At the center of the galaxy

The integrative role of medical progress notes

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Abstract. Studies of the medical record have generally taken the progress notes as just one entity among many. In contrast, we argue that progress notes are a coordinative artifact of a rather special kind that constitute the core of the medical record, in which physicians organize and summarize the immense amount of data that is available in the modern hospital environment. The study we report indicates that narrative plays a fundamental role in the way physicians document their findings and thoughts in the progress notes, because it allows them to not only record "facts" but also – by filtering, interpreting, organizing and qualifying information – to impose some order on events. Furthermore, we show how physicians use the progress notes to question available information, speculate about possible or plausible reasons for why something has happened, and suggest appropriate lines of action. This insight has important implications for the design of EMR systems.

Introduction

The integration of clinical documentation (i.e. information about a patient's symptoms, diagnosis and treatment) into electronic medical record (EMR) systems is a controversial issue. Researchers and designers of EMR systems have for decades been working at limiting physicians' use of so-called "free text" in the medical record and replacing it with codes or "structured data" (Rosenbloom et al., 2010). However, clinicians generally value the efficiency, flexibility and expressivity of "free text" and they find that structured data entry is too restrictive and time-consuming (Rosenbloom et al. 2011; Siegler & Adelman 2009). In this short paper, we want to shed some light on this issue by taking a closer look at the

role, content and form of the key "free text" artifact in the traditional, paper-based medical record, namely the progress notes.

The medical record is immensely complex and variegated. As an ordering system – comprising a heterogeneous and distributed assembly of specialized representational and coordinative artifacts and protocols – the medical record is adapted to support the high degree of specialization of clinical work. The core of the medical record is constituted by the progress notes, a coordinative artifact of a rather special kind. It consists of a consecutive series of prose texts, a reiterative, cumulative manuscript written sequentially by doctors to support and document their own medical reasoning, and to inform other physicians. (Poirier and Brauner, 1990; Hobbs, 2003). Our investigation shows that the progress notes are part and parcel of an open-ended, enormously variegated and essentially contingent epistemic process unfolding in time. (Bång and Timpka, 2003). The progress notes are a medium of the integrative discourse in which the ensemble of clinicians collaboratively make sense of the multitudes of artifacts associated with the medical record and express what they collaboratively take to be the state of the patient's illness and what they think needs to be done at the time of writing.

In this paper, we briefly present some results from an analysis of a series of paper based progress notes produced during a five days acute hospitalization of an elderly man diagnosed with *paroxystic atrial fibrillation*, which is a type of irregular heartbeat that occurs only occasionally. During these five days, the physicians produced 13 pages of typewritten progress notes. We focus, in particular, (1) on identifying the structural, linguistic and substantive conventions or "genre rules" (Yates and Orlikowski, 1992) that guide the composition of progress notes, and (2) on highlighting how the physicians use case-narratives to make sense of the available evidence, construct plausible cause-and-effect relationships, and express degrees of certainty and uncertainty in very nuanced and subtle ways.

The Progress notes

The Progress notes were dictated digitally by the physicians after examining the patient and later typed by a medical secretary, printed out and added to the patient's medical record. The notes were recorded daily or several times a day. They describe the patient's rapidly shifting conditions and the treatment given as well as the physicians' thinking about what is going on and what is planned.

The format of the notes is concise. The notes are written in medical language using highly specialized terminology as well as shorthand, acronyms and abbreviations – some of which are standardized and common while others are more local and idiosyncratic. Therefore, understanding the text requires a great deal of background knowledge concerning not only common medical terms and procedures, but also local circumstances and resources. As pointed out by Hobbs

(2003), progress notes are a "condensed text" in which "the reader's background knowledge supplies the cohesion that is provided by explicit linkage in other contexts" (Hobbs, 2003)

The main body of the notes is, as a guide for readers, divided into sections with relatively standardized headings, and indentations are used to accentuate prescriptions and orders and make it easy to spot them in text. The composition of the notes follows a common pattern. They are organized into the following sections (1) past medical history, (2) history of present illness, (3) laboratory data, images and results from the physical examination of the patient, (4) assessment and (5) plan. However, the progress notes we studied were written in a variety of formats and varied much in length and detail. The substance, organization and style varied from one medical specialism to another. Each group of specialists – while adhering to the conventions of the progress note genre – addressed "concerns that reflect the unique philosophy and skills of that professional group" (Poirier and Brauner, 1990) and constructed noticeably different clinical narratives, each foregrounding certain events and types of data. The cardiologists, for instance, focused on cardiovascular disease and honed in on such issues as blood pressure, heart rate and stroke volume, while the ICU physicians had a broader perspective, taking a more systemic approach to treatment. The progress notes embody the complexity of medical work in the hospital setting and, consequently, lack "the ultimate cohesiveness of a single author or point of view" (Poirier and Brauner, 1990).

It is characteristic of the progress notes we have analyzed that doubt, uncertainty and ambiguity were very much present in them. Physicians must regularly act upon uncertain, incomplete and even contradictory evidence and the process of diagnosis and treatment is therefore, in the words of Poirier and Brauner, often "fraught with ambiguity and inconclusiveness" (Poirier and Brauner, 1990). This essential uncertainty of medical practice was reflected in the physicians' writing. They were clearly wary of drawing unfounded or premature conclusions about the source of the patient's problems and, consequently, they often presented their hypotheses and conclusions as tentative and provisional, for instance by hedging their statements with adverbs such as "possibly," "probably" and "presumably."

Furthermore, the physicians carefully expressed their degree of trust in the recorded information by marking it for both source and mode of knowing (factual, firsthand or reported) and, sometimes, even by explicitly questioning its trustworthiness. They did so by following writing conventions that "key grammatical forms to the sources of information" (Hobbs, 2003). The patient's own report of his or her symptoms was, for instance, marked as indirect discourse, while information stemming from other health professionals was reported in the agentless passive voice. So-called objective information, that is, information

which is “deemed to be directly observable or independently verifiable” (Hobbs, 2003), was reported as facts.

Implications for EMR design

Progress notes are not a literal recording of everything that happen along the patient’s illness trajectory, but rather a highly selective account of events, findings, and thoughts, as seen from a certain perspective. They function as a cognitive artifact that facilitates memory and recall and they enable collaborative sensemaking and coordination of actions in a highly complex, distributed work practice. The conventions guiding their form and substance have developed over more than a century and today they play a fundamental role in medical practice. The research problem is to understand the ‘logic’ underlying the discourse as represented by the progress notes in the context of the orbiting documents.

This insight has important implications for the design of EMR systems. To be truly useful in clinical practice, they must accommodate physicians’ need for composing, storing and sharing medical narratives, hypotheses, reflections, elaborations, plans of action, etc. in a straightforward and flexible way. There are, however, also good reasons for adding more structure to the medical record in order to allow for reuse and automatic processing of data. So it is not a question of either-or, but a question of striking an appropriate balance between structure, in the form of structured text and codified data, and expressivity, in the form of narrative text. Yet, exactly how to do this is the challenge for EMR designers. In other words, the question is: what should be the role and format of progress notes in the EMR

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