional teamwork in the diagnostic process.
- Collaboration among pathologists, radiologists, other diagnosticians, and treating health care professionals to improve diagnostic testing processes.

Recommendation 1b: Health care professionals and organizations should partner with patients and their families as diagnostic team members and facilitate patient and family engagement in the diagnostic process, aligned with their needs, values, and preferences. To accomplish this, they should:

- Provide patients with opportunities to learn about the diagnostic process.
- Create environments in which patients and their families are comfortable engaging in the diagnostic process and sharing feedback and concerns about diagnostic errors and near misses.
- Ensure patient access to electronic health records (EHRs), including clinical notes and diagnostic testing results, to facilitate patient engagement in the diagnostic process and patient review of health records for accuracy.
- Identify opportunities to include patients and their families in efforts to improve the diagnostic process by learning from diagnostic errors and near misses.

Figure .1 The National Academy Report Recommendations (Balogh et al., 2015).

According to the National Academy, the doctor and nursing staff are the main components of the primary care team; on the one hand, there is the patient and his or her family. This forms the core of the team. If the situation calls for it, other medical specialists including radiologists, pathologists, subspecialists, pharmacists, allied health providers, and others may also become involved (Figure 2) (Graber et al., 2017).

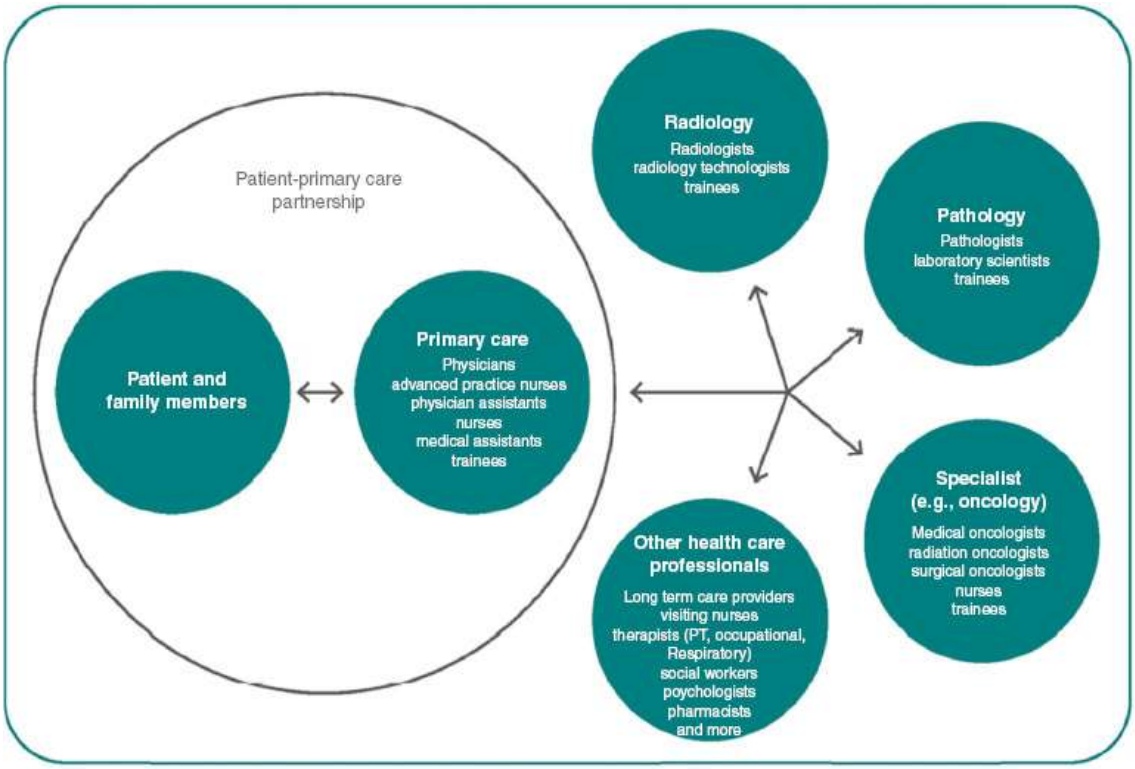


Figure .2 additional medical specialists who assist in the diagnostic process make up the enlarged diagnostic team (Graber et al., 2017).

