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The Role of Medical Informatics in GIM Research

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Medical informatics could potentially facilitate general internal medicine (GIM) research, teaching, and patient care, yet many researchers are unaware of the advantages offered by the field. In an effort to highlight the utility of medical informatics in GIM research, we present the following research "pain point," a case in which a research investigator struggled to extract electronic data that were routinely collected and stored in the electronic health record (EHR).

Scenario

Benjamin Bearnot, a resident at Massachusetts General Hospital (MGH) in Boston, is interested in methods to better identify and treat patients suffering from addiction. Many of these patients are not correctly identified by physicians at admission and are treated for their overt medical conditions (e.g. withdrawal, Hepatitis C) but not for their underlying addiction. While treatment of the overt medical condition is important, treatment of the underlying addiction is essential to the proper care of the patient. In an effort to better identify addiction patients, Dr. Bearnot has searched for information routinely collected in the EHR that could be used to flag these patients and discovered that nurses at admission frequently collect the AUDIT-C, a three-item screening tool designed to identify patients with alcohol use disorder.[1] The features of this study are described below:

- *Goal*: 1) to describe the demographic and medical characteristics of patients who undergo AUDIT-C screening and to compare those who screen positive to those who screen negative and 2) to examine the subset of patients who are subsequently referred to addiction consultation services
- *Setting*: MGH, a 999-bed medical center located in Boston, MA
- *Population*: All inpatient admissions to an internal medicine floor at MGH

Dr. Bearnot and colleagues determined that AUDIT-C data were collected and stored within the EHR, but they did not know how to extract these data. As far as they knew, the only way to collect the data would be to perform a chart review. It would be preferable to download the data as a spreadsheet so that they could be analyzed using statistical software.

Assessment

The problem faced by Dr. Bearnot and colleagues is a common one among clinical investigators not versed in data extraction methods involving EHRs. Many clinical investigators, after receiving appropriate institutional review board approvals, resort to sitting in front of a computer screen and conducting a chart review by sheer brute force. There are many problems with this approach. First, it is time consuming. Most of these investigators are busy clinicians whose time would be much better spent considering what the data mean rather than trying to recollect data that have already been collected. Second, it invites error. These individuals may make errors in re-recording the data that were not present in the original record. Third, it is very difficult to collect all relevant data on a statistically meaningful sample of patients due to the sheer effort required. Fourth, it raises issues about how the data are cleaned and interpreted that are better addressed at the analytic stage rather than during initial recording. Specifically, investigators are often tempted to simplify or interpret data at the point of data extraction and may not be consistent in how this is done. Finally, by failing to learn how to systematically extract data from the EHR, investigators doom themselves to the same painful process the next time they want to answer an important clinical question.

Intervention

After Dr. Bearnot discussed the pain point with senior informatics researchers at MGH/Partners Healthcare, a data extraction tool was repurposed for this project. The tool was used to extract the AUDIT-C data from the Clinical Application Suite at MGH, which houses several applications in the MGH EHR, including the order entry system, results viewer, and list management system. Responses were extracted in a coded manner, allowing for analysis of the data in a number of meaningful ways, including association with referral data. This represents a secondary use of nursing data, which leverages routinely collected clinical data within the EHR for the investigation of important research and quality improvement questions.

Reference

1. Bush K, Kivlahan DR, McDonell, MB, Fihn SD, Bradley KA. The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Arch Intern Med 1998; 158(16):1789-95.   *SGIM*