What is the impact of electronic health records on the quality of health data?

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Electronic health records (EHRs) have the potential to improve patient safety, and the efficiency and effectiveness of healthcare delivery. However, the adoption of EHRs has raised both clinical and administrative concerns about data quality. A number of research papers published in the Health Information Management Journal (HIMJ) have explored the quality of health data in this context. For example, Paul and Robinson (2012) highlighted such concerns in their discussion of the impact of poor documentation of drug allergy in the patient’s medical record, the under-reporting of adverse drug reactions and incomplete coding. Another study examined mortality data, an essential element for health service planning, where poor quality of cause of death coding was attributed in part to documentation errors in death certificates (Haghighi et al. 2013). An evaluation of the treatment of swine flu in 2009 in Iran concluded that missing information in patients’ medical records made it impossible to evaluate the efficacy of the treatment (Hanafi et al. 2012). Population-based data can be compromised, as shown in a study of the Victorian Perinatal Data Collection, where there was under-reporting of a number of conditions (Davey et al. 2013). Conversely, awareness by researchers of the high quality of a national dataset has been suggested as a possible contributor to increased use, further enhancing the value of the data (Freestone, Williamson & Wollersheim 2012). Studies have shown, therefore, that the quality of data in EHRs and national health datasets has the potential to impact not only on healthcare delivery and patient outcomes, but also on research output. Further research is required to assess the quality of data in EHRs to inform strategies for improving quality. This would then maximise the potential of EHRs to facilitate improved patient outcomes.

When investigating the quality of health data, two key issues need to be addressed: the specific characteristics or dimensions of data quality; and how data quality is assessed or measured. A comprehensive set of data quality dimensions are proposed by the American Health Information Management Association (2012) and these provide a useful guide for those interested in examining data quality. These dimensions are particularly relevant in the electronic health record environment and include: accuracy (the extent to which the data are free of identifiable errors); accessibility (data items are easily obtainable and legal to access with strong protections and controls built into the process); comprehensiveness (all required data items are included); consistency (the extent to which the data are reliable and the same across applications); currency (the extent to which data are up-to-date); definition (the specific meaning of a healthcare-related data element); granularity (the level of detail at which the attributes and values of data are defined); precision (data values should be strictly stated to support the purpose); relevancy (the extent to which data are useful for the purposes for which they were collected); and timeliness (whether the data are available within a useful time frame).

When investigating data quality it is important to clarify which method or combination of methods is appropriate to assess this quality. There are a number of methods used to assess data quality. Examples of methods are: ‘gold standard’, where data from another source are used as the gold standard; ‘data element agreement’, where two or more elements within an EHR are compared to see if they report the same or compatible information, and ‘element presence’ where a determination is made as to whether or not a desired data element is present (Weiskopf & Weng 2013).

The EHR, with its advanced storage, accessibility and linkage capacities, can be leveraged to reduce diagnostic errors by providing quick access to information, the ability to share assessments in real-time between clinicians and with patients and advanced capabilities to follow-up test results and track medications, whilst also providing access to electronic sources of knowledge information at the point of care (Schiff & Bates 2010). Even though EHRs have enormous potential, data quality in this environment poses particular challenges. For example, it has been suggested that structured documentation in templates and the use of check boxes can reduce the richness and completeness of the patient history narrative. Comprehensive documentation of the first patient examination and past history is considered to be a critical element to assess the clinical picture of the patient, which is then used when making the initial diagnosis and plans for treatment. Will templates and
check boxes suffice for this? Although the patient's health record is a legal document used for research and education, the central role of clinical documentation in the health record 'should be to clearly describe and communicate what is going on with the patient' (Schiff & Bates 2010). The EHR should facilitate, not hinder, communication between health professionals and support their decision making regarding diagnosing, testing and treating patients. One area where EHRs have been suggested as assisting communication has been with electronic discharge summaries. It has been recommended that electronic multidisciplinary discharge summaries would improve the quality and timeliness of communications between GPs and hospital doctors regarding lung cancer patients (Rowlands, Callen & Westbrook 2012). Further research is required, however, to ensure the quality of electronic discharge summaries, particularly with regards to the inclusion of all test results, current medications and follow-up details.

The quality of the data, in all its dimensions (e.g. accuracy, accessibility), is therefore essential to ensure clinicians and patients value, trust and use the EHR. Inaccuracies and missing data can lead to diagnostic and treatment errors with subsequent adverse impacts on patient outcomes and the cost of healthcare delivery. Data quality in EHRs is therefore an area which urgently requires further research. We currently do not have sufficient evidence to answer the question: What is the impact of EHRs on the quality of health data? Any such research should clearly specify which dimensions of data quality are being assessed and what method is being used to evaluate the quality. A systematic review of studies that have examined data quality in EHRs, and ways in which data quality can be assessed (e.g. gold standard or data element agreement), would provide a useful baseline and highlight areas where further research needs to be undertaken.

References