The PCMH's objectives and primary care's place in accountable care organizations are two factors that are influencing how primary care is practiced today. A patient-centered approach to care, enhanced communication with the care team and access to care, care management and coordination, patient involvement in care planning, and a dedication to population health as previously described are just a few of the goals that the Patient Centered Medical Home (PCMH) aims to accomplish. Although these are admirable goals, the reality is that the primary care practice model in use today concentrates its resources on billable in-person interactions that are mostly problem-focused. A team approach to primary care makes use of the abilities and education of medical assistants, registered nurses, and other clinic employees in addition to PCPs (physicians, nurse practitioners, and physician assistants) to ensure that every team member performs at the highest level possible. Using a well-known structure like a home construction team, the team model puts the patient at the center of the group, where they collaborate with all team members to improve their health and set goals for their care. This model can help people understand the roles and interactions of a medical home team, and new team roles and workflows can successfully accomplish the objectives of the patient-centered medical home model (Petterson et al., 2012).

Aim of study

This study aimed to show the collaboration among healthcare workers and its effect on the safety of patients.

Literature review

The diagnostic procedure can be modeled by involving nurses through collaborative care rounds. By combining the documenting of Collaborative care rounds, which integrate assessments, diagnoses, and treatment plans from several professional specialties, can enhance and enhance traditional rounding by lowering diagnostic error. Similar advantages can be obtained via team "huddles" in ambulatory situations. Huddles and collaborative rounds both aim to counteract the "electronic soiling" that occurs while using electronic medical records. With varying degrees of success, work in this direction has begun. The Albert B. Chandler Hospital at the University of Kentucky has been

using the Inter-Professional Teamwork Innovation Model (ITIM). It is a team approach to rounding that includes the bedside nurse, doctor, pharmacist, and care facilitator. As a member of a rounding team, you are expected to play a part, support one another, and provide a cohesive care plan. This and other innovative pilot projects will help bring about long-term success and a grassroots shift in practice that will further improve patient outcomes. Patients and families stand to gain the most overall as trust is built via increased collaboration and learning to listen to all members of the care team when providing diagnostic feedback (Beaird et al., 2017).

Nurses are at the forefront of patient care

More services are provided by nursing staff than by any other type of provider. This group includes registered nurses, licensed practical nurses, and nursing assistants/unlicensed assistive people. Nursing staff is on the front lines of healthcare systems. At every stage of the care continuum, these teams execute tasks that are crucial to the effectiveness of healthcare systems (assessment, surveillance, service delivery, detection of difficulties, etc.). However, an unacceptably high proportion of quality and safety issues—many of which having to do with nursing care—have been reported during the past 20 years in all developed nations. Numerous studies have found high rates of adverse outcomes that are responsive to nurses (D'Amour et al., 2014).

Concerns were raised about these issues not only because of the deaths, disabilities, and other consequences they produce, but also because of the significant financial strain they place on healthcare systems. These unfavorable results have been primarily linked to a number of shortcomings (low staffing levels, excessive workloads, high employee turnover, and high absenteeism rates), which are indicative of the challenges faced by many healthcare organizations in obtaining, allocating, and retaining the human resources required to deliver nursing care. Another major contributing factor to these issues is that insufficient working conditions, subpar care procedures, and ineffective management techniques mean that the nursing staff that is available is not always utilized to its full capacity, which results in dysfunctions in the delivery of nursing services. Studies on magnet hospitals over the years have demonstrated the importance of investing in nurse staffing and high-quality practice settings for both improving nurse satisfaction and retention and improving patient outcomes (Tchouaket et al., 2017).

