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ORIGINAL ARTICLE

Collaborative Diagnostic Conversations Between Clinicians, Patients, and Their Families: A Way to Avoid Diagnostic Errors

Nataly R. Espinoza Suarez, MD; Ian Hargraves, PhD; Naykky Singh Ospina, MD, MSc; Angela Sivly; Andrew Majka, MD; and Juan P. Brito, MD, MSc

Abstract

Objective: To identify the components of the collaborative diagnostic conversations between clinicians, patients, and their families and how deficiencies in these conversations can lead to diagnostic errors.

Patients and Methods: We purposively selected 60 video recordings of clinical encounters that included diagnosis conversations. These videos were obtained from the internal medicine, and family medicine services at Mayo Clinic's campus in Rochester, Minnesota. These clinical encounters were recorded between November 2017, and December 2021, during the conduct of studies aiming at developing or testing shared decision-making interventions. We followed a critically reflective approach model for data analysis.

Results: We identified 3 components of diagnostic conversations as follows: (1) recognizing diagnostic situations, (2) setting priorities, and (3) creating and reconciling a diagnostic plan. Deficiencies in diagnostic conversations could lead to framing issues in a way that sets diagnostic activities off in an incorrect or undesirable direction, incorrect prioritization of diagnostic concerns, and diagnostic plans of care that are not feasible, desirable, or productive.

Conclusion: We identified 3 clinician-and-patient diagnostic conversation components and mapped them to potential diagnostic errors. This information may inform additional research to identify areas of intervention to decrease the frequency and harm associated with diagnostic errors in clinical practice.

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The National Academy of Medicine defines a diagnostic error as "the failure to establish an accurate and timely explanation of the patient's health problem(s) or communicate that explanation to the patient."[1,2] Diagnostic errors are common; approximately 12 million US adults are affected by a diagnostic error in the outpatient setting.[3-5] Although estimates vary, up to half of diagnostic errors lead to potential harm.[4] Multiple drivers for diagnostic errors have been identified (eg, cognitive errors, team dynamics, practice limitations and demands, organizational, legal, and societal pressures).[6-12]

The National Academy of Medicine definition of diagnostic errors is focused on the accuracy, timeliness, and appropriate communication of a particular diagnosis. Despite the importance of communication, a limited number of studies have centered on communication itself when investigating diagnostic errors, with most studies focusing on the accuracy and timeliness component.[1,2] Yet, communication during the diagnostic process between the clinical team, patients, and their families plays an important role in diagnostic errors.[6,13-15] Research into the contribution of communication factors to diagnostic errors has largely focused on the transfer of information from one party to another—whether those parties be clinicians, team members, patients, or information systems.

"Communication" in the information transfer view of the diagnostic process suggests a paradigm in which clinicians "do diagnosis" and patients receive diagnoses.[16,17] In this model, patients represent a source of

From the Knowledge and Evaluation Research Unit (N.R.E.S., I.H., A.S., J.P.B.), Division of Endocrinology, Diabetes, Metabolism, and Nutrition (N.R.E.S., I.H., A.S., J.P.B.), and Mayo Clinic Emeritus consultant (A.M.), Mayo Clinic, Rochester, MN; and Division of Endocrinology (N.S.O.), Department of Medicine, University of Florida, Gainesville, FL.

information accepted as input by clinicians, followed by the integration of clinicians' cognitive processes and expertise to merge this information with test results.[18,19] This process results in the output of a diagnosis communicated to the patient, and the flow of the diagnosis into treatment decision making.

In practice, patients are much more communicatively active in diagnosis. They express the concerns that set diagnosis in motion, use their own language and perspective to frame their concern and call out particular features, redirect clinicians when necessary, figure out if and how any diagnostic tests or imaging are feasible or propose alternative arrangements, and contribute to prioritizing the next steps.[20] Patients undertake these activities in conversation with their clinicians, and clinicians engage in these conversations to ensure high quality care.[21,22] Deficient diagnostic conversations may not address the patients' needs and concerns, and patients may be confused about what diagnostic procedures they need to do next, how to do them, and why they are necessary.[23-25] Patient-clinician conversation is an important target for preventing diagnostic error.[21,23]

We distinguish patient-clinician conversation from the ambiguous umbrella term communication or the limited sense in which the term communication is conceptualized as a mere transfer of information. We define collaborative diagnostic conversations as instances in which patients and clinicians work together in conversation to determine diagnoses or the appropriate next diagnostic steps. In diagnostic conversations, patients contribute to orienting diagnostic activities to their problems, concerns, or situations. Because this is an active process, we emphasize diagnosis as a verb over diagnosis as a noun.

