

# Clinical Documentation in the 21st Century: Executive Summary of a Policy Position Paper From the American College of Physicians

Thomson Kuhn, MA; Peter Basch, MD; Michael Barr, MD, MBA; and Thomas Yackel, MD, MPH, MS, for the Medical Informatics Committee of the American College of Physicians\*

Clinical documentation was developed to track a patient's condition and communicate the author's actions and thoughts to other members of the care team. Over time, other stakeholders have placed additional requirements on the clinical documentation process for purposes other than direct care of the patient. More recently, new information technologies, such as electronic health record (EHR) systems, have led to further changes in the clinical documentation process. Although computers and EHRs can facilitate and even improve clinical documentation, their use can also add complexities; new challenges; and, in the eyes of some, an increase in inappropriate or even fraudulent documentation. At the same time, many physicians and other health care professionals have argued that the quality of the systems being

used for clinical documentation is inadequate. The Medical Informatics Committee of the American College of Physicians has undertaken this review of clinical documentation in an effort to clarify the broad range of complex and interrelated issues surrounding clinical documentation and to suggest a path forward such that care and clinical documentation in the 21st century best serve the needs of patients and families.

*Ann Intern Med.* 2015;162:301-303. doi:10.7326/M14-2128 [www.annals.org](http://www.annals.org)  
For author affiliations, see end of text.

This article was published online first at [www.annals.org](http://www.annals.org) on 13 January 2015.

In the past decade, medical records have become increasingly synonymous with electronic health records (EHRs). However, although "EHR" is the current term of art used to describe computer-based systems that perform a broad range of functions related to documenting and managing patient care, this will not always be the case. Similarly, clinical documentation's definition has grown to encompass more than just physician notes. Existing technology, such as registries, portals, connected home monitoring devices, and provider- and patient-controlled mobile devices, as well as technology not yet in use or even built, is likely to integrate with or possibly even replace the EHR (as currently conceptualized) as a primary vehicle for viewing and recording clinical documentation. Although the term "EHR" is used throughout this paper, the issues addressed could reasonably apply to any future technology-enabled system of clinical documentation.

This position paper reviews the current and emerging purposes of clinical documentation, the drivers that may influence or distract from these purposes, and the opportunities and challenges that have arisen from EHRs. We believe that physicians must help define and prioritize the many important roles that clinical documentation serves today. Therefore, this paper proposes a set of guiding principles and actions that can be taken by clinicians, provider institutions, technology vendors, government regulators, payers, and other interested groups to improve the quality and value of clinical documentation and to better use this documentation to improve care.

The primary goal of EHR-generated documentation should be concise, history-rich notes that reflect the information gathered and are used to develop an impression, a diagnostic and/or treatment plan, and recommended follow-up. Technology should facilitate attainment of these goals in the most efficient manner possible without losing the humanistic elements of the record that support ongoing relationships between patients and their physicians.

## METHODS

The decision to develop this policy paper was made by the Medical Informatics Committee of the American College of Physicians (the College, or ACP), which is charged with addressing issues concerning the effect of health information technology and informatics on the health care of the U.S. public and the practice of internal medicine and its subspecialties. The recommendations that were developed were informed by a literature review and input from the various College constituencies and nonmember experts in the field. The policy paper and related recommendations were reviewed and approved by the College's Governing Board in September 2014.

### See also:

Editorial comment . . . . . 315

Web-Only

Appendix: Full Policy Position Paper

\* This paper, authored by Thomson Kuhn, MA; Peter Basch, MD; Michael Barr, MD, MBA; and Thomas Yackel, MD, MPH, MS, was developed for the Medical Informatics Committee of the American College of Physicians (ACP). Contributor committee members include Peter Basch, MD (*Chair*); Mitchell Adler, MD, JD, MPH; Robert Brahan, MD; James Cimino, MD; Robert Dolin, MD; Floyd Eisenberg, MD, MPH; Jim Jirjis, MD, MBA; Nareesa Mohammed-Rajput, MD, MPH; Debra Stottlemeyer, MD, MBA; Alan Wynn, MD; and Thomas Yackel, MD, MPH, MS.

## EVOLVING PURPOSES AND DRIVERS OF CLINICAL DOCUMENTATION

Electronic health records have made defensive documentation easier, which some would interpret as better documentation and others would interpret as a source of "note bloat," in which key findings and actions are obscured by superfluous negative findings, irrelevant documentation, and differential diagnoses, all of which make the record difficult and time-consuming to read (1). Because prior entries are easily carried forward to current notes, these distended records can be a source of excess downstream documentation that perpetuates the difficulty many physicians perceive when trying to quickly find a useful signal in a field of noise.

Defensive medicine has resulted in longer notes, with the increased documentation arguably not improving patient care. The problem-oriented medical record has also led to longer notes but is at least designed to improve decision making and treatment. Both of these influences have increased the time physicians spend on documentation. However, the increase in documentation time for problem-oriented documentation is likely offset by the reduction in time for downstream use. It is conventional wisdom that a well-organized record and note make continuing care with the same and subsequent providers easier and quicker. These influences were dwarfed by the next major driver of change to clinical documentation: the issuance of the evaluation and management (E&M) guidelines in 1995 and 1997.

The E&M guidelines were devised, at least initially, with the support of organized medicine as a response to the lack of an externally verifiable measure of cognitive services. These guidelines largely redefined cognitive services as not what was *done*, but rather what was *documented*. They created a complex system of rules that further specified format requirements. This has created an imbalance of values, with coding and compliance trumping clarity and conciseness, as well as a harshly negative "gotcha" mentality that saps the professionalism out of physicians.

## ACP POSITION STATEMENTS AND RECOMMENDATIONS

The following statements represent the official policy positions and recommendations of the ACP. The rationale for each is provided in the full position paper, which is available in the **Appendix** (available at [www.annals.org](http://www.annals.org)).

### Policy Recommendations for Clinical Documentation

1. *The primary purpose of clinical documentation should be to support patient care and improve clinical outcomes through enhanced communication.*

2. *Physicians working with their care delivery organizations, medical societies, and others should define professional standards regarding clinical documenta-*

*tion practices throughout their organizations. Further, clinical usefulness of health information exchange will be facilitated by appropriate redesign of clinical documentation based on consensus-driven professional standards unique to individual specialties as a result of collaboration with standards-setting organizations.*

A. *The clinical record should include the patient's story in as much detail as is required to retell the story.*

B. *When used appropriately, macros and templates may be valuable in improving the completeness and efficiency of documentation, particularly where that documentation is primarily limited to standardized terminology, such as the review of systems and physical examination findings.*

C. *The EHR should facilitate thoughtful review of previously documented clinical information. Ready review of prior relevant information, such as longitudinal history and care plans as well as prior physical examination findings, may be valuable in improving the completeness of documentation as well as establishing context.*