A crucial initial step in resolving issues with nursing resources (particularly nursing human resources), procedures, and results is measuring them and disseminating the data to all levels of the healthcare system. Nursing interventions, however, offer a vast potential source of healthcare data generation; nevertheless, since this data is typically unseen, it cannot be regularly used to evaluate how well healthcare services are performing. Recent reforms in developed nations have sparked a number of initiatives in healthcare organizations that directly affect nursing staff (e.g., altering treatment routes, reorganizing team compositions). However, the repercussions of these changes have not received much attention. Because of this, decision-makers are ill-equipped to decide how best to staff nursing homes in a way that guarantees patient safety and quality of care. On the other hand, front-line practitioners are not well-informed about the most clinically and financially feasible therapies. The conceptualization of nursing care performance has experienced significant advancements and a great deal of interest in recent years. In actuality, though, businesses still need to prioritize the indicators that can create a balanced common scorecard and that should be added to current information systems from a wide range of metrics that may be responsive to nursing. Care settings are sometimes restricted to a small number of the most readily available indicators in the absence of a common reference, which does not give them a true or accurate picture of the contributions of nursing (Dubois et al., 2017).

Radiology is a branch of medicine

Medical imaging has influenced healthcare science. It includes radiology, which uses imaging technologies including positron emission tomography (PET), magnetic resonance imaging (MRI), magnetic resonance spectroscopy (MRS), endoscopy, and X-ray radiography, and is an essential part of biological imaging. Imaging technologies are critical to the diagnosis and management of disorders.

They are an advanced technique for visual representation that aids medical practitioners in comprehending the state of their patients. Recording and measurement techniques including magnetoencephalography (MEG), electrocardiography (ECG), and electroencephalography (EEG) do not provide images; instead, they depict the data as a parameter graph vs. time or maps that show the susceptible information with less accuracy.

Thus, on a restricted scale, these technologies can be considered to create medical imaging. Roughly 5 billion research on medical imaging techniques have been published worldwide as of 2010. Diagnostics is the main application for medical imaging technologies. Medical diagnosis is the process of determining the ailment and accompanying symptoms of a patient. The diagnosis, which is required for therapy, provides the information about the sickness or condition that is obtained from the patient's medical history, physical tests, and surveys. Because an illness has many different indications and symptoms, none of which are exact, diagnosing the disorder becomes a challenging stage in medical science. Erythema, or redness of the skin, for example, can indicate a number of various conditions. As a result, a variety of diagnostic methods are needed to determine the causes of different diseases and to either cure or prevent them (Kasban et al., 2015).

Importance of Collaboration

For a number of reasons, cooperation between radiologic technologists and nurses is crucial. First of all, throughout the patient's X-ray procedure, both professions are crucial. While radiologic technologists run imaging equipment and carry out the actual X-ray treatments, nurses offer patient care, assistance, and education. Secondly, better patient satisfaction is achieved through decreased wait times, increased workflow efficiency, and improved teamwork. Lastly, collaboration between radiologic technologists and nurses can guarantee patient safety and adherence to recommended radiation exposure measures (Almutery et al., 2022).

Clinical laboratories play a crucial role in diagnosing

Currently, there are several contradictory issues that make diagnosis difficult. First, there is a constant need for more laboratories with the capacity to conduct the widest range of diagnostic tests due to the rise in biomarkers. Second, in order to make quick judgments regarding patient management, biological test results must be obtained during treatment. In microbiology, the most crucial problems are frequently identifying a communicable illness that necessitates isolation of the patient and accurately diagnosing an infection to determine whether treatment is necessary and which course of action is most appropriate. Third, it's critical to identify infections that are easily treated with ambulatory care and those that could worsen the prognosis and necessitate hospitalization (Drancourt et al., 2016).

One example of how laboratory medicine can benefit from the same approach is the concept of a diagnostic management team (DMT), a collaborative effort among medical experts focused around a specific diagnostic discipline in pathology (e.g., hematopathology, coagulation, microbiology) with the aim of improving diagnostic accuracy. Health professionals from other related fields, including as radiography, nursing, primary care, and biomedical informatics, may also be part of a DMT. Pathologists are sometimes perceived as playing auxiliary roles in the diagnosis process. The DMT reasserts pathologists' critical position in the diagnostic process by emphasizing their critical role in test selection and result interpretation, as well as by improving communication and the flow of diagnostic information between treating physicians and skilled pathologists. The phrase "wall" being removed between pathologists and treating physicians is commonly used to characterize this enhanced DMT communication (Laposata & Cohen, 2016).