The aim of this study was to identify the components of collaborative diagnostic conversations between clinicians, patients, and their families and how deficiencies in these conversations can lead to diagnostic errors.

PATIENTS AND METHODS

Study Design

We used qualitative methods to analyze video recordings of clinical encounters in internal medicine and family medicine services at Mayo Clinic's campus in Rochester, Minnesota. These clinical encounters were recorded between November 2017, and December 2021, during the conduct of studies aiming at developing or testing shared decision-making interventions. The Mayo Clinic Institutional Review Board approved the original project protocol as well as the use of these videos for secondary analyses. Written consent was obtained from all participants who participated in the included videos.

Encounter Selection

We purposively sampled 60 video recordings (45 first-time appointments and 15 follow-up appointments) of encounters from the internal medicine and family medicine services at Mayo Clinic's campus in Rochester, Minnesota.

Purposeful selection was based upon the following criteria (agreed upon by A.M., I.H., J.P.B., and N.R.E.S.): (1) final diagnosis and treatment, (2) diagnosis plan for further exploration, (3) examination, (4) discussions of test results, and (5) confusion or conflict around the diagnosis or diagnostic plan. These criteria are further described in Table 1.

To be selected, conversations had to exhibit 1 or more of these criteria in order to create a sample size feasible for a rich in-depth analysis.

Data Analyses

To understand the components of diagnostic conversations, we followed a critically reflective approach.[26] This approach guides the identification and comparison of concepts or ideas with current actions. The approach includes 2 phases as follows: first, the analysis, which describes the content of the diagnostic conversations in the selected recorded clinical encounters, and second, the articulation, where the observations were organized to establish functional components of diagnostic conversations. All members of the analysis team participated in the 2 phases of analysis and were familiar with the data. Videos were initially identified by 4 researchers (N.R.E.S., I.H., A.M., and J.P.B.). Once the inclusion criteria were identified, 1 researcher (N.R.E.S.) assured that the included encounters met the criteria (Table 1).

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TABLE 1. Video Purposive Sampling Criteria

Selection criteria	Definition
Final diagnosis and treatment	Patients describe their problems and concerns and obtain a final diagnosis and treatment plan.
Diagnosis plan for further exploration	Patients describe their problems and concerns leading to diagnostic tests or imaging.
Examination	A routine visit during which possible diagnostic tests or imaging are considered.
Discussion of test results	Discussion of test or imaging results that may lead to a diagnosis or referral to other specialties.
Confusion or conflict around the diagnosis or diagnosis plan	Cases where a patient does not believe or accept the clinician's diagnosis or all diagnostic means of exploration have been exhausted.

During the analysis phase, 1 researcher (N.R.E.S.) reviewed batches of the selected videos, recorded the observations, and presented the initial observations' summary during the team consensus meetings. The findings were discussed in bi-weekly meetings with a group consisting of 3 clinicians (J.P.B., A.M., N.R.E.S.) and a human-centered designer with expertise in shared decision making and communication (I.H.). During each meeting, the researcher (N.R.E.S.) presented an analysis of the videos focusing on understanding the components of the diagnostic process. When needed, these presentations were aided by small extracts from videos. During the articulation phase, the group (I.H., A.M., J.P.B., N.R.E.S.) reflected on these observations, proposed accounts of what was observed, and worked toward consensus about the components of diagnostic conversations. The meeting notes informed the next set of video analyses. This process continued until all the themes from the analysis were incorporated into a map of components of the diagnostic conversation and potential links to diagnostic errors.