D. *Where previously documented clinical information is still accurate and adds to the value of current documentation, this process of "review/edit and/or attest, and then copy/forward" (hereafter referred to as copy/forward) of specific prior history or findings may improve the accuracy, completeness, and efficiency of documentation. However, these documentation techniques can also be misused, to the detriment of accuracy, high-quality care, and patient safety.*

E. *Effective and ongoing EHR documentation training of clinical personnel should be an ongoing process.*

3. *As value-based care and accountable care models grow, the primary purpose of the EHR should remain the facilitation of seamless patient care to improve outcomes while contributing to data collection that supports necessary analyses.*

4. *Structured data should be captured only where they are useful in care delivery or essential for quality assessment or reporting.*

5. *Prior authorizations, as well as all other documents required by other entities, must no longer be unique in their data content and format requirements.*

6. *Patient access to progress notes, as well as the rest of their medical records, may offer a way to improve both patient engagement and quality of care.*

7. *The College calls for further research to:*

A. *Identify best practices for systems and clinicians to improve accuracy of information recorded and the value of information presented to other users.*

B. *Study the authoring process and encourage the development of automated tools that enhance documentation quality without facilitating improper behaviors.*

C. Understand the best way to improve medical education to prepare new and practicing clinicians for the growing uses of health information technology in the care of patients and populations and to recognize the importance of their responsibility to document their observations completely, concisely, accurately, and in a way that supports their reuse.

D. Determine the most effective methods of disseminating professional standards of clinical documentation and best practices.

### **Policy Recommendations for EHR System Design to Support 21st-Century Clinical Documentation**

1. EHR developers need to optimize EHR systems to facilitate longitudinal care delivery as well as care that involves teams of clinicians and patients that are managed over time.

2. Clinical documentation in EHR systems must support clinicians' cognitive processes during the documentation process.

3. EHRs must support "write once, reuse many times" and embed tags to identify the original source of information when used subsequent to its first creation.

4. Wherever possible, EHR systems should not require users to check a box or otherwise indicate that an observation has been made or an action has been taken if the data documented in the patient record already substantiate the action(s).

5. EHR systems must facilitate the integration of patient-generated data and must maintain the identity of the source.

### **SUMMARY**

Electronic health records should be leveraged for what they can do to improve care and documentation, including effectively displaying prior information that shows historical information in rich context; supporting critical thinking; enabling efficient and effective documentation; and supporting appropriate and secure sharing of useful and usable information with others, including patients, families, and caregivers. These features are unlikely to be optimized as long as the format and content of clinical documentation are primarily based on coding and other regulatory requirements. Furthermore, under these circumstances, EHRs lose

much of their potential to improve care and documentation and instead are relegated to doing nothing that could not be done with paper records—only less efficiently.

We are in danger of repeating history by overstructuring the clinical record and overloading it with extraneous data (2). Physicians must learn to leverage the enormous and growing capabilities of EHR technology without diminishing or devaluing the importance of narrative entries. Failure to do so will inevitably influence the way we think and teach, to the detriment of patient care.

Cooperation is needed among industry health care providers, health care systems, government, and insurers to continue to improve the documentation. We must work together to fundamentally change the EHR from a passive recipient of information to an active virtual care team member.

From the American College of Physicians, MedStar Health, and National Committee for Quality Assurance, Washington, DC, and Oregon Health & Science University, Portland, Oregon.

**Disclaimer:** The authors of this article are responsible for its contents, including any clinical or treatment recommendations.

**Financial Support:** Financial support for the development of this guideline comes exclusively from the ACP operating budget.

**Disclosures:** Disclosures can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M14-2128](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M14-2128).

**Requests for Single Reprints:** Thomson Kuhn, MA, American College of Physicians, 25 Massachusetts Avenue NW, Suite 700, Washington, DC 20001; e-mail, [tkuhn@acponline.org](mailto:tkuhn@acponline.org).

Current author addresses and author contributions are available at [www.annals.org](http://www.annals.org).

### **References**

1. Siegler EL, Adelman R. Copy and paste: a remediable hazard of electronic health records [Editorial]. *Am J Med*. 2009;122:495-6. [PMID: 19486708] doi:10.1016/j.amjmed.2009.02.010
2. Barr MS. The clinical record: a 200-year-old 21st-century challenge [Editorial]. *Ann Intern Med*. 2010;153:682-3. [PMID: 21079228] doi:10.7326/0003-4819-153-10-201011160-00015

**Current Author Addresses:** Mr. Kuhn: American College of Physicians, 25 Massachusetts Avenue NW, Suite 700, Washington, DC 20001.

Dr. Basch: MedStar Health, 660 Pennsylvania Avenue SE, Suite 100, Washington, DC 20003.

Dr. Barr: National Committee for Quality Assurance, 1100 13th Street NW, Suite 1000, Washington, DC 20005.

Dr. Yackel: Department of Medical Informatics, Oregon Health & Science University, 3181 SW Sam Jackson Park Road, BICC, Portland, OR 97201.

**Author Contributions:** Conception and design: T. Kuhn, P. Basch, M. Barr, T. Yackel.

Analysis and interpretation of the data: T. Kuhn.

Drafting of the article: T. Kuhn, P. Basch, M. Barr.

Critical revision of the article for important intellectual content: T. Kuhn, P. Basch, M. Barr, T. Yackel.

Final approval of the article: P. Basch, T. Yackel.

Administrative, technical, or logistic support: T. Kuhn.

Collection and assembly of data: T. Kuhn.

## APPENDIX: CLINICAL DOCUMENTATION IN THE 21ST CENTURY: A POLICY POSITION PAPER FROM THE AMERICAN COLLEGE OF PHYSICIANS

### Executive Summary

Clinical documentation was developed to track a patient's condition and communicate the author's actions and thoughts to other members of the care team. Over time, other stakeholders have placed additional requirements on the clinical documentation process for purposes other than direct care of the patient. More recently, new information technologies, such as EHR systems, have led to further changes in the clinical documentation process. Although computers and EHRs can facilitate and even improve clinical documentation, their use can also add complexities; new challenges; and, in the eyes of some, an increase in inappropriate or even fraudulent documentation (3, 4). At the same time, many physicians and other health care professionals have argued that the quality of the systems being used for clinical documentation is inadequate. The Medical Informatics Committee of the ACP has undertaken this review of clinical documentation in an effort to clarify the broad range of complex and interrelated issues surrounding clinical documentation and to suggest a path forward such that care and clinical documentation in the 21st century best serve the needs of patients and families.

### Introduction

Observe, record, tabulate, communicate.

