Reorganizing the History of Present Illness to Improve Verbal Case Presenting and Clinical Diagnostic Reasoning Skills of Medical Students: The All-Inclusive History of Present Illness

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ABSTRACT: The Institute of Medicine states that most diagnostic errors are caused by flaws in clinician diagnostic thinking. Accurately inferring the correct diagnosis from the patient history is the best way to improve diagnostic accuracy and efficiency. Such an improvement is contingent upon training early phase medical learners how to organize data from a patient history to arrive at the most likely diagnosis of the patient's chief health concern (CC). We describe how organizing the traditional history of present illness into what our trainees have come to call the "*All-Inclusive History of Present Illness*" (*AIHPI*) by applying the Bayesian statistical concepts of *chronologically sequencing*, as suggested by Skeff, both relevant historical risks and known medical events generate a series of pre-event probabilities of the most likely disease causing a patient's CC. Our trainees have enthusiastically recognized that the AIHPI organization process helps them improve both their ability to deliver well-organized, succinct verbal case presentations and the efficiency of generating and communicating what they think is the most likely disease causing a patient's CC.

KEYWORDS: All-inclusive HPI, favored diagnostic hypothesis, relevant patient history, cost-effective patient care

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Declining Emphasis on Clinical Reasoning Skills: A Worrisome Trend in Medical Education

The emphasis on teaching clinical reasoning skills in many medical schools and residency programs has declined in recent years,[1-6] and several national trends in the current health care environment may be responsible: mounting economic pressures have pushed many health systems and providers to increase clinical productivity and efficiency,[6-11] widespread adoption of electronic health records has increased time spent interfacing with computers instead of patients,[12-14] and a climate has developed in medical schools emphasizing the achievement of high United States Medical Licensing Examination (USMLE) Step scores[15]—all of which have come at the cost of sacrificing time dedicated to teaching clinical skills and diagnostic reasoning.[15-17]

Preserving the Art and Science of Medicine in the Modern Era: Reemphasizing the Value of Obtaining and Properly Organizing the Patient History

The patient history remains, among all diagnostic methods and resources employed by clinicians to this day, "the most powerful and sensitive and most versatile instrument available to the physician."[2] The knowledgeable evaluator can predict the accurate diagnosis in 80% to 85% of medical cases by skillfully combining an analysis of the presenting patient concern and properly sequencing all relevant prior aspects of the patient history.[18-23] Therefore, teaching health professionals how to organize a patient history to support the favored diagnostic hypothesis (FDH) explaining a patient's chief health concern (CC) is an extremely high priority.

The All-Inclusive History of Present Illness

Our trainees have dubbed our updated approach to organize the traditional history of present illness (HPI) as the *All-Inclusive History of Present Illness* (*AIHPI*) and have often conveyed its value both in helping them improve the organization and delivery of their verbal and written teaching case presentations and in helping them develop better diagnostic and treatment plans for their patients. The concept underlying the AIHPI is an expanded version of the traditional HPI, placed immediately after the patient's introduction and a properly characterized CC (Figure 1). The AIHPI includes all *relevant* aspects of the patient's risks for disease, and social and past medical histories prior to the acute event captured in the CC which support and justify what has become the trainee's FDH (Figure 2). As all diseases are preceded by risks,[24,25] the best way to sequence the emerging story is chronologically to organize such data from the time of the patient's birth up to the events culminating in the CC. Thus, the AIHPI may begin with relevant data from the Family History, the historical reflection of the first risk (genetic) experienced by all. Then summarized chronologically are the relevant acquired risks and

	Chief complaint only	Properly formatted Chief Concern:
Patient 1	"Headache"	60 yo woman with "the worst headache of my life" of 1 hour duration.
Patient 2	"Headache"	25 yo man with "mild headache" of 6 months duration.
Patient 3	"Back pain"	35 yo man who presented with back pain of 6 months duration and was found to have serum Ca 14.1 mg/dL on lab testing.

Figure 1. Chief concern.

Chief Concern: 35 yo man presents with the CC of "bloody stools" for two weeks.	
HPI: Two weeks ago he noticed his first bloody stool: "there was some red blood in the toilet bowl." The bloody stools have persisted, prompting the visit to clinic. **ROS:** Positive for fatigue, unintentional weight loss. Negative for fevers, abdominal pain, or melena. **PMH:** Hypothyroidism, Hypertension **PSH:** No abdominal surgeries. **Meds:** Levothyroxine, Lisinopril, Multivitamin **SH:** 20-pack year smoking history. **FH:** Brother diagnosed with CRC at age 36.	**AIHPI:** • Background history relevant to understanding this patient's CC begins with a brother diagnosed with CRC at age 36. • The patient has a personal history of a 20-pack year smoking history. He has no history of heavy alcohol use. • He was healthy until 6 months ago when he began to notice fatigue and subsequently experienced an unintentional weight loss of 10 pounds. • Two weeks ago, he first noticed a bloody stool: "there was some red blood in the toilet bowl." Bloody stools have persisted, prompting today's visit to the clinic. • He has no history of taking anticoagulants including ASA/NSAID use, recent antibiotics, abdominal surgeries, prior colonoscopies, hemorrhoids, fevers, or abdominal pain. • Based on the above history, the patient was admitted to the hospital for further evaluation and management.