Researcher Reflexivity

In keeping with our reflexive approach to our critically reflexive analysis, we see our subjectivities as researchers as resources that have productively shaped this project.[27] Of the researchers who directly contributed to analyzing the data, 1 is a qualitative researcher with training in clinical medicine, video observations, and video data analysis (N.R.E.S.), 3 are researchers trained in clinical medicine, who have expertise in patient-clinician communication and diagnostic errors research (J.P.B., A.M., N.S.O.), and 1 shared decision-making expert and human-centered designer with expertise in shared decision making and communication (I.H.).

RESULTS

After an iterative and dynamic process of video-graphic analysis and group reflections, we described the functional components of diagnostic conversations and the potential diagnostic errors associated with each.

We identified 3 diagnostic conversation components, defined as activities, that were undertaken to move the diagnostic process forward and establish the action that will come from a diagnostic conversation. Our components are further explained in Table 1.

Recognizing Diagnostic Situations

The first component is the recognition of a situation as needing diagnostic activities; to recognize whether something is or may be wrong. This recognition may be relatively straightforward, as in cases when the patient comes to the visit in pain or complains of not being able to sleep. Recognition of a situation that warrants attention may also arise as a result of clinical observations (eg, physical examination) or test or imaging results. At other times, it is only as the conversation progresses that issues become apparent and the need for and direction of diagnostic activities become clear.

Language use sets the trajectory of the conversation. For example, the conversation and

TABLE 2. Diagnostic Conversation Components

Shared activities in diagnostic conversation	Conversational challenges/limitations during the clinical encounter		Associated diagnostic errors
	Specific	Examples	
Recognizing diagnostic situations. Aim: To recognize whether and in which way something is or may be wrong.	Failure to speak and listen in ways that surface a sense that something is wrong. Failure to cultivate the language and interactions that express, refine, and revise effectively what may be wrong. Discordance between the accounts of the situation that are used as the basis for further action and the situation itself.	Patients and clinicians speak and listen together but indications of something being wrong and why it is important to the patient are silenced, unheard, or unspoken. This may include premature or inappropriate conversion of the terms in which the situation is surfacing into medical terminology. This includes mischaracterizing what is concerning or why it is of concern.	Not being aware that the situation requires diagnostic activities. Framing the issue in a way that sets diagnostic activities off in an incorrect or undesirable direction.
Setting priorities Aim: To determine what problems/concerns to focus on at the present point in time and why.	Failure to uncover and make use of a pluralistic range of reasons for focusing attention concerns and to develop and use the language appropriate for, and which enables their expression. Failure to clearly articulate, organize, deliberate, and agree on what the focal concern(s) will be and why.	These reasons may include clinical urgency, patient fears or concerns, patient preferences, how an area of focus practically affects the patient's day-to-day life, and the location of the concern with the flow of differential diagnoses. Lack of medical active listening, communication strategies or medical or lifeworld information that supports a focus on a particular concern. Clinician failure to balance or fear to the possible beneficial and harmful consequences of perusing a concern, the capacity to act on the concern.	Not focusing activities appropriately
Creating and reconciling a diagnostic plan Aim: To determine how focal concerns will be addressed	Failure to uncover and use an adequate set of potential ways of responding to focal concerns and to develop and use the language appropriate for, and which enables their expression.	These may include medical reasons, the balance of sensitivity and specificity, the resources required—equipment, personnel, temporal, financial, the patient's capacity to practically do and sustain what would be required, the necessity, availability and quality of caregiver support, the extent to which a potential way allows for subsequent action.	Perusing the wrong diagnostic activities, or initiating activities that are not feasible or which the patient is willing to do. Patients not aware of, or committed to, which diagnostic activities that they will engage in and how they will go about them.