—Sir William Osler (1849–1919)

The medical record was first used by physicians to record their findings and actions and as a vehicle to communicate with other physicians who might care for

the patient in the future. Physician notes were concise, were handwritten or dictated, varied in length and detail, and typically reflected the personality and style of the physician. They often contained nonstandard abbreviations and, if legible, were difficult to comprehend (5). This was the documentation style of physicians until the early 20th century, when leading hospitals began to require structure and the use of forms to organize what had been essentially free-form notes in order to perform analyses of their medical records and improve quality. The use of forms and standardized data elements led physicians to note a “loss of the narrative descriptions” as well as the author's list of provisional diagnoses, speculations, opinions, and uncertainties. A sense that the notes had become dry recitations of facts led to a change in behavior by physicians, who began writing in the margins and on the backs of the tables because of frustration with the imposed formats (5).

The concern about the loss of narrative continues today and is further complicated by an increasing demand for structured data for needs other than patient care, such as satisfying regulatory requirements and population health, and by the growing use of EHRs to view and create new documentation, which creates a new set of potential benefits, challenges, and unintended consequences.

Over time, clinical documentation has evolved in response to other pressures outside of the desire to improve systems of care in hospitals and care for individual patients. The medical record also became an essential legal document with requirements for non-modification and retention, a vehicle for education of medical students and trainees, and the defined work product for which physicians were paid. Recently, the Meaningful Use program has expanded medical record documentation requirements to include specific information pertaining to payer quality measures and to serve as a vehicle for health information sharing with patients, families, and caregivers (6). As patient engagement with the medical record continues, components of clinical documentation, such as the medical problem list, will shift from authorship by a single physician to authorship by multiple contributors and editors, including physicians, other nonphysician providers, and patients and families (7).

In the past decade, medical records have become increasingly synonymous with EHRs. However, although “EHR” is the current term of art used to describe computer-based systems that perform a broad range of functions related to documenting and managing patient care, this will not always be the case. Similarly, clinical documentation's definition has grown to encompass more than just physician notes. Existing technology, such as registries, portals, connected home monitoring devices, and provider- and patient-

controlled mobile devices, as well as technology not yet in use or even built, is likely to integrate with or possibly even replace the EHR (as currently conceptualized) as a primary vehicle for viewing and recording clinical documentation. Although the term "EHR" is used throughout this paper, the issues addressed could reasonably apply to any future technology-enabled system of clinical documentation.

This position paper reviews the current and emerging purposes of clinical documentation, the drivers that may influence or distract from these purposes, and the opportunities and challenges that have arisen from EHRs. We believe that physicians must help define and prioritize the many important roles that clinical documentation serves today. Therefore, this paper proposes a set of guiding principles and actions that can be taken by clinicians, provider institutions, technology vendors, government regulators, payers, and other interested groups to improve the quality and value of clinical documentation and to better use this documentation to improve care.

The primary goal of EHR-generated documentation should be concise, history-rich notes that reflect the information gathered and are used to develop an impression, a diagnostic and/or treatment plan, and recommended follow-up. Technology should facilitate attainment of these goals in the most efficient manner possible without losing the humanistic elements of the record that support ongoing relationships between patients and their physicians.

## Methods

The decision to develop this policy paper was made by the Medical Informatics Committee of the ACP, which is charged with addressing issues concerning the effect of health information technology and informatics on the health care of the U.S. public and the practice of internal medicine and its subspecialties. The recommendations that were developed were informed by a literature review and input from the various College constituencies and nonmember experts in the field. The policy paper and related recommendations were reviewed and approved by the College's Governing Board in September 2014.

## Evolving Purposes and Drivers of Clinical Documentation

### *Defensive Medicine*

Courts have long considered clinical documentation to be discoverable, and the existence of an unaltered contemporaneous medical record is considered to be a more trusted source of truth than the memory of a physician or patient. This has served as a driver for legible and more extensive documentation, with a particular focus on the inclusion of pertinent positive and negative history and physical findings, as well as clear

statements of what the physician was thinking and why a particular course of action or treatment was or was not done. Electronic health records have made defensive documentation easier, which some would interpret as better documentation and others would interpret as a source of "note bloat," in which key findings and actions are obscured by superfluous negative findings, irrelevant documentation, and differential diagnoses, all of which make the record difficult and time-consuming to read (1). Because prior entries are easily carried forward to current notes, these distended records can be a source of excess downstream documentation, which perpetuates the difficulty many physicians perceive when trying to quickly find a useful signal in a field of noise.

### *The Problem-Oriented Medical Record*

In 1968, Lawrence L. Weed, MD, published a seminal article on the subject of clinical documentation, "Medical Records that Guide and Teach" (8). Weed observed then (decades before the emergence of the EHR as a tool outside of selected academic centers and computer laboratories) that paper-based clinical documentation was confusing, scattered, repetitious, and sometimes even directly responsible for diagnosis and therapy errors. His response was to argue for a new style of documentation that focused on problems and how they should be managed and documented (9):

In the face of the confusion concerning the necessary quantity of data, the initial collection of data should be made as significant and complete as possible. The organization of the medical record should be a matter of immediate concern to practicing physicians and students. . . . Properly trained paramedical personnel can both contribute greatly to the data-collection phase and help teach it. The medical faculty must become far more interested and expert in teaching the analysis of medical data, the complete formulation of the problems, and the disciplined following of each.

Weed's work was widely read and appreciated and, by the mid-1970s, became the standard by which American medical students were taught to document.

Defensive medicine has resulted in longer notes, with the increased documentation arguably not improving patient care. The problem-oriented medical record has also led to longer notes but is at least designed to improve decision making and treatment. Both of these influences have increased the time physicians spend on documentation. However, the increase in documentation time for problem-oriented documentation is likely offset by the reduction in time for downstream use. It is conventional wisdom that a well-

organized record and note make continuing care with the same and subsequent providers easier and quicker. These influences were dwarfed by the next major driver of change to clinical documentation: the issuance of the E&M guidelines in 1995 and 1997.

### **E&M Guidelines**

Before the release of the E&M guidelines, physician billing for nonprocedural work was based on a self-assessment of difficulty and/or time spent with a patient, and clinical documentation—which may have included some defensive documentation and might have been problem-based—was left to the professional judgment of the physician. The length of a document and what was included in it were at the discretion of the physician. Thus, a physician could reasonably create longer documentation for a brief visit and shorter documentation for a more complex visit. The level of the charge for cognitive services was essentially a self-attestation, and there was little to support it besides the word of the billing provider (unlike a charge for a procedure, which is relatively easy for an auditor to independently confirm by looking at the physician's schedule and seeing whether billing seemed excessive).