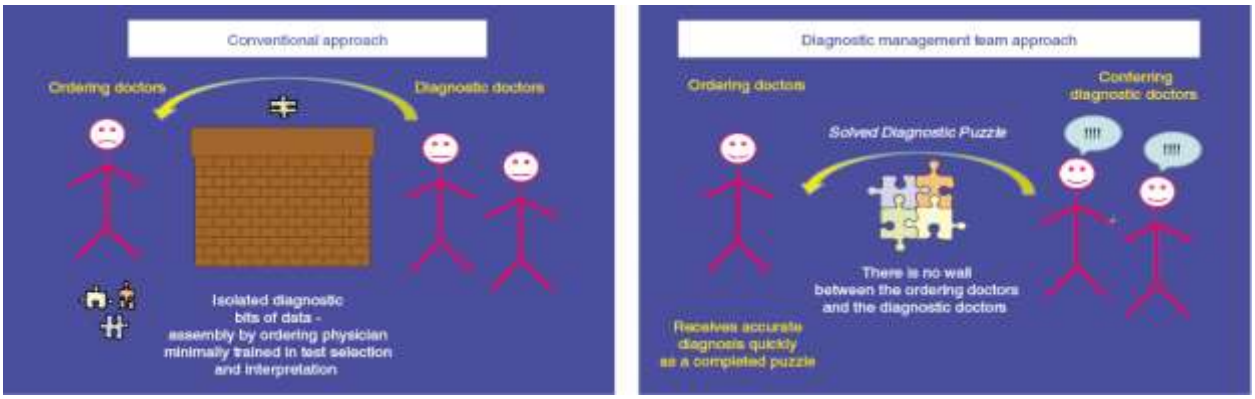


Figure .3 The Diagnostic Management Team removes the barrier to communication between knowledgeable laboratory experts and doctors (Laposata & Cohen, 2016).

Pharmacists collaborate with other healthcare

Physicians are crucial in the fight against pharmaceutical non-adherence. Despite having diverse areas of competence, pharmacists and nurses are qualified in this sector. Together with doctors, they both assert their place by the patient's side. Such interprofessional collaborations need to be properly established in order to prevent care duplication (Celio et al., 2018).

Clinical outcomes for patients with a range of acute and chronic diseases, such as diabetes mellitus, hypertension, and hyperlipidemia, have been improved by team-based pharmacist interventions in hospital and community settings through the provision of medication therapy management (MTM), comprehensive medication management (CMM), and/or chronic disease state management (CDSM). A workforce development plan was completed by each inpatient and PCMH clinical pharmacist to help them prepare for their new roles, improve communication between pharmacists and physicians, and provide patients with comprehensive, high-quality healthcare (Matzke et al., 2018).

Pharmacists can improve the management of chronic illnesses and help avoid medication administration errors. Prescription renewals, medication reconciliation, drug interaction detection, monitoring drug therapy and prescribed medicines through laboratory testing, and patient education are just a few of the patient-related responsibilities that pharmacists oversee. Pharmacists defend the patient's rights when a prescription may no longer be necessary or advantageous. Pharmacists usually work on nonclinical days to follow up with patients who are experiencing treatment concerns or at the nurses' and doctors' request, despite their limited time and financial resources (Alim et al., 2016). Pharmacists' inclusion in the interprofessional care team should benefit patients' recuperation in a number of ways, including by lowering prescription drug costs and improving the efficacy of treatment for patients with chronic illnesses. The existing responsibilities of pharmacists within this team, however, have not yet received enough attention or research. As a result, this review addresses the role that pharmacists play in the interprofessional care team when it comes to managing patients with chronic illnesses from a variety of angles, such as collaboration, coordination, partnership, collaborative decision-making, and therapeutic outcomes (Rahayu et al., 2021).