Continued on next page

TABLE 2. Continued

Shared activities in diagnostic conversation	Conversational challenges/limitations during the clinical encounter		Associated diagnostic errors
	Specific	Examples	
	Failure to deliberate, value, and clearly articulate potential ways of responding, and to finally agree on how to proceed.	This includes weighing different ways of responding, negotiating conflicting priorities regarding how to proceed, problem solving impediments to ways of proceeding. This includes not developing plans which clearly connect to focal concerns, patient's problematic situation, and which is well grounded in its purpose.	

the words that the patient and clinician might use throughout are different if a patient begins by saying "I think I have strep" than if they say "My throat hurts." In the first instance the words "virus" and "bacteria" are likely to be quickly referenced by the clinician (as it is much more likely that the patient has a viral rather than a bacterial infection), whereas in the second case, the whole encounter could run without "virus" or "bacteria" ever being mentioned—"there's a lot of that going around" might suffice. As a consequence, the first conversation might dwell on the causes of the symptom, whereas the second might turn quickly to relief.

The central task of this component (recognizing diagnostic situations) is to ensure that issues warranting attention are discovered and that they are formulated in ways that allow for further situationally, medically, emotionally, and patient-important responsive diagnostic activities.

Inadequate conversation can lead to incorrect identification and framing of diagnostic situations, leading to diagnostic plans of care that might appear to be appropriate but that do not correctly address the situation that needs diagnosis. Specific conversational challenges observed during clinical encounters are related to failure to speak and listen, and failure to use correct language to express, refine, and revise effectively what may be wrong and the understanding of the situation that needs further action (see Table 2).

In this case, diagnostic errors may be associated with not being aware that the situation requires diagnostic activities, or framing the issue in a way that sets diagnostic activities off in an incorrect or undesirable direction.

For example, a 46-year-old woman presented to her primary care physician for follow-up. This was her 5th visit this year. Her symptoms included fatigue, headache, and poor sleep. During these visits, her medical evaluation was negative, except for a new diagnosis of depression, for which she is now receiving treatment. In addition, during the last visit, she was found to have a wrist fracture, and at the start of the year, she was found to have fractured ribs, both secondary to accidents.

At each of the visits, her clinician thoroughly evaluated her symptoms of fatigue,

headache, poor sleep, and correctly diagnosed depression and fractures. Yet, the root cause of her recurrent presentation and chronic symptoms was intimate partner violence that remained unidentified and for which appropriate medical action was not taken. The important diagnostic situation was not recognized, as the diagnostic situation (recurrent visits, with suggestive symptoms of intimate partner violence) was not framed appropriately or explored through conversations.

Setting Priorities

The work of using conversation to recognize and frame a situation as requiring diagnostic activities focuses on whether and in which ways something is wrong (eg, abnormal physical examination, patients expressing symptoms or concerns, abnormal diagnostic tests). The second component, the work of setting priorities determines what problems or concerns to focus on at the present time (eg, by asking the patient his/her main concern or the clinician explaining the most urgent issues to treat).

As the terms and contours of the diagnostic situation solidify in conversation, some priorities emerge organically, for example, when a clinician says "I'm worried about the swelling in your leg." At other times, where to focus further diagnostic attention occurs through an explicit laying out of potential areas of concern and prioritizing where to devote effort and attention at this point in time. Additionally, conversation is used to surface unexpressed or unrecognized priorities for consideration.

The central task of this component is to identify and voice potential priorities, refine and order them, and to make explicit why some concerns are of higher priority than others. As with the recognition of a situation as requiring diagnostic activities, the purpose of this functional component is to further secure the footing from which diagnostic or treatment action can be taken and directed.

Specific conversational challenges pertaining to priority setting observed during clinical encounters related to failure to use appropriate language during the conversations to uncover and express concerns, or failure to clearly articulate, organize, deliberate, and agree on what the focal concern(s) will be and why (see Table 2).

When priorities are set incorrectly, diagnostic errors can be associated with not focusing activities appropriately.

For example, a 55-year-old woman presented to her primary physician for evaluation of neck pain. She had been suffering from moderate pain that is usually worst with movement, and she is unsure if it was preceded by trauma. To complete her evaluation a computed tomography (CT) of the neck was ordered, and the only abnormality was a 0.8-cm thyroid nodule. During follow-up conversations, this new imaging finding took center stage, and the clinician recommended evaluation by an endocrinologist. The patient underwent a thyroid ultrasound and a consultation with an endocrinologist, who reassured her that no further interventions were required. The patient awaits a return visit with her primary care; yet, her main symptom of neck pain remains unaddressed because it was given lower priority by the clinician.