The E&M guidelines were devised, at least initially, with the support of organized medicine as a response to this lack of an externally verifiable measure of cognitive services. These guidelines largely redefined cognitive services as not what was *done*, but rather what was *documented*. They created a complex system of rules that further specified format requirements. Furthermore, the formatting and presentation of the guidelines impede their implementability, with table-within-a-table-within-a-table construction of the definitions of level of service and unhelpful terms (such as “expanded problem focused”) that make it more cognitively challenging to determine the level of service without constantly referring to definitions. In addition to these guidelines being difficult to understand and use, and even counterintuitive, they are increasingly understood to be a poor fit for chronic care and the emerging typical visit for internists—visits that combine components of preventive care, chronic care management, counseling and education, and new acute problems (10). In addition, they pose challenges to hospitals, whose Medicare and Medicaid billing is based solely on physician documentation. Also, for many physicians, they created a substantial new burden by turning the provision of care into a 2-step process: caring for the patient and then “backfilling” a note to fit an arcane documentation format, where much of the documentation includes often irrelevant elements of patients' clinical histories and examinations rather than decision-making and care management activities. Thus, in place of a

thoughtfully written review of systems that listed pertinent positive or negative findings, clinically meaningless terms, such as “ten point review of systems was negative,” were introduced into the record to satisfy E&M guidelines. Instead of clinical needs determining the level of detail of the physical examination, documentation of the examination was driven by the required number of “bullets” to fulfill the requirements for a specific code (11).

Remembering to include this backfill of what often amounts to boilerplate default negative or normal findings is difficult with paper records but a strength of most EHRs. In fact, this strength of EHRs created their initial business case; they could help physicians to “right code” and never fear an audit finding of unintentional billing fraud. This business case continues today and, in the opinion of many EHR experts, is the reason that most EHRs still do a better job with coding support than with improving quality and safety (11). However, a recent report by the Office of Inspector General of the U.S. Department of Health and Human Services concluded that in 2014, nearly 2 decades after the publication of the E&M documentation guidelines, almost half of all E&M visits for Medicare patients were not coded correctly (3). Of the roughly 40% of claims that were considered miscoded, 26% were upcoded and 14.5% were downcoded. The Office of Inspector General further noted no significant difference in coding errors between physicians documenting in paper records and those using EHRs (3).

Before the issuance of the E&M guidelines, the consequences of not creating good clinical documentation were essentially limited to difficulty for the authoring clinician (for example, having trouble following his or her notes; finding it challenging to mount an adequate defense for a rare occurrence, such as a malpractice lawsuit; or being embarrassed in front of his or her patient because of a lack of appropriate follow-up). However, not adhering to the E&M guidelines could lead to billing fraud, with the potential for fines, permanent restriction from the Medicare and Medicaid programs, and even criminal penalties. Therefore, it is understandable that the desire to be paid fairly for one's work and avoid civil and criminal penalties has become the primary driver for clinical documentation. Also, unlike in days past, what is now illogically considered to be the gold standard of a good note comes not from clinical professors and mentors but from professional coders and corporate compliance training. An imbalance of values has been created, with compliance, coding, and security trumping patient care, clinical well-being, and efficiency (12). A harshly negative “gotcha” mentality that saps the professionalism out of physicians has also appeared.

### ***Increasing Demands for Structured Data***

As with the rise of the quality movement in hospitals in the early 1900s, the current shift from volume-based to value-based payment models is driving the need for more structured data. Electronic health record systems lead to expectations of easier and more complete access to coded clinical information among non-clinicians who depend on clinical records to do their work. Entities that desire these data are adding more structured and coded data requirements to their reporting requirements in an effort to obtain more robust data sets.

The laudable goal is to be able to extract data automatically from patient records, compile the data into reports, and export them with the click of a button. This process, if it worked well, would be far better than the current process of manual chart abstraction; additional data entry at the point of care; and dependency on claims data for measurement of quality, public health reporting, research, and regulatory compliance.

Unfortunately, obtaining coded data from electronic records remains elusive. Many "e-measures" are in the early stages of development and thus have not been fully implemented in EHR systems. These measures often require physicians and other health care professionals to enter additional data into the appropriately structured fields. It is unlikely that entering accurate and complete data into structured fields will become a high priority unless doing so becomes easier and more efficient than it typically is or the consequences of noncompliance become increasingly severe.

Inaccuracies in the record translate into inaccurate reports, which could limit the usefulness of enhanced access to clinical information. For example, physicians often assume that absence of evidence equals evidence of absence (for example, if a precise code for diabetes is not on the problem list, the physician assumes the patient does not have it).

Perhaps the most compelling justifications for structured data are the potential roles they can play in automating clinical decision support (CDS) (13). Whether through the use of patient data to enable context-aware "infobuttons" to facilitate retrieval of patient-relevant knowledge from online resources or by driving logic-based alerts and reminders, CDS systems require patient data in formats and terminologies that they can recognize and manipulate. These systems, in turn, have the potential to improve all aspects of care across the spectrum of diagnostic and therapeutic decision making. Meta-analyses report that although CDS systems can improve process measures, evidence is sparse on whether they improve clinical, economic, or efficiency-related outcomes (14).

### ***Open Notes***

The concept of open notes, an initiative to allow patients to view the notes written by physicians, nurses, and other providers, adds a new, more immediate demand for patient-centeredness in clinical documentation (15). Although it is still too early to state with certainty how the increased transparency of open notes will change existing clinical documentation, the following changes—all of which are believed to be positive by provider and patient participants in pilots of the open notes initiative—are likely: avoidance of pejorative language in descriptions of patients, patient behaviors, and findings; increased documentation and clarity in documentation of care plans; and increased efforts at timely completion of notes. However, without a broad-based educational effort toward patients and families that clarifies that a good medical note should be an accurate but brief synthesis of history, findings, decision making, and plans, rather than a verbatim transcript of a clinical interaction, open notes could inadvertently lead to longer notes, with even more time spent on documentation.

### ***Patient-Generated Health Data***

It is clear that patients will become a significant source of the documentation in their records (16, 17). Sources will include practice-supplied questionnaires; data from tracking devices, such as those for blood pressure and weight; and the words of the patients themselves through e-mail and other messaging systems. Electronic health record systems are being challenged to integrate patient-generated data while maintaining the identity of the data source. Physicians and other health care professionals must be able to trust the data, which means that they must be able to understand the source of and the route taken by all data. Systems will need to record and manage the provenance of all data in the clinical record along with the data (18). Along the same lines, joint patient-provider decision making, team collaboration, and care process management must be documented and managed by future EHR systems (19).

### ***Opportunities and Challenges of Clinical Documentation With EHRs***

Electronic health records offer opportunities to improve several aspects of paper-based records but also introduce challenges to the evolving functions and purposes of the medical record. For example, EHRs now being implemented add new structure to medical records through templates and drop-down boxes. This may be leading to increasing use of the copy/paste function and other 21st-century versions of workarounds seen in the early 20th century and mentioned in the introduction. Electronic health record documentation is always legible; is always available anytime and

anywhere, except during system downtime; and can be accessed by multiple persons, including patients, at the same time in different locations. However, legibility and availability do not necessarily result in efficiency and usability (20). Depending on the EHR system, clinicians who are used to expeditiously flipping through prior notes in a well-organized paper record may find that the EHR is less efficient. However, EHRs could result in better care based on embedded CDS and presentation of data in clinically relevant and actionable formats, especially for patients with chronic or complex conditions. On the other hand, poorly designed or implemented formats could inadvertently obscure the guidance that the original data collection effort was designed to support. These systems also need constant monitoring and periodic updates of the evidence base behind the recommendations.

