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Transformation of VHA health data into clinically useful information to provide quality veteran care

The Veterans Health Administration (VHA) is the largest integrated healthcare system in the United States, caring for nearly 6 million of the nation's 23 million veterans annually. VHA provides a full range of primary care, mental health, medical specialty, surgical, and rehabilitative services to enrolled veterans. It employs over 240,000 staff (including 65,000 health professionals) and manages over 1,400 sites of care (medical centers, outpatient clinics, nursing homes, and counseling centers). The critical need for a comprehensive electronic medical record system is demonstrated by the observation that approximately 130 million outpatient encounters, 600,000 hospitalizations, over 400 million laboratory tests and radiological procedures, and 170 million prescription fills are provided annually. In addition, nearly 1 billion clinically related free-text notes are recorded annually, representing a small fraction of the total electronic data collected over the past two decades.

VHA's effective use of health information technology for patient care and healthcare administration, combined with expert data analyses by VHA researchers and managers, has been an important contributing factor to the success of VHA quality improvement efforts and its ability to advance evidence-based care [1–5]. Researchers have a long history of using the VHA's vast data resources to better understand the VHA's and the nation's healthcare system on individual patient, regional, and population levels. For example, recent publications have utilized VHA databases to address issues as diverse as the impact of resident duty hour reform on surgical and procedural patient safety indicators [6], the influence of obesity on quality of care [7], the impact of clopidogrel and proton pump inhibitor treatment on outcome of acute coronary syndrome [8], the impact of increasing medication copayments on medication adherence [9], and the proportion of patients at least 65 years of age hospitalized for pneumonia who are subsequently diagnosed with pulmonary malignancy [10]. The results of VHA data-based publications are often relevant to non-VHA practices and healthcare organizations.

The research value of VHA databases depends on not only the quality and accessibility of the underlying data but also an understanding of the clinical and administrative processes that produce data, of how best to use data to measure important constructs, and of limitations inherent in using administrative and clinical data for research objectives. VHA researchers have greatly enhanced the value of VHA health information technology by the skilled use of data and analytic techniques to provide answers to important research questions.

VHA researchers, by conducting systematic data evaluations, enlarge efforts to address data quality and clinical coding and thereby contribute to system-level improvements. Going forward, data quality evaluations inform efforts to improve the usefulness of VHA data for both research and management purposes. The results of formal analyses of data quality and completeness are disseminated through journal publications, web-based seminars on data quality that are subsequently archived in a readily retrievable format, and education of staff in the use and interpretation of data and analytic tools. Further, to facilitate access and analysis, VHA is implementing structured documentation using emerging clinical data standards to complement or replace unstructured text-based medical notes and reports, centralizing the most important clinical and administrative data sets, and evaluating the feasibility of using natural language processing to abstract clinically relevant concepts from its extensive free-text data.

The success of the VHA healthcare system depends importantly on the transformation of data into information. Understanding the strengths and limitations of VHA data and committing to continuous improvement in data quality and accessibility are core VHA missions that are required to provide the highest quality care to America's veterans. Finally, by making public meaningful analyses of performance based on data [2–11], VHA demonstrates its quality of care and maintains the trust of veterans, their families, and the American taxpayer, thereby ensuring its continued ability to serve “those who have borne the battle.”

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