

TECHNOLOGY UPDATE

CLINICAL UPDATE IN CLINICAL INFORMATICS: PART I

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At this year's 2018 SGIM Annual Meeting, we presented a Clinical Update in alignment with the meeting theme of Health Information Technology (IT): Clinical Informatics. Clinical Updates at the annual meeting are opportunities to highlight in 60 minutes important published papers in the preceding year on a certain topic, and in the format of clinical vignettes. This article is the first of a series, each written as a narrative review, that summarizes key papers that we presented about clinical informatics for generalists.

Introduction

For the Clinical Update, we focused on literature in six subtopics of clinical informatics:

- **desktop medicine**
- **policy recommendations on electronic health records (EHR) and health IT**
- **clinical decision support**
- **population health**
- **mobile devices in clinical care**
- **mobile devices in clinical research informatics**

In this series in *SGIM Forum*, we will summarize and provide references for further reading on each topic in more depth than was possible during the live session. This first article in the series focuses on desktop medicine, its universal and global nature, how it is categorized and quantified, and briefly notes ongoing efforts to address its burden and consequences.

Methods

We searched titles and abstracts from five journals, published between March 2017 and March 2018, for original research, reviews, and research letters. These five journals were selected as having the highest likelihood of publishing informatics studies that would be most relevant to general internal medicine physicians: *Journal of the American Medical Informatics Association*, *Applied*

Clinical Informatics, *Annals of Internal Medicine*, *JAMA Internal Medicine*, and *Journal of General Internal Medicine*.

Additional papers published in other journals or up to two years prior to the annual meeting were included if they were particularly impactful in one of the key theme areas identified for this Clinical Update.

Case Vignette

Dr. van Laar finishes her fully booked clinic schedule. Even though she had two no-shows, she just barely stayed on-schedule between office visits, care coordination, and follow-up on urgent same-day results. She now has patient phone calls to do, secure messages to respond to, and new results to address in her electronic inbox. Clinical documentation from appointments and phone calls are also incomplete.

Desktop Medicine

The vignette describes a scenario familiar to general internists, who bear growing administrative burdens that manifest as increased time spent on desktop medicine and reduced time spent on patient care. *Desktop medicine* consists of activities such as communicating with patients through a secure patient portal, responding to patients' online requests for prescription refills or medical advice, ordering tests, sending staff messages, and reviewing test results.¹

The greatest concern is that added time performing administrative tasks translates to lost time for humanism and empathy. Distractions produced by the EHR can erode these qualities of a physician-patient relationship, which Sulmasy, et al., noted in the March 2017 *JGIM* on ethical implications of EHRs and makes recommendations focusing on how EHR use must be in service of the patient.² In May 2017, the American College of Physicians described seven public policy statements and recommendations as strategies aligned with the mindset

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of Patients Before Paperwork, also an ACP campaign to reduce administrative burdens.³

Several studies were published 12 months prior to the Annual Meeting that tabulated physicians' desktop medicine time and patient care time. Methods used either a time-motion study approach, akin to Sinsky, et al., original study published in 2016,⁴ or EHR timestamps or audit logs to passively monitor physicians' distribution of time. Time-motion studies involve direct observations and presumably offer the most accurate possible measurements of time spent on certain activities, but limitations include the time-consuming nature of the method (i.e., an individual is observing the physician's work) and the Hawthorne effect (i.e., the physician's behavior changes due to the presence of an observer). EHR timestamps and audit logs can be a useful, scalable means for measuring visit time, but suffer limitations that stem from a lack of direct observation: measures of time are imprecise (e.g., if a physician does not log in to the EHR during a patient visit), may be overestimated (e.g., if a physician forgets to log out of the EHR), and do not represent all possible desktop medicine activities (e.g., time a physician spends talking on the phone).

One study of a large accountable care organization in California examined EHR logs using timestamps and time allocation data in an EHR in order to track physician time spent on desktop medicine tasks.¹ EHR logs from more than 637,000 outpatient visits done between 2011 and 2014 by 471 primary care physicians were studied. Among their findings, physicians' time was about evenly split between during clinical time, with 3.08 hours spent face-to-face and 3.17 hours performing desktop medicine tasks.

At Geisinger, audit logs were used to analyze workflow for >36,000 primary care encounters that occurred from January 2009 to June 2011

at 26 clinic locations at Geisinger Clinic.⁵ Interestingly, this study found that time spent with patients was on average longer before 10:00 a.m. (16.3 minutes) compared to after that time (15.4 minutes or less).

In time-motion study of Swiss residents, 36 internal medicine residents were observed (696 hours in total) and categorizing what activity they performed and where. This study found that they spent an average of 1.7 hours per day with patients and an average of 5.2 hours per day using computers.⁶ Fifty-two percent of their time was spent on indirect patient activities, while only 28.0% was on direct patient activities.

A study in Amsterdam, the Netherlands, involved observing 24 residents of various specialties at two academic centers (more than 162 hours of observation in total) and categorizing their activities as documentation, patient care, peer communication, and other activities.⁷ This study found that 38% of residents' time was spent on administrative tasks, 37% on educational activities or collaborative meetings, and only 13% on direct patient contact. Further, the observations were performed before and after implementation of a structured EHR and concluded that documentation time had increased by at least 8.3%, which translates to about one additional minute per 11-minute visit.

Discussion

In summary, studies confirm what we anecdotally experience: Face-to-face time with a patient is between 13%⁷ to slightly above 50%¹ of a physician's time (higher would be desirable). About one-third more to than one-half of a physician's time is spent performing desktop medicine tasks.⁴⁻⁷ These are fairly consistent findings, regardless of method of study, EHR vendor, or country.

Administrative demands are typically driven by billing and coding requirements, regulatory require-

ments such as care quality reporting, patient safety surveillance, and, further, increasingly for research and other secondary uses. Although a direct causal relationship between EHR use and burnout is difficult to quantify, it has already become a generally accepted phenomenon via unintended natural experimentation and observation. One study published in the 12 months prior to the Annual Meeting sought to quantify this relationship and through a cross-sectional survey found statistically significant relationship between EHR alert burden and physical fatigue and cognitive weariness.⁸

It is important to highlight that these administrative burdens also impact residents, which is concerning for a variety of reasons. As learners in early career and professional development stages, their entire future career still lies ahead of them. If untenable and growing administrative burdens continue, this portends potentially serious long-term consequences relating to the long-term sustainability of the physician workforce.

In terms of solutions, streamlining documentation has become the greatest target for improvement, given its role as the most time-consuming burden of all types of desktop medicine tasks. A variety of possible solutions may lie ahead, some of which are in different stages of maturity. In the short-term, the use of medical scribes via phone or in-person offer physicians a way to free up their attention for the patient. Other alternatives consider speech recognition instead of keyboard and mouse usage for data entry,⁹ or engaging patients in co-production of content for documentation.¹⁰ Lastly, there are industry-academia collaborations towards developing artificial intelligence (AI) based solutions, including virtual scribes (also called digital or AI scribes) to facilitate clinical documentation. These are the most promising technologies for

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redistributing generalists' time and attention to focus on direct patient care, yet are also the least mature in development, evaluation and implementation.

The next article in this series will focus on policy recommendations for electronic health records (EHR) and health information technology.

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