

Development of a Comprehensive Data Set of Information Items for General Dental Record

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Objective

The purpose of this study was to develop a comprehensive list of information items that could guide the design and content of computer-based patient records appropriate for general dentistry. The objective of this study was to identify and extract information content from de-identified patient records maintained by general dentists in the US. This study builds directly on a previous project, in which we analyzed the content of patient record forms. While the previous study only examined patient record format, this study focused on what dentists actually record.

Background

For more than a century dental patient records are used as a tool to document patient findings and to assist clinicians during patient care. As stated in the frequently quoted statement, “dentists and patients forget but good records remember”, complete and comprehensive patient records are essential to support the decision-making process and to perform outcomes research. Unfortunately current evidence suggests that dental records vary significantly in the degree to which they meet this standard. The scope and completeness of patient records differ among dentists, and many non-standardized and idiosyncratic approaches to documenting care are in use. Today as more and more dentists adopt electronic dental records to deliver patient care, it is

essential we address the question of what information needs to be documented and how should it be structured in an electronic patient record.

Study Design

Using the methodology developed in a previous pilot project, we completed this study by using the Baseline Dental Record (BDR - developed in a previous study), a structured collection of 363 data fields, to classify the information content of dental records. Our objective was to extract information items from a sample of 100 de-identified patient records from 10 general dentists across the US. From each of the participating dentists, we requested 10 de-identified patient records with varying complexities. Records were selected with a focus on varied patient conditions and types of treatment in order to capture a broad range of clinical information. In addition, records had to document care for active patients, be written in English, and include at least one finding (e.g. “cavitation m #13”) and/or one diagnosis (e.g. “generalized periodontitis”).

We were able to obtain 95 de-identified patient records from 11 general dentists across U.S. Two dental informaticians reviewed 76 records and extracted approx. 1,500 information items. After reviewing several records from dentists #10 and #11, no new information items were evident and the remaining records were not reviewed. Information items were identified in one of

two ways: explicit or implicit. An information item was explicit if it was identified by a label. For instance, the de-identified patient record format contained the phrase “Are you on special diet?” which indicated the presence of an information item termed Special Diet. Conversely, many information items, especially in progress notes and in free-text fields, were not labeled specifically, but could be inferred from the text. One example is the phrase “Patient is suffering from bipolar disease (manic depression),” which was contained in a generic information item labeled “Other condition/problems.” In this case, the reviewers defined the Implicit Information Item “Bipolar Disease” and added it to the BDR.

Once the raw list of information items was compiled, we organized it the same way the BDR was organized. However, this comprehensive list was more granular and hierarchical when compared to the BDR. Once the categorization of the information items was completed, a panel of four dentists reviewed this list to improve the organization and eliminate any redundant and non-relevant (for general dentistry) information items. As a result of this refinement, the total number of information items was reduced to approx. 1,100. The top level categories of the comprehensive list were organized based on the activity/process model specified in the *ANSI/ADA Specification 1000: Standard Clinical Data Architecture for the Structure and Content of an Electronic Health Record*. The section “Provide clinical services” of the process model covers the delivery of clinical care and is divided into four parts: (1) obtain clinical data, (2) determine health status, (3) determine service plan, and (4) deliver patient care.

Results

The entire list of 1100 information items were organized under approximately 177

information categories with a maximum of five levels of hierarchy. Our findings from this study indicated a noticeable increase in the number and type of information items compared to our earlier study. For instance, the medical history in the BDR had 120 information items, while the corresponding section in this comprehensive list has a total of 335. Other information categories with significant numbers of information items include clinical intraoral examination (174 information items), comprehensive oral history (126 information items), social history (109 information items), and medication history (54 information items). We also observed that participating dentists documented a lot of patient information as free text in the progress notes, which may partially be due to a lack of appropriate data fields/information items in the patient record format they used. A comprehensive specification of valid values for each information item was outside the scope of this project.

Conclusion

In the process of this study, we not only validated the BDR structure, but also extended it using information actually recorded in private dental practices. The resultant comprehensive list of information items once validated will serve as the main resource for the design and development of the electronic dental record information model.

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