In this case, the lack of prioritization of the clinical problem between the patient and clinicians once the thyroid nodule was identified led to lack of diagnosis and treatment of her neck pain (eg, muscular-skeletal in etiology). Moreover, the patient was confused as her symptom of neck pain is persistent, but her endocrinologist assured her that no further diagnostic activities were required.

Creating and Reconciling a Diagnostic Plan

This last component focuses on how the situation will be addressed. Sometimes that plan is treatment, at other times, more diagnostic activities are required. We refer to a plan for further diagnostic activities as a diagnostic plan. These activities could include monitoring, imaging, further testing, etc. After the analysis and team reflections about the diagnostic plans formed in the encounters, we suggest diagnostic plans should have medical, ethical, feasibility, desirability, and productivity dimensions. A medically and ethically sound diagnostic plan is one that adheres to appropriate ethical principles and standards, including not incurring unnecessary harm. These plans are conducted in a way that supports patients through any emotional distress, respects and honors the dignity of the patient,

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and does not unnecessarily subject the patient to the risk of a medical cascade as a result of incidental findings. A medically sound diagnostic plan has a reasonable link to what is known about the patient's predicament and balances sensitivity and specificity, against the barriers to, and limitations of any diagnostic studies.

A diagnostic plan that is feasible is one that patients, caregivers, and health care organizations can execute with minimal appropriate demands on time, scheduling, financial, technical, social, transportation, bodily, and emotional resources—among others. Feasible plans recognize that there is a burden of diagnostic work that is borne by patients and that testing may be expensive, unpleasant, painful, or distressing. In conversation, patients and clinicians identify patient specific burdens of testing and imaging, weigh them, problem-solve, and adjust plans to make them optimally possible and tolerable for patients and caregivers.

A diagnostic plan that is desirable is one that the patient wants to undertake and that on balance most aligns with their goals, preferences, and desire for physical, emotional, and intellectual relief. A diagnostic plan that is productive is one that will produce results that most appropriately facilitate further action. Actionable results are ones that establish a need for treatment intervention (or not), advance differential diagnosis processes, and connect to a range of sound next steps (or at least, provide some footing for working out what the next steps should be).

We observed some conversational challenges affecting the creation and reconciliation of diagnostic plans, such as, failure to use adequate language to respond to concerns and to express responses to patients' concerns, failure to deliberate, value, and clearly articulate potential ways of responding, or finally agree on how to proceed (see Table 2).

When diagnostic plans are created and reconciled incorrectly, diagnostic errors may be associated with pursuing incorrect diagnostic activities, or initiating activities that are not feasible, or those that the patient does not wish to pursue.

For example, a 45-year-old man is found to have an adrenal nodule after he presented to the emergency department with shortness of breath and had a CT of the chest completed. He was otherwise without symptoms and had recovered from pneumonia that had caused his initial symptoms. The clinician would like to complete imaging studies to better evaluate the incidental finding in terms of size and potential risk of adrenal cancer and moves forward with ordering magnetic resonance imaging. However, the patient does not complete this test as he suffers from claustrophobia.

Alternatively, the clinician could have co-created the diagnostic plan of care with the patient and decided to complete a dedicated adrenal CT that would have provided similar diagnostic information and would have been acceptable to the patient. Due to the lack of co-creation and reconciliation of the diagnostic plan and medical evaluation to clarify cancer risk are not completed leading to a potential delay in diagnosis.

DISCUSSION

Through evaluation of clinical visit recordings and research team reflections, we have described important components of diagnostic conversations and how inadequate use of these components can lead to diagnostic errors.