The electronic health record

Even though it isn't a team member in and of itself, the electronic health record has such a significant impact that it merits consideration. How does the new diagnostic team benefit from the electronic medical record? Due to the unintentional creation of electronic silos as a result of EHR deployment, the impact is currently primarily negative. As previously said, the EHR has taken on the role of the de facto standard for health care communication, causing each team member to function independently (Wachter, 2015).

Front line providers – the physician, physician assistant

Since ambulatory care is where most diagnoses are made, the new diagnostic teams should be established and utilized in primary care, pediatrics, family medicine, and emergency medicine. A

doctor may still oversee the diagnosis process on the new team, but it will increasingly be headed by someone else. A growing number of advanced practice nurses, including physician assistants and nurse practitioners, are taking on front-line roles and handling diagnosis. The person in charge of the process, whether a doctor or an advanced practice provider, will need to adjust to a new working paradigm that makes use of the unique skills and contributions of each team member. Team leaders are not born leaders; they may require specialized training to equip them for this position. This means that in order to provide this interprofessional perspective, new curriculum in undergraduate and graduate training are required. Because of their deeply rooted traditional approach to medicine and patient care, practicing physicians who are accustomed to operating individually and in a more directive manner may find it more difficult to learn how to manage a team (Graber et al., 2017).

The patient

The patient is the focal point of the diagnostic team. The patient assumes a more involved role in the new diagnostic team, better characterized as a partnership. In the past, the patient has only received the diagnosis passively. The idea that "Doctor knows best" is prevalent in society portrays power dynamics and unequal relationships. A new and drastically different relationship between the patient and the healthcare team is starting to take shape because to patient involvement. The framework offered by social network theory helps to explain how the patient's team interacts with one another. Effective relational coordination is characterized by seven essential observable behaviors, which center on the role relationships (sharing mutual respect, common goals, and frequent communication) and communication quality (timely, accurate, frequent, and effective in issue solving). It might be more challenging to put these ideas into effect during a patient's diagnostic process than in treatment settings, where there are more defined paths and a common management strategy for many patients with a same diagnosis. What precisely is the aim of the diagnosis, what precisely is the patient being asked to accomplish, and how does share decision-making work? In addition to enhancing the promptness and precision of the diagnosis, actively participating patients can serve as their own safeguard, identifying issues that could potentially cause harm (Abu-Rish Blakeney et al., 2017).

Allied health professionals

It has long been acknowledged that allied health professionals (AHPs), which include respiratory therapists, physical therapists, occupational therapists, clinical laboratory scientists, and other non-nursing, non-physician medical professionals, are important members of the healthcare team. Within the parameters of their individual practice acts, many AHPs offer functional diagnoses and prognoses; however, medical diagnosis has generally been excluded. The majority of the blame may lie with societal norms and state practice acts that restrict medical practice and acknowledge the doctor as the master diagnostician (Thomas & Newman-Toker, 2016).

AHPs have the chance to notice minute variations in patient presentation from one interaction to the next since, on average, they spend more time with patients than physicians do, frequently over an extended period of time where monitoring of changes in patient status is easily observed. In addition, a large number of AHPs have attained extremely high levels of specialization. By working with certain patient populations, taking part in continuing education and training, and pursuing individual research, many AHPs have acquired highly specialized knowledge and examination abilities. The capacity to identify symptoms or test results that may not be congruent with a diagnosis made by a physician is a common part of this skill set and knowledge base for AHPs (Thomas & Newman-Toker, 2016).

Conclusion

Despite the lack of data to support its potential to improve diagnosis, teamwork has been shown to be a highly practical and effective strategy for improving performance in numerous health care contexts, including aviation and surgical and intensive care units. The National Academy of Medicine's (NAM) advice to foster and apply cooperation to enhance diagnosis offers a special chance with significant potential to enhance the diagnostic procedure and aid in the prevention of diagnostic error.

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