



Diagnosis has important implications for patient care, research, and policy. Diagnosis has been described as both a process and a classification scheme, or a “pre-existing set of categories agreed upon by the medical profession to designate a specific condition”.

When a diagnosis is accurate and made in a timely manner, a patient has the best opportunity for a positive health outcome because clinical decision making will be tailored to a correct understanding of the patient’s health problem. In addition, public policy decisions are often influenced by diagnostic information, such as setting payment policies, resource allocation decisions, and research priorities.

## Overview of the Diagnostic Process

The diagnostic process is a complex, patient-centered, collaborative activity that involves information gathering and clinical reasoning with the goal of determining a patient’s health problem. This process occurs over time, within the context of a larger health care work system that influences the diagnostic process. The diagnostic process draws on an adaptation of a decision-making model that describes the cyclical process of information gathering, information integration and interpretation, and forming a working diagnosis.



The diagnostic process proceeds as follows: First, a patient experiences a health problem. The patient is likely the first person to consider his or her symptoms and may choose at this point to engage with the healthcare system. Once a patient seeks health care, there is an iterative process of information gathering, information integration and interpretation, and determining a working diagnosis. Performing a clinical history and interview, conducting a physical exam, performing diagnostic testing, and referring or consulting with other clinicians are all ways of accumulating information that may be relevant to understanding a patient’s health problem. The information-gathering approaches can be employed at different times, and diagnostic information can be obtained in different orders. The continuous process of information gathering, integration, and interpretation involves hypothesis generation and updating prior probabilities as more information is learned. Communication among health care professionals, the patient, and the patient’s family members is critical in this cycle of information gathering, integration, and interpretation.

The working diagnosis may be either a list of potential diagnoses (a differential diagnosis) or

a single potential diagnosis. Typically, clinicians will consider more than one diagnostic hypothesis or possibility as an explanation of the patient's symptoms and will refine this list as further information is obtained in the diagnostic process. The working diagnosis should be shared with the patient, including an explanation of the degree of uncertainty associated with a working diagnosis. Each time there is a revision to the working diagnosis, this information should be communicated to the patient. As the diagnostic process proceeds, a fairly broad list of potential diagnoses may be narrowed into fewer potential options, a process referred to as diagnostic modification and refinement. As the list becomes narrowed to one or two possibilities, diagnostic refinement of the working diagnosis becomes diagnostic verification, in which the lead diagnosis is checked for its adequacy in explaining the signs and symptoms, its coherency with the patient's context (physiology, risk factors), and whether a single diagnosis is appropriate. When considering invasive or risky diagnostic testing or treatment options, the diagnostic verification step is particularly important so that a patient is not exposed to these risks without a reasonable chance that the testing or treatment options will be informative and will likely improve patient outcomes.

Throughout the diagnostic process, there is an ongoing assessment of whether sufficient information has been collected. If the diagnostic team members are not satisfied that the necessary information has been collected to explain the patient's health problem or that the information available is not consistent with a diagnosis, then the process of information gathering, information integration and interpretation, and developing a working diagnosis continues. When the diagnostic team members judge that they have arrived at an accurate and timely explanation of the patient's health problem, they communicate that explanation to the patient as the diagnosis.

It is important to note that clinicians do not need to obtain diagnostic certainty prior to initiating treatment; the goal of information gathering in the diagnostic process is to reduce diagnostic uncertainty enough to make optimal decisions for subsequent care. In addition, the provision of treatment can also inform and refine a working diagnosis, which is indicated by the feedback loop from treatment into the information-gathering step of the diagnostic process. This also illustrates the need for clinicians to diagnose health problems that may arise during treatment.

There are identified four types of information-gathering activities in the diagnostic process: **taking a clinical history and interview; performing a physical exam; obtaining diagnostic testing;** and **sending a patient for referrals or consultations.** The diagnostic process is intended to be broadly applicable, including the provision of mental health care. These information-gathering processes are discussed in further detail below.

## Clinical History and Interview

Acquiring a clinical history and interviewing a patient provides important information for determining a diagnosis and also establishes a solid foundation for the relationship between a clinician and the patient. A common maxim in medicine attributed to William Osler is: “Just listen to your patient, he is telling you the diagnosis”. An appointment begins with an interview of the patient, when a clinician compiles a patient’s medical history or verifies that the details of the patient’s history already contained in the patient’s medical record are accurate. A patient’s clinical history includes documentation of the current concern, past medical history, family history, social history, and other relevant information, such as current medications (prescription and over-the-counter) and dietary supplements.

The process of acquiring a clinical history and interviewing a patient requires effective communication, active listening skills, and tailoring communication to the patient based on the patient’s needs, values, and preferences. The National Institute on Aging, in guidance for conducting a clinical history and interview, suggests that clinicians should avoid interrupting, demonstrate empathy, and establish a rapport with patients. Clinicians need to know when to ask more detailed questions and how to create a safe environment for patients to share sensitive information about their health and symptoms. Obtaining a history can be challenging in some cases: For example, in working with older adults with memory loss, with children, or with individuals whose health problems limit communication or reliable self-reporting. In these cases it may be necessary to include family members or caregivers in the history-taking process. The time pressures often involved in clinical appointments also contribute to challenges in the clinical history and interview. Limited time for clinical visits, partially attributed to payment policies, may lead to an incomplete picture of a patient’s relevant history and current signs and symptoms.