Figure 2. HPI versus AIHPI comparison. AIHPI indicates All-Inclusive History of Present Illness; ASA, aspirin; CC, chief health concern; CRC, colorectal cancer; FH, family history; HPI, history of present illness; NSAID, nonsteroidal anti-inflammatory drug; PMH, past medical history; PSH, past surgical history; ROS, review of system; SH, social history.

known medical encounters (selected from the social, past medical, surgical, obstetrics/gynecology, and psychiatric histories) which have evolved as the patient aged up to the time of the present CC.

The Importance of Chronologically Organizing the Patient History in the AIHPI

As noted above, the concept embodied in the AIHPI is not new. The series of articles by Skeff, summarized in his seminal article,[26] predicted the success of what we have now chosen to call the AIHPI. Skeff's "Chronology of Present Illness" (CPI) emphasized the importance of the temporal evolution of clinical events relevant to understanding the patient's present CC. Such data laid out in "story form" as the events in the CPI unfolded strongly built the case for the emerging FDH.

Assembling the relevant historical risks as well as the known relevant prior medical events in the AIHPI in chronological order conceptually generates a series of likelihood ratios steadily increasing (or decreasing by the skilled use of pertinent negatives) the probability that one's FDH is correct. Although the actual sensitivity/specificity values of each patient statement or of the other historical details are not known, we assume that those we intuitively consider medically "relevant" to understanding the patient's CC best fit the disease process that has become our FDH at that point in time. The fact that Skeff's paper is now more than 5 years old illustrates how little attention is given to teaching medical students and residents the important concept of chronologically organizing the relevant events in a patient's medical history. While we need to better study and define what bits of historical information are truly relevant to identifying diseases likely to be causing commonly occurring CCs, even *early stage learners* in our verbal case presentation workshops *quickly comprehend* how to sequence such data as it occurred in the patient's life history! Having a better-supported FDH permits the more efficient selection of those laboratory tests, imaging

studies, and consultant-provided diagnostic procedures *truly indicated* to confirm hypothesized diseases.

Conceptualizing, learning, and applying the principles on which the AIHPI is based is not a simple task but rather a skill requiring clinical experience to understand what are relevant aspects of disease history, signs, and symptoms. Workshops during which students bring their attempts to construct well-organized, succinct verbal presentations on recently evaluated patients accelerate how to construct the AIHPI which best justifies the FDH at the time of the evaluation.

AIHPI Workshops Substantially Enhance the Acquisition of Both Verbal Case Presentation and Clinical Diagnostic Reasoning Skills

Workshops are critically important to demonstrating to learners how the AIHPI relates to generating well-organized, succinct verbal case presenting and clinical diagnostic reasoning skills. Assembling the AIHPI requires students to record *and edit* the patient's CC to be sure that it stimulates thoughts of the *differential diagnosis and/or* captures the exact reason why the patient needed to be evaluated. From the patient's completed database (history, physical examination, and selected laboratory/imaging studies), the AIHPI organizer must select those bits of background information which are *relevant* to understanding the disease process most likely causing the patient's CC, the FDH. The verbal presentation of the AIHPI must put into words the chronologically organized story using those appropriate bits of history which led the patient to seek help; the story must never contain redundancies, and the database section must be performed in less than 5 minutes. Workshops on constructing the AIHPI should be led by instructors knowledgeable about how properly to state the CC (and/or its alternatives, such as a specific reason for referral, transfer, or admission) and why chronologically organizing the flow of "relevant" historical content is critical. How to organize and conduct such workshops along with demonstration handout materials will be detailed in a subsequent publication.

Conclusion

The AIHPI model is a reconceptualization and revision of the traditional HPI. Although the AIHPI process works well for all specialties, workshops are especially important for students during the internal medicine clerkship. Each third year medical student should be required each week to present a recently evaluated patient using the AIHPI format. From our observations and the feedback provided by our trainees, students trained as described above more rapidly develop the ability to deliver excellent VCPs and in the process begin to understand how to better diagnose the patient's disease. When integrated into practice, arriving more rapidly at the most likely clinical diagnosis will improve patient outcomes and almost certainly result in substantial cost savings.[11,27]

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