Physicians and other health care professionals also contribute to issues with EHR usability and efficiency through their documentation behaviors. To respond to the pressures of clinical documentation, physicians and other health care professionals may generate longer-than-necessary notes in an effort to be complete and also document quickly. Copy/paste features and templates in EHRs make it easy to create long, verbose, repetitive, and difficult-to-read notes that may satisfy coding and audit requirements but do not adequately meet the need for clinical care and communication with other health care professionals involved in caring for the same patient. If used appropriately, these functions can facilitate more efficient and consistent documentation. However, they also make it easier to propagate imprecise or incorrect documentation.

The primary goal of EHR-generated documentation should be concise, history-rich notes that reflect the information gathered and are used to develop an impression, a diagnostic and/or treatment plan, and recommended follow-up. Technology should facilitate attainment of these goals in the most efficient manner possible without losing the humanistic elements of the record that support ongoing relationships between patients and their physicians. The evolution of EHRs is an opportunity for the evolution of clinical documentation. However, there are considerable challenges with many EHR platforms.

### **Data Display**

A common complaint from users is that EHR interfaces are unnecessarily cluttered and require too much navigation for too little value (20). Among the sources of screen clutter are requirements to document and track information that may not be necessary for care delivery but is required for other purposes, such as quality reporting, reimbursement, public health reporting, and registry reporting. Human-factors engineering

might lead to improvements in the usability of these interfaces. Although vendors often characterize end-user customization as a positive attribute of EHR products, the ability to customize data presentation and documentation workflow by clinicians and their teams may inadvertently contribute to some of the inefficiency of operations compared with less customizable but well-tested standardized versions.

### **Data Entry**

Electronic health record vendors have addressed the need for specific elements of documentation to support billing by designing various shortcuts and tools. Some of these functions can improve the efficiency of documentation, whereas others force physicians to enter information in ways that are not necessarily consistent with medical training or the way in which physicians typically approach diagnostic and therapeutic considerations. The most common documentation tools are templates, drop-down boxes, macros (simple scripts used to automate data entry), and the copy/paste function (21). None of these options for documentation is inherently inappropriate, but each can be intentionally or unintentionally misused. The copy/paste (or bring forward or cloning) function and one-click templates have received considerable attention because of the perception that repetitive, similar entries across medical records are a sign of fraud or attempts to justify higher-complexity E&M codes and can undermine the credibility of the entire record. The Centers for Medicare & Medicaid Services (CMS) states that "Documentation is considered cloned when each entry in the medical record for a beneficiary is worded exactly like or similar to the previous entries. . . . Cloning of documentation is considered a misrepresentation of the medical necessity requirement for covered services" (22).

The CMS and other payers, who are subject to pressure from legislators and others, are struggling to develop rules for the appropriate and inappropriate use of various techniques, such as limited-space templates. However, an examination of paper-based records from most physicians clearly shows that the nature of medical documentation—other than the patient narrative—tends to be controlled and standardized with respect to documenting normal or expected findings. One-click templates and macros to generate findings from a normal physical examination or review of systems are time-saving functions that replicate what physicians would otherwise have to handwrite in paper-based records and should be acceptable as long as the final, signed documentation accurately reflects what occurred during the patient-physician encounter. Shortcuts to bring forward other history, if verified and updated by the physician as necessary, should likewise be

acceptable for appropriate documentation. In response to concerns about the copy/paste function, some have suggested that EHRs support links to the sources of the data being referenced to provide attribution and the ability to trace the information to the original author (23).

Clinical documentation is not improved by the use of nonstandard terminology or forced uniqueness (as a response to the warnings from CMS mentioned earlier on documentation cloning). It is best served by brevity and thoughtfulness and should efficiently convey findings; thought processes; decisions; shared decisions; actions taken; and, where appropriate, actions not taken.

### ***Capture and Use of Structured Data***

For many types of information, properly formatted structured data are of enormous value and greatly aid clinical care, especially through well-designed CDS and flow charts that highlight opportunities for improving the health of individuals and populations. However, not all clinical data lend themselves to structured documentation.

The act of entering coded observations into a record, such as by selecting items from a list, is slow and awkward by nature. The mental activity involved in converting a patient narrative into coded values on a highly structured screen can lead to errors. Documentation of these types of clinical information via drop-down lists, check boxes, macros, and templates can be distracting to the physician and disruptive to vital clinical thinking and storytelling. These data capture features, when used in excess, can undermine the value of the information by standardizing away the heterogeneity that makes each patient encounter unique. Electronic health records can inadvertently drive the clinical interview and lead to encounters and documentation that lack sufficient context and detail necessary to guide medical care.

A recent time-and-motion study (24) suggested that clinical records are less about composition and might be better conceived as exercises in synthesis of information over time. The authors observed a high level of fragmentation of documentation activities and frequent task transitions. They concluded that, as constructed, EHRs might lead to an "increased load on working memory, increased probabilities of errors, and as a result, a number of workarounds to compensate for limitations of computerized systems." The ideal note would facilitate hybrid documentation by allowing physicians to efficiently capture the patient narrative and supplement it with context-sensitive, template-driven data that enhance rather than detract from the clinical record's relevance as a communication tool. Further-

more, the EHR should account for the concept of synthesis of information over time.

### **Emerging Requirements**

Clinical documentation in the 21st century is also driven by new requirements that were previously not performed by physicians. Completing medication reconciliation; reviewing easily accessible and often voluminous amounts of outside data; and maintaining accurate, updated problem lists are activities that, although of demonstrable value, were not done as often 20 years ago. Payers now require more documentation for pre-authorizations and payment, and a growing list of private and public entities require additional reporting for such purposes as tracking quality, public health initiatives, and research (25). Recent activity generated by these groups within the standards development process makes it clear that the list of required reports will grow and will result in the need for the collection of even more structured data. These requirements result in added complexity to clinical documentation. Because other members of the clinical team cannot easily assume many of these responsibilities, physicians must spend additional time addressing the requirements—time that potentially detracts from providing care to individual patients.

As the health care industry adopts and implements EHR systems, the number of new requests for data and information derived from the EHR by parties external to the medical practice is almost certain to grow (19). In many cases, the underlying technical specifications are not fully defined. For example, documentation systems will have to support audio and video in addition to text. As with all current and anticipated technology innovations, successful adoption and use depend on the resolution of nontechnologic barriers, including legal, ethical, and payment policies. Therefore, before vendors can design and implement the desired structured data elements to aggregate and report the desired information, end users, the federal government, insurers, and regulatory bodies need to fully specify the data needed for these purposes. Standards bodies and public entities must then provide testable specifications.

