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Structured Data Entry of Cross-Coverage Notes Using a PDA

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Introduction

Fast, convenient and reliable clinical data entry by clinicians has long been a major challenge. A number of approaches have been developed and applied in different clinical information systems. Speech recognition, descriptional knowledge, template-driven forms, and XML structured data entry are possible solutions, but each has its limitations in different contexts.[1,2] At Columbia-Presbyterian Medical Center, clinicians routinely use our Web-based Clinical Information System (WebCIS) to write and review cross-coverage notes (called *sign-out notes*) to facilitate transfers in patient care. Our group has begun studying the clinical content of sign-out notes and ways to store that content in a structured form. Once in structured form, specific details, such as admission diagnoses, medications, allergies, and responsible providers, can be automatically extracted to help meet clinicians' information needs[3,4] and support clinical alerting systems.

We are exploring ways to improve the capture of sign-out notes using a hand-held wireless device that provides clinicians with access to PalmCIS, our handheld extension of WebCIS. Mobile, hand-held devices provide certain advantages over desk-bound applications by being available at the point of care and supporting structured data entry. However, they are less suited for entry of longer, text-based notes. We have therefore developed a hybrid approach that allows sign-out notes to be written either as free text (in WebCIS) or structured text (in PalmCIS) and then be reviewed and modified using either system.

Sign-out Note Structure

We analyzed 100 sign-out notes (mean length 85 words) to identify the most common structural keywords, in order to determine headings for structured data entry. We found that the text could be partitioned into seven common headings: history of present illness (HPI), medications (MEDS), allergies (ALL), primary medical doctor (PMD), advanced directive status (Full Code, DNR, etc.), intravenous orders (IV) and culture orders (CX).

System Architecture

If the first sign-out note for a given patient is written using WebCIS, it is stored in the clinical data repository (CDR) in an unstructured form; if the note is written using PalmCIS, it is stored as structured text. When a sign-out note is retrieved by PalmCIS, a parsing program then structures the sign-out note into the seven main sections mentioned above (obviously, this is easier if the note was originally written with PalmCIS). This note is presented on the PDA (see figure) in an editable text field where clinicians can make changes. The edited note is then stored in the CDR. If the note is reviewed in WebCIS, it appears as structured text.

Discussion

Our system allows sign-out notes to be progressively structured into semantically well-formed clinical notes. It also allows clinicians to write free text, preserving expressiveness, while giving them the option of structured entry to capture data rapidly. The improved structure should yield improved parsing using natural language processing to support reuse of the sign-out notes for decision support. Sign-out notes can now be updated through desktop and handheld systems, which offers greater convenience for data entry.

References

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