Identification of Inactive Medications in Narrative Physician Notes

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Abstract

Information about inactive medications is important for patient safety but is frequently missing from the electronic medical record. We investigated the feasibility of extracting this information from narrative physician notes.

Our analysis of 298 physician notes showed that 1 in 3 notes contains documentation of medication discontinuation. This documentation can be described by one of six semantic fields.

Documentation of inactive medications is common in narrative documents and could potentially be extracted using semantic analysis.

Introduction

Accurate medication information at the point of care is important for delivery of high-quality care and prevention of adverse events\cite{1}. Inappropriate administration of medications the patient no longer takes has a particularly high potential for adverse drug events; nevertheless, errors of this type are common in electronic medical records\cite{2}. Other sources of medication information (e.g. patients, insurance claims or pharmacies) can be helpful but may also be inadequate. Physicians are required to document all patient care they provide, including discontinuation of any medications, in narrative notes. We therefore carried out an assessment of feasibility of identification of discontinued medications through analysis of the text of physician notes in the electronic medical record.

Materials and Methods

We analyzed 298 outpatient physician notes randomly selected from the electronic medical record at Partners HealthCare in Boston, MA. Notes from all specialties were included. In the first step of the analysis a single reviewer identified all instances of documentation of inactive medications in the notes. We defined inactive medications as all medications that patient was documented to have taken at some point in the past but would not be taking by the time the visit described in the note was over. Both medications discontinued before and during the visit documented in the note were included. Medications previously discontinued but resumed during the visit were excluded. Medications that were discontinued due to an allergic reaction or an adverse event (including medications that were documented only as a part of the allergy list) were not included.

In the second step we analyzed all instances of documentation of inactive medications to establish semantic fields most commonly used for this purpose in the medical narrative. Lexical sets that comprised each field were identified. The study protocol was reviewed and approved by Partners Human Research Committee.

Results

The average size of the note analyzed was 1,886 bytes (range 3 to 9,006). A total of 96 instances of documented inactive medications were identified, on average 0.32 (range 0 to 7) per note.

Six semantic fields that were used to document discontinued medications were identified (Table 1).

<table>
<thead>
<tr>
<th>Semantic Field</th>
<th>Frequency (%)</th>
<th>Examples from the lexical set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>31</td>
<td>discontinue, stop</td>
</tr>
<tr>
<td>Date</td>
<td>20.7</td>
<td>&lt;med&gt; until &lt;date&gt;</td>
</tr>
<tr>
<td>Past</td>
<td>18.6</td>
<td>had been using, was on</td>
</tr>
<tr>
<td>Does not work</td>
<td>14.9</td>
<td>did not respond</td>
</tr>
<tr>
<td>Change</td>
<td>9.4</td>
<td>change to &lt;med2&gt;</td>
</tr>
<tr>
<td>Completed</td>
<td>5.4</td>
<td>finished &lt;med&gt;</td>
</tr>
</tbody>
</table>

Discussion

Missing information on discontinued medications is a common and serious problem with a high potential for adverse events. In this preliminary study we have shown that medication discontinuation is frequently documented in narrative physician notes in the electronic medical record. This documentation can be described by a limited number of semantic fields and therefore could potentially be extracted using semantic analysis of the document.

References