Poor communication is at the heart of most patients' complaints about clinicians' performance, and studies have shown that problems in patient-clinician interaction threaten patient safety.[28-34] Giardina et al explored patients' experiences related to diagnostic errors and described problematic clinician behaviors related to the diagnostic process that were not consistent with patient-centered care (eg, ignoring patients' knowledge, disrespecting patients, failing to communicate, and engaging in manipulation or deception).[6] Listening is an essential component of diagnosis.[35] Failure to listen to patients may lead to dismissing patients' or family members' reports of clinical cues and leave patients feeling helpless and unheard.[36-39]

Conversation is a type of communication that is different from the timely, accurate, and coordinated transfer of information. It involves an active, collaborative, purposeful, interchange between patients, caregivers, and clinicians. Diagnostic conversation serves the purpose of moving from an uncertain sense that something is wrong toward appropriate,

patient-centered response. Achieving this purpose uses functional conversational components-identifying diagnostic situations, prioritization of concerns, and the codevelopment of diagnostic plans.[40] Avoidable diagnostic errors are likely to occur when patient-clinician conversation is deficient in these aspects.

Instead of considering patients as passive diagnostic subjects, it is more appropriate to view them as partners or co-producers during the diagnostic process. To give patients space and a role during the diagnosis process, it is important to listen to them.[41] This recalls Osler's admonition "Listen to your patients—they're telling you the diagnosis." Although listening is important, telling (as referenced by Osler) is every bit as important. Telling is not simply the transfer of potentially revelatory information to the clinician, it also allows the patient to set the terms of the conversation in their own words. What patients and clinicians will and can do in the encounter depends heavily on the words that are used. When patients have space to tell, they not only convey, they lay the foundation for productive conversation, priority setting, and eventual action.[6]

The creation of diagnostic plans between clinicians and patients could be guided by the principles and activities of shared decision making in treatment.[42] Following a shared decision-making approach, planning is not a series of steps, completion of a checklist or recipe, but rather a purposeful interaction that requires the active engagement and involvement of the patient and clinician. This approach to creating a diagnostic plan would include efforts to recognize that there is more than one way of addressing the situation, develop potential plans and to evaluate and reconcile these plans with respect to the demands of the situation and reach a conclusion and agreement as to what to do.

Our study has several limitations. First, our recordings captured single encounters that included diagnostic conversations, so we were not able to describe the effects of continuity of care and longitudinal relationships. Second, the nature of our observations did not allow us to directly evaluate patients and physicians' perspectives or experiences during these conversations. Third, we focused on conversation content and structure for our analysis and did not investigate patients' or clinicians' cognitive processes or nonverbal aspects of patient-clinician communication. Fourth, because we aim to detail the content of collaborative diagnostic conversations, we focused on explicit and rich extracts of conversations. As a result, we did not include conversations with short or nonexistent diagnosis discussions. Finally, this study was done in a tertiary care center, which may hinder comparisons with clinician practices in different settings and serving different patient populations.

Although the value of patient-clinician communication in the diagnostic process has received attention, the novelty of our study is that we focused on diagnostic conversation, treated conversation as having a function, and described in depth the functional components of diagnostic conversations on the basis of evaluation of contemporary real-life clinical visits. We also identified conversational factors that may influence diagnostic errors. Another strength of our work is that our sample included different settings (eg, internal medicine and family medicine) and a variety of pathologies that required different diagnostic conversations (eg, diabetes, osteoporosis, and cephalea).

CONCLUSION

Conversation is the workhorse of diagnosis, it sets diagnosis in motion, creates an environment in which it progresses, reveals diagnostic direction and the patient-centered significance of issues, makes apparent the questions that need to be asked, and develops, evaluates, and sets next steps in motion. Conversation is also humanistic, it rests on respect, creates trust, develops meaningful and productive relationships, and expresses who people are. It is an intimate element of care. Errors in conversation not only harm diagnosis, they threaten the foundations of care.

In clinical practice, clinicians, patients, and their caregivers can collaborate in diagnostic conversations. Important components of this process include: recognition of diagnostic situations, setting priorities, and creating and reconciling diagnostic plans that are ethical, feasible, desirable, and productive. Failures in conversation and the codevelopment of

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diagnostic plans can lead to potentially harmful diagnostic errors.

POTENTIAL COMPETING INTERESTS

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Abbreviations and Acronyms: **CT,** computed tomography

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Correspondence: Address to Andrew Majka, MD, Mayo Clinic Emeritus consultant, Mayo Clinic, 200 First St SW, Rochester, MN 55902.

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