### **Policy Recommendations for Clinical Documentation**

Clinical documentation, whether on paper or in an EHR and regardless of other drivers, should strive to effectively and efficiently serve the purposes of documentation as described by Sir William Osler: "record, tabulate, communicate." Although there are perceived and real issues with the functionality and usability of EHRs, they have the potential to improve the viewing, analysis, and communication of clinical information, and as they become more interoperable, it is critically important that what they record is accurate.

The College makes the following recommendations for clinical documentation. Most clinical documentation is now or will soon be completed in EHRs, and our recommendations are therefore made in this context. The College strongly supports the use of EHRs in clinical medicine on the basis of the potential to improve quality of care provided to individuals and populations.

The College strongly supports the use of new capabilities within EHRs and other health information technology to enhance the efficiency and accuracy of documentation as well as the transformation of the medical record from predominantly a reflector of gathered information to a dynamic, team-oriented communication tool that serves the entire care team, including patients and families. To these ends, the College offers the following policy recommendations.

1. *The primary purpose of clinical documentation should be to support patient care and improve clinical outcomes through enhanced communication.*

The primary purpose of clinical documentation is to facilitate excellent care for patients. Whenever possible, documentation for other purposes should be generated as a byproduct of care delivery rather than requiring additional data entry unrelated to care delivery. The consequences of having additional primary purposes for clinical documentation, such as defensive documentation, drive excessive documentation and need to be addressed (19). Also, the current E&M guidelines cause many unintended negative consequences of clinical documentation. To the extent that the E&M system is maintained as is, creative solutions to improve and simplify clinical documentation will be difficult to introduce because current documentation is driven by the need to support billing and comply with regulatory and coding requirements. Furthermore, the College believes that the recommendation by the Office of Inspector General of more education to address its recent finding that almost half of all E&M visits for Medicare patients are coded incorrectly is not only the wrong approach to the problem but fails to acknowledge what should be self-evident. Regulations should be clear and should address clinical workflow without adding burden for documentation solely for the purpose of obtaining reimbursement. It is a waste of time, money, and focus to continue to force what can be viewed metaphorically as the round pegs of clinical practice into the square holes of the E&M documentation guidelines. Ultimately, billing requirements should be adjusted to accept accurate documentation generated for clinical purposes.

2. *Physicians working with their care delivery organizations, medical societies, and others should define professional standards regarding clinical documentation practices throughout their organizations. Further,*

*clinical usefulness of health information exchange will be facilitated by appropriate redesign of clinical documentation based on consensus-driven professional standards unique to individual specialties as a result of collaboration with standards-setting organizations.*

Good documentation is a fundamental component of high-quality care. Professional standards for high-quality computer-based clinical documentation should keep the best elements of paper-based documentation without duplicating its inefficiencies and limitations. The standards should emphasize clarity, brevity, and attention to the needs of other readers, including patients. Consensus-driven standards could form the basis for modifications to the E&M guidelines.

No one format is appropriate for all specialties or clinical situations, but each organization or practice should develop "chart etiquette" principles and policies based on a well-defined set of standards. These professional standards should address the following key issues:

A. *The clinical record should include the patient's story in as much detail as is required to retell the story.*

When permitted by regulations, it may contain entries by the patient as well as other care team members.

B. *When used appropriately, macros and templates may be valuable in improving the completeness and efficiency of documentation, particularly where that documentation is primarily limited to standardized terminology, such as the review of systems and physical examination findings.*

C. *The EHR should facilitate thoughtful review of previously documented clinical information. Ready review of prior relevant information, such as longitudinal history and care plans as well as prior physical examination findings, may be valuable in improving the completeness of documentation as well as establishing context.*

When data are pulled from another location in the chart, the source of the data should be indicated, and the data should be supplemented by appropriately abstracted narrative content and, when appropriate, should be referenced and traceable.

D. *Where previously documented clinical information is still accurate and adds to the value of current documentation, this process of "review/edit and/or attest, and then copy/forward" (hereafter referred to as copy/forward) of specific prior history or findings may improve the accuracy, completeness, and efficiency of documentation. However, these documentation techniques can also be misused, to the detriment of accuracy, high-quality care, and patient safety.*

Electronic health records offer an easier way to see relevant prior history, information, and findings in rich historical context than paper records. When such capa-

bilities are present, the College encourages their use because they allow for better and more focused interim history taking and a ready comparison between what was previously observed and what is currently observed. In fact, it is reasonable to assume that this approach, when done thoughtfully, can result in more accurate documentation in certain settings, particularly for ongoing preventive and chronic care. Regardless of the method used, clinical documentation tends to be repetitive, with the same words or phrases used to describe common observations each time they are made.

There is great concern throughout the medical community about a variant of copy/forward known as "copy/paste," where an entire note is copied into the same or another patient's records, with the clinician intending to edit the new note such that it accurately represents the new history, examination, assessment, and plan (26). When most of the copied note is accurate for the same patient in another encounter or for a different patient, and little or no editing is needed, copy/paste can save time and keystrokes. However, this is often not the case. There are too many examples of copying without editing that results in computer-generated notes with factual errors that are passed from note to note and old dates and values, such as vital signs and intake and output, that are not updated. As opposed to the documentation techniques mentioned earlier (macros, templates, and selective copy/forward), which add benefit with less risk, the copying and pasting of an entire note is inherently risky and should be avoided. We are concerned that, in reaction to clear abuses of copy/paste, regulators and health care institutions will attempt to put a blanket ban on all documentation methods where the documenter is not uniquely generating text in each document. Use of any documentation tool by itself should not be considered evidence of improper documentation practice. More study is needed to separate valuable uses of documentation tools from abuses of them. That said, if clinicians carry forward previously generated templates, default verbiage, or information (via copy/forward or macro-generated text), they must exercise caution such that what is documented is accurate and reflects the history, findings, and decision making for that visit. Furthermore, when leveraging templates, default verbiage, or previously documented information, the documenter should not create contradictory information or excessive documentation (beyond what is necessary for defensive medicine, regulatory purposes, quality measurement, and compliance with an appropriate E&M code).

The College further recommends that CMS, other payers, and other organizations that have issued blanket guidance against note cloning reexamine their existing guidance, which equates and confuses the method with the end result.

*E. Effective and ongoing EHR documentation training of clinical personnel should be an ongoing process.*

Recent evidence shows that the quality and quantity of training and support can significantly affect the ability of staff to make optimal use of the system. Additional training is required with every system upgrade. Inappropriate data entry practices can be reduced by thorough training combined with well-thought-out institutional policies that balance local compliance requirements with support for efficient documentation.

*3. As value-based care and accountable care models grow, the primary purpose of the EHR should remain the facilitation of seamless patient care to improve outcomes while contributing to data collection that supports necessary analyses.*

The data needs of large, complex entities could result in additional data collection requirements for physicians and their clinical teams that detract from the core workflow processes associated with direct patient care. To the extent possible, metrics designed to support analyses of quality and value should leverage data collected in the usual course of patient care, with appropriate attention to privacy and other ethical concerns, rather than requiring clinicians to take extra time to collect structured data not essential to patient care. When data are required beyond those that are generated as a consequence of care delivery, clinicians, practices, and health care systems should be compensated for time spent collecting these additional data.

