Feasibility of Integrating Dental School Electronic Health Record Data to Facilitate Oral Health Research

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Abstract and Objective

There is a critical need or high quality data sources that can enable research, evidenced-based dentistry and improve patient care. In this project we determined the feasibility of integrating data from 3 dental school EHRs. The results suggest that dental EHR data may be a viable source for creating a large oral health dataset suitable for research.

Keywords:

Dental informatics, Data integrations, Electronic health records

Introduction

Americans make over 280 million dental visits per year and undergo more than 400 million dental procedures with a cost of over $120 billion.[1] Despite significant improvements in oral health over the last 2 decades, there is an urgent need to improve the evidence to justify many of these treatments, procedures and therapies. Secondary analysis of the data that reside in dental electronic health records (EHR) is a particularly appealing approach to facilitate research and generate new knowledge. The objective of this project was to determine the feasibility of extracting a limited set of data from three large dental schools in the USA, and determine the potential for integration. Although each of the dental schools use a common EHR system, data are collected, stored and used very differently posing challenges for data integration.

Methods

Three dental schools (UT Houston, Tufts and UCSF) conducted a pilot study in 2008 to determine feasibility of integrating data sources from their respective EHR systems. The first challenge was to obtain Institutional Review Board (IRB) approval at each of the three institutions. All three dental schools obtained IRB approval (exempt status) by February 2008 to share totally de-identified data, limited to one data set. Following IRB approval, each school's IT department exported specific data elements, including demographic and health history data, from all new patient encounters, comprehensive examinations and periodic oral examinations from pre-doctoral dental clinics at each institution from 8/1/06 to 7/31/07. The data was sent to UT-Houston for analysis and integration.

Results

It was found that during the 12-month period that the clinics in the three schools performed 11,910 new patient encounters and examinations. Due to a standardized terminology, dental procedures were easily integrated. An analysis of health history fields (also see Figure 1) showed that the number of history fields collected by an institution ranged from approximately 60 to 380 fields. A large portion of fields were coded using standard or common terminology, however, many fields were not, providing further challenges for semantic interoperability. In total we discovered the presence of 292 concepts, in which 29% were shared among all three schools.

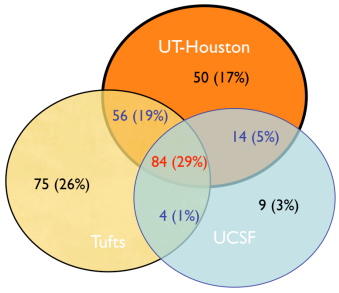

Figure 1-Degree of overlap of concepts from the medical history form in 3 dental EHR systems. (Numbers are counts)

Conclusion

Our preliminary work demonstrates that our dental schools can successfully export and combine a limited set of data from their EHR systems. Although the three dental schools used the same EHR, differences were discovered in fields such as those related to health history. Although our preliminary work has demonstrated the feasibility and our ability to integrate data with some significant effort, it is currently unclear what data In future work, we seek to integrate specific data elements from these four dental schools into a user-friendly and secure repository (i2b2).