There are growing concerns that traditional “bedside evaluation” skills (history, interview, and physical exam) have received less attention due the large growth in diagnostic testing in medicine. Some researchers have noted that these methods were once the primary tools for diagnosis and clinical evaluation, but “the recent explosion of imaging and laboratory testing has inverted the diagnostic paradigm with clinicians often bypassing the bedside evaluation for immediate testing”. The interview has been called a clinician’s most versatile diagnostic and therapeutic tool, and the clinical history provides direction for subsequent information-gathering activities in the diagnostic process. An accurate history facilitates a more productive and efficient physical exam and the appropriate utilization of diagnostic testing. Indeed, Kassirer concluded: “Diagnosis remains fundamentally dependent on a personal interaction of a [clinician] with a patient, the sufficiency of communication

between them, the accuracy of the patient's history and physical examination, and the cognitive energy necessary to synthesize a vast array of information".

## Physical Exam

The physical exam is a hands-on observational examination of the patient. First, a clinician observes a patient's demeanor, complexion, posture, level of distress, and other signs that may contribute to an understanding of the health problem. If the clinician has seen the patient before, these observations can be weighed against previous interactions with the patient. A physical exam may include an analysis of many parts of the body, not just those suspected to be involved in the patient's current complaint. A careful physical exam can help a clinician refine the next steps in the diagnostic process, can prevent unnecessary diagnostic testing, and can aid in building trust with the patient. There is no universally agreed upon physical examination checklist; myriad versions exist online and in textbooks.

Due to the growing emphasis on diagnostic testing, there are concerns that physical exam skills have been underemphasized in current health care professional education and training. For example, Kugler and Verghese have asserted that there is a high degree of variability in the way that trainees elicit physical signs and that residency programs have not done enough to evaluate and improve physical exam techniques. Physicians at Stanford have developed the "Stanford 25," a list of physical diagnostic maneuvers that are very technique-dependent. Educators observe students and residents performing these 25 maneuvers to ensure that trainees are able to elicit the physical signs reliably ([Stanford Medicine 25 Team, 2015](#)).

## Diagnostic Testing

Over the past 100 years, diagnostic testing has become a critical feature of standard medical practice. Diagnostic testing may occur in successive rounds of information gathering, integration, and interpretation, as each round of information refines the working diagnosis. In many cases, diagnostic testing can identify a condition before it is clinically apparent; for example, coronary artery disease can be identified by an imaging study indicating the presence of coronary artery blockage even in the absence of symptoms.

The primary emphasis of this section focuses on laboratory medicine, anatomic pathology, and medical imaging. However, there are many important forms of diagnostic testing that extend beyond these fields, and the committee's conceptual model is intended to be broadly applicable. Additional forms of diagnostic testing include, for example, screening tools used in making mental health diagnoses, sleep apnea testing, neurocognitive assessment, and

vision and hearing testing.

Although it was developed specifically for laboratory medicine, the brain-to-brain loop model is useful for describing the general process of diagnostic testing. The model includes nine steps: test selection and ordering, sample collection, patient identification, sample transportation, sample preparation, sample analysis, result reporting, result interpretation, and clinical action. These steps occur during five phases of diagnostic testing: pre-pre-analytic, pre-analytic, analytic, post-analytic, and post-post-analytic phases. Errors related to diagnostic testing can occur in any of these five phases, but the analytic phase is the least susceptible to errors

The pre-pre-analytic phase, which involves clinician test selection and ordering, has been identified as a key point of vulnerability in the work process due to the large number and variety of available tests, which makes it difficult for nonspecialist clinicians to accurately select the correct test or series of tests. The pre-analytic phase involves sample collection, patient identification, sample transportation, and sample preparation. During the analytic phase, the specimen is tested, examined, or both. Adequate performance in this phase depends on the correct execution of a chemical analysis or morphological examination, and the contribution to diagnostic errors at this step is small. The post-analytic phase includes the generation of results, reporting, interpretation, and follow-up. Ensuring accurate and timely reporting from the laboratory to the ordering clinician and patient is central to this phase. During the post-post-analytic phase, the ordering clinician, sometimes in consultation with pathologists, incorporates the test results into the patient's clinical context, considers the probability of a particular diagnosis in light of the test results, and considers the harms and benefits of future tests and treatments, given the newly acquired information. Possible factors contributing to failure in this phase include an incorrect interpretation of the test result by the ordering clinician or pathologist and the failure by the ordering clinician to act on the test results: for example, not ordering a follow-up test or not providing treatment consistent with the test results

## **Referral and Consultation**

Clinicians may refer to or consult with other clinicians (formally or informally) to seek additional expertise about a patient's health problem. The consult may help to confirm or reject the working diagnosis or may provide information on potential treatment options. If a patient's health problem is outside a clinician's area of expertise, he or she can refer the patient to a clinician who holds more suitable expertise. Clinicians can also recommend that the patient seek a second opinion from another clinician to verify their impressions of an uncertain diagnosis or if they believe that this would be helpful to the patient. Many groups

raise awareness that patients can obtain a second opinion on their own. Diagnostic consultations can also be arranged through the use of integrated practice units or diagnostic management teams.

**Adapted from:** *Committee on Diagnostic Error in Health Care; Board on Health Care Services; Institute of Medicine; The National Academies of Sciences, Engineering, and Medicine; Balogh EP, Miller BT, Ball JR, editors. Improving Diagnosis in Health Care. Washington (DC): National Academies Press (US); 2015 Dec 29. 2, The Diagnostic Process. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK338593/>*

Facebook Comments

## Share:

- [Facebook](#)
- [Twitter](#)
- [LinkedIn](#)
- [Pinterest](#)
- [WhatsApp](#)
- [Print](#)