*4. Structured data should be captured only where they are useful in care delivery or essential for quality assessment or reporting.*

To preserve the integrity of the patient narrative, requirements for capture of structured data should be kept to a minimum. Structured data should never take the place of narrative comments when such data change the meaning of the patient's narrative. Physicians should not be required to code data elements for third parties that are not essential for the provision of safe, high-quality, and high-value care. Coding and structured data entry by physicians or staff should only be considered in cases where the value of the coded element is extremely high and the data element cannot be readily abstracted from the note with sufficient accuracy by using natural language processing, which involves computer-based abstraction and coding of terms from narrative text (19).

*5. Prior authorizations, as well as all other documents required by other entities, must no longer be unique in their data content and format requirements.*

Reasonable information required for most prior authorizations for testing and treatment purposes should

be part of most clinical documentation. When that information exists, payers and others who have prior authorization requirements should modify their requirements to use the relevant data collected during the provision of care rather than requiring redundant data collection solely for the purpose of completing prior authorization forms. Payers should collaborate with medical societies and other interested stakeholders to define what data points are most important for prior authorization requirements.

6. *Patient access to progress notes, as well as the rest of their medical records, may offer a way to improve both patient engagement and quality of care.*

Studies of open notes have shown improved engagement of patients in their care, and patient review provides a new form of peer review to improve accuracy in documentation (27). However, it is too early to push for broad implementation. Although the study and use of open notes should be expanded, providers should have the option of "opting out" individual notes from automatic release in the small percentage of cases where such release could be harmful to the patient.

7. *The College calls for further research to:*

A. *Identify best practices for systems and clinicians to improve accuracy of information recorded and the value of information presented to other users.*

B. *Study the authoring process and encourage the development of automated tools that enhance documentation quality without facilitating improper behaviors.*

C. *Understand the best way to improve medical education to prepare new and practicing clinicians for the growing uses of health information technology in the care of patients and populations and to recognize the importance of their responsibility to document their observations completely, concisely, accurately, and in a way that support their reuse.*

D. *Determine the most effective methods of disseminating professional standards of clinical documentation and best practices.*

### **Policy Recommendations for EHR System Design to Support 21st-Century Clinical Documentation**

1. *EHR developers need to optimize EHR systems to facilitate longitudinal care delivery as well as care that involves teams of clinicians and patients that are managed over time.*

The primary purpose of a health record is to support care delivery over time and across all venues in which patients receive care, including such new processes as shared decision making, care coordination, and the delivery of high-value care. Vendors need to improve the ability of systems to capture and manage

structured data as well as thought processes, descriptions, speculations, opinions, and uncertainties. Important elements of documentation, such as the patient narrative and differential diagnosis, cannot be lost as a consequence of overstructuring or underdesigning the user interface (28). The needs of medical practice should drive the development of EHRs and not the reverse (29).

2. *Clinical documentation in EHR systems must support clinicians' cognitive processes during the documentation process.*

Clinicians must be able to view related information without having to navigate away from a window in which they are working (30). Each data element needs to be examined and assessed for a more automated and accurate way to capture that element. More easily generated hybrid notes that include narrative as well as some template-driven components (such as duration, ameliorating or exacerbating factors, or pattern) might be a significant improvement over many available documentation options. Electronic health record systems must enable collection of data and interpretation of information from multiple sources by clinicians as appropriate and necessary, including nuanced medical discourse, structured items, and data captured in other systems and devices (30).

In addition to cognitive support, EHR vendors need to make sure that the technology options include reasonable accommodations for expected partial disabilities, such as various arthritic conditions, the carpal tunnel syndrome, vision and hearing loss, and cervical spine disease.

3. *EHRs must support "write once, reuse many times" and embed tags to identify the original source of information when used subsequent to its first creation.*

Electronic health record systems must allow clinicians to easily search available data during note writing and must give the option of linking content from prior entries or copy/paste with appropriate tags. To the extent that the reusability of the collected data is increased, the need to collect additional data for secondary purposes will be decreased. This will benefit everyone involved (31).

4. *Wherever possible, EHR systems should not require users to check a box or otherwise indicate that an observation has been made or an action has been taken if the data documented in the patient record already substantiate the action(s).*

Some systems require documentation of the same content multiple times. For example, even though a member of the clinical team records measures of height, weight, and blood pressure during patient intake, some EHR systems require physicians to check a separate box to show that they screened for high blood pressure and obesity. Because of the complex and variable nature of many clinical activities, there will always

be some need to document a set of actions and then acknowledge that they were documented, but these should be minimized to the extent possible. The EHR should auto-attest to the clinician's use of the record. If the physician reviewed the laboratory result, the EHR should record and attest to this behind the scenes in a way that satisfies compliance, audit, and billing requirements rather than requiring the physician to redundantly pull information from one part of the record into the visit note for billing justification or to redundantly report all of the screening tests within the record that were reviewed.

5. *EHR systems must facilitate the integration of patient-generated data and must maintain the identity of the source.*

This will require that the provenance of all data in the clinical record is recorded and managed along with the data (18). Physicians and other health care professionals must be able to trust the data, which means that they must be able to understand the source of and the route taken by all data. Electronic health record systems should support joint patient-provider decision making, team collaboration, care process management, and advanced CDS (19).

## Summary

Electronic health records should be leveraged for what they can do to improve care and documentation, including effectively displaying prior information that shows historical information in rich context; supporting critical thinking; enabling efficient and effective documentation; and supporting appropriate and secure sharing of useful and usable information with others, including patients, families, and caregivers. These features are unlikely to be optimized as long as the format and content of clinical documentation are primarily based on coding and other regulatory requirements. Furthermore, under these circumstances, EHRs lose much of their potential to improve care and documentation and instead are relegated to doing nothing that could not be done with paper records—only less efficiently.

We are in danger of repeating history by overstructuring the clinical record and overloading it with extraneous data (2). Physicians must learn to leverage the enormous and growing capabilities of EHR technology without diminishing or devaluing the importance of narrative entries. Failure to do so will inevitably influence the way we think and teach, to the detriment of patient care.

Cooperation is needed among industry health care providers, health care systems, government, and insurers to continue to improve the documentation. We must work together to fundamentally change the EHR

from a passive recipient of information to an active virtual care team member.

## Web-Only References

3. U.S. Department of Health and Human Services, Office of Inspector General. Coding Trends of Medicare Evaluation and Management Services. Washington, DC: U.S. Department of Health and Human Services; 2012. Accessed at <http://oig.hhs.gov/oei/reports/oei-04-10-00180.asp> on 27 October 2014.
4. Abelson R, Creswell J, Palmer G. Medicare bills rise as records turn electronic. *The New York Times*. 21 September 2012:A1. Accessed at [www.nytimes.com/2012/09/22/business/medicare-billing-rises-at-hospitals-with-electronic-records.html](http://www.nytimes.com/2012/09/22/business/medicare-billing-rises-at-hospitals-with-electronic-records.html) on 27 October 2014.
5. Siegler EL. The evolving medical record. *Ann Intern Med*. 2010;153:671-7. [PMID: 21079225] doi:10.7326/0003-4819-153-10-201011160-00012
6. Blumenthal D. Wiring the health system—origins and provisions of a new federal program. *N Engl J Med*. 2011;365:2323-9. [PMID: 22168647] doi:10.1056/NEJMs1110507
7. Walker J, Darer JD, Elmore JG, Delbanco T. The road toward fully transparent medical records. *N Engl J Med*. 2014;370:6-8. [PMID: 24304001] doi:10.1056/NEJMp1310132
8. Weed LL. Medical records that guide and teach. *N Engl J Med*. 1968;278:593-600. [PMID: 5637758]
9. Weed LL. Medical records that guide and teach. *N Engl J Med*. 1968;278:652-7. [PMID: 5637250]
10. Berenson RA, Basch P, Sussex A. Revisiting E&M visit guidelines—a missing piece of payment reform. *N Engl J Med*. 2011;364:1892-5. [PMID: 21591942] doi:10.1056/NEJMp1102099
11. Ejnes Y. English is the second language of medical documentation. *KevinMD.com*. 24 May 2013. Accessed at [www.kevinmd.com/blog/2013/05/english-language-medical-documentation.html](http://www.kevinmd.com/blog/2013/05/english-language-medical-documentation.html) on 27 October 2014.
12. Mechanic D. The uncertain future of primary medical care [Editorial]. *Ann Intern Med*. 2009;151:66-7. [PMID: 19581648] doi:10.7326/0003-4819-151-1-200907070-00012
13. Bates DW, Kuperman GJ, Wang S, Gandhi T, Kittler A, Volk L, et al. Ten commandments for effective clinical decision support: making the practice of evidence-based medicine a reality. *J Am Med Inform Assoc*. 2003;10:523-30. [PMID: 12925543]
14. Bright TJ, Wong A, Dhurjati R, Bristow E, Bastian L, Coeytaux RR, et al. Effect of clinical decision-support systems: a systematic review. *Ann Intern Med*. 2012;157:29-43. [PMID: 22751758] doi:10.7326/0003-4819-157-1-201207030-00450
15. Delbanco T, Walker J, Darer JD, Elmore JG, Feldman HJ, Levell SG, et al. Open notes: doctors and patients signing on. *Ann Intern Med*. 2010;153:121-5. [PMID: 20643992] doi:10.7326/0003-4819-153-2-201007200-00008
16. Slack WV, Kowaloff HB, Davis RB, Delbanco T, Locke SE, Safran C, et al. Evaluation of computer-based medical histories taken by patients at home. *J Am Med Inform Assoc*. 2012;19:545-8. [PMID: 22237866] doi:10.1136/amiajnl-2011-000580
17. Bachman JW. The patient-computer interview: a neglected tool that can aid the clinician. *Mayo Clin Proc*. 2003;78:67-78. [PMID: 12528879]
18. Ahern DK, Woods SS, Lightowler MC, Finley SW, Houston TK. Promise of and potential for patient-facing technologies to enable meaningful use. *Am J Prev Med*. 2011;40:S162-72. [PMID: 21521591] doi:10.1016/j.amepre.2011.01.005
19. Cusack CM, Hripcsak G, Bloomrosen M, Rosenbloom ST, Weaver CA, Wright A, et al. The future state of clinical data capture and documentation: a report from AMIA's 2011 Policy Meeting. *J Am Med Inform Assoc*. 2013;20:134-40. [PMID: 22962195] doi:10.1136/amiajnl-2012-001093
20. Embi PJ, Yackel TR, Logan JR, Bowen JL, Cooney TG, Gorman PN. Impacts of computerized physician documentation in a teaching hospital: perceptions of faculty and resident physicians. *J Am Med Inform Assoc*. 2004;11:300-9. [PMID: 15064287]

21. Hirschtick RE. A piece of my mind. Copy-and-paste. JAMA. 2006; 295:2335-6. [PMID: 16720812]
22. Lowes R. Cloned EHR notes jeopardize Medicare payment. Medscape Medical News. 25 September 2012. Accessed at [www.medscape.com/viewarticle/771548](http://www.medscape.com/viewarticle/771548) on 27 October 2014.
23. Cimino JJ. Improving the electronic health record—are clinicians getting what they wished for? JAMA. 2013;309:991-2. [PMID: 23483171] doi:10.1001/jama.2013.890
24. Mamykina L, Vawdrey DK, Stetson PD, Zheng K, Hripcsak G. Clinical documentation: composition or synthesis? J Am Med Inform Assoc. 2012;19:1025-31. [PMID: 22813762] doi:10.1136/amiajnl-2012-000901
25. Foote RS. The challenge to the medical record. JAMA Intern Med. 2013;173:1171-2. [PMID: 23712375] doi:10.1001/jamainternmed.2013.976
26. Rattner S, Mathes M, Siegler E, Snyder L, Barclay L, Zawahir N, et al. American College of Physicians ethics case studies: copied, pasted, and misdiagnosed (or cloned notes and blind alleys). Medscape. 2012. Accessed at [www.medscape.org/viewarticle/763617](http://www.medscape.org/viewarticle/763617) on 27 October 2014.
27. Delbanco T, Walker J, Bell SK, Darer JD, Elmore JG, Farag N, et al. Inviting patients to read their doctors' notes: a quasi-experimental study and a look ahead. Ann Intern Med. 2012;157: 461-70. [PMID: 23027317] doi:10.7326/0003-4819-157-7-201210020-00002
28. Sinsky CA, Hess J, Karsh BT, Keller JP, Koppel R. Comparative User Experiences of Health IT Products: How User Experiences Would Be Reported and Used. Washington, DC: National Academies Pr; 2012.
29. Sinsky CA, Beasley JW, Simmons GE, Baron RJ. Electronic health records: design, implementation, and policy for higher-value primary care. Ann Intern Med. 2014;160:727-8. [PMID: 24842418] doi: 10.7326/M13-2589
30. Chen ES, Cimino JJ. Patterns of usage for a Web-based clinical information system. Stud Health Technol Inform. 2004;107:18-22. [PMID: 15360766]
31. Rosenbloom ST, Denny JC, Xu H, Lorenzi N, Stead WW, Johnson KB. Data from clinical notes: a perspective on the tension between structure and flexible documentation. J Am Med Inform Assoc. 2011; 18:181-6. [PMID: 21233086] doi:10.1136/jamia.2010.007237