A National Clinical Quality Program for Veterans Affairs Catheterization Laboratories (from the Veterans Affairs Clinical Assessment, Reporting, and Tracking Program)

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A "learning health care system", as outlined in a recent Institute of Medicine report, harnesses real-time clinical data to continuously measure and improve clinical care. However, most current efforts to understand and improve the quality of care rely on retrospective chart abstractions complied long after the provision of clinical care. To align more closely with the goals of a learning health care system, we present the novel design and initial results of the Veterans Affairs (VA) Clinical Assessment, Reporting, and Tracking (CART) program—a national clinical quality program for VA cardiac catheterization laboratories that harnesses real-time clinical data to support clinical care and quality-monitoring efforts. Integrated within the VA electronic health record, the CART program uses a specialized software platform to collect real-time patient and procedural data for all VA patients undergoing coronary procedures in VA catheterization laboratories. The program began in 2005 and currently contains data on 434,967 catheterization laboratory procedures, including 272,097 coronary angiograms and 86,481 percutaneous coronary interventions, performed by 801 clinicians on 246,967 patients. We present the initial data from the CART program and describe 3 quality-monitoring programs that use its unique characteristics—procedural and complications feedback to individual labs, coronary device surveillance, and major adverse event peer review. The VA CART program is a novel approach to electronic health record design that supports clinical care, quality, and safety in VA catheterization laboratories. Its approach holds promise in achieving the goals of a learning health care system. Published by Elsevier Inc. (Am J Cardiol 2014;114:1750−1757)

In 2004, the Department of Veterans Affairs (VA) embarked on a national initiative to improve the quality of its cardiac care.[1,2] As part of this initiative, the need to measure the quality and outcomes of patients undergoing procedures in all the VA cardiac catheterization laboratories was identified. In response, VA operational, clinical, and research leaders proposed a national clinical quality program for VA catheterization laboratories that could generate real-time clinical data to support quality-monitoring efforts and achieve the goals of a learning health care system. The new program—the VA Clinical Assessment, Reporting, and Tracking (CART) program—captures clinical information at the point of care and allows for its immediate use to support quality-monitoring programs. By using clinical data to generate both the patient record of care and the data to monitor and improve the quality of that care, separate chart abstraction efforts and maintenance of independent databases are no longer required. As a result, The CART program provides the building blocks for a "learning health care system" that can provide real-time data to drive continuous improvement of cardiac care in VA catheterization laboratories.[3] In this manuscript, we describe CART's design, implementation, data, and initial quality-monitoring programs.

Methods

A team of clinicians, health services researchers, and information technology developers designed the CART program.[4] The foundation of the program is a clinical software application integrated into the VA electronic health record (EHR). When any coronary procedure (i.e., diagnostic angiogram or percutaneous coronary intervention [PCI]) in any VA catheterization laboratory is performed, the clinicians use the application to record patient and procedural data. These data are automatically recorded in the EHR as the procedural note. In addition, it is available for analysis to support quality-monitoring and research efforts, both locally and nationally.

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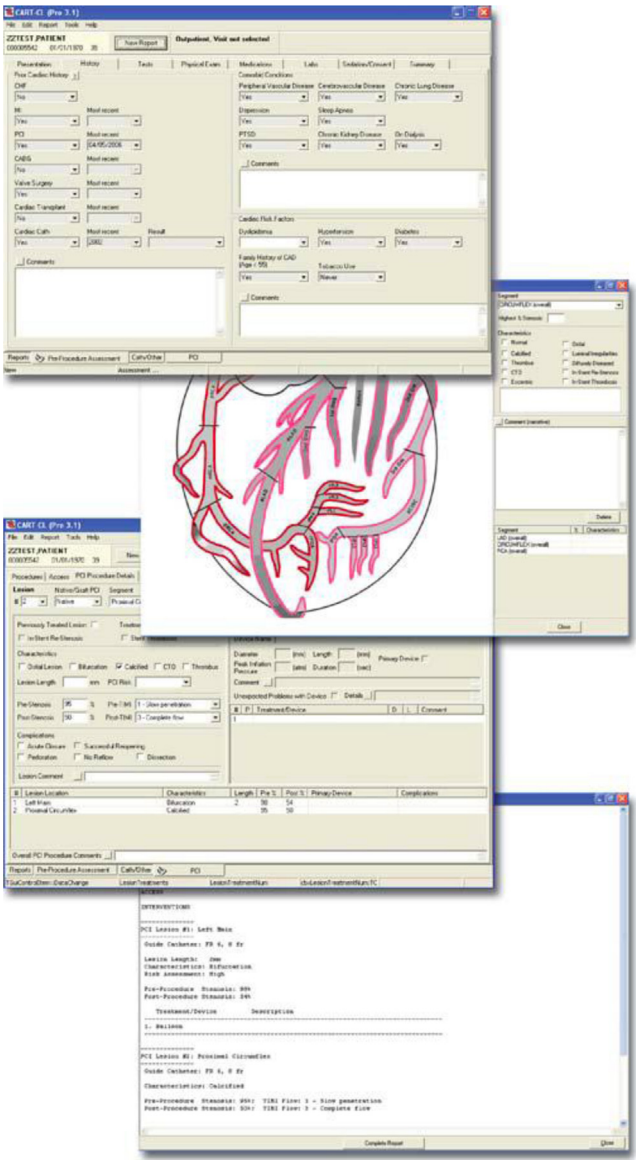

Figure 1. CART user interface screen.

In order for the CART data to serve these multiple purposes simultaneously, standardized and comprehensive data about both patients and procedures are needed. The CART software application enables standardized clinical data entry at the point of care using data elements and definitions from the American College of Cardiology's National Cardiovascular Data Registry, the largest cardiac clinical registry in the United States.[5] This harmonization of data elements permits direct comparisons between VA sites as well as benchmarking and comparison of VA care with the >1,500 non-VA medical centers that participate in the National Cardiovascular Data Registry CathPCI Registry. Data elements and definitions are selected and regularly updated by a clinical advisory committee of VA interventional cardiologists to maintain clinical relevance (e.g., adoption of new techniques and procedures) and ease of use. Regular communication between the CART program leadership, National Cardiovascular Data Registry, and "front line" clinicians in the VA catheterization laboratories ensures that the system remains current. At the time of a catheterization laboratory procedure, clinicians use standardized data fields to enter discrete data elements for both preprocedural and procedural clinical notes (Figure 1). To maximize efficiency, information that is already available from the EHR, such as demographics, clinical conditions, medications, vital signs, and laboratory results, are automatically imported into the preprocedural note. The clinician can also supplement this initial data with additional information as needed. After completion of the catheterization laboratory procedure, the clinician then records procedural information and outcomes, again using the standardized data fields. Once completed, standardized and comprehensive preprocedures, cardiac catheterization, and/or PCI reports are immediately available in the EHR, thus providing "real-time" information to the patient and his or her care team.

Implementation of the CART program began in 2004 and, by the end of 2010, was used to record patient and procedural data on all coronary angiographies and PCIs performed in all VA catheterization laboratories nationwide (Figure 2). As of April 2014, the CART program had collected data on 434,967 catheterization laboratory procedures, including 272,097 coronary angiograms and 86,481 PCIs, performed by 801 clinicians on 246,967 patients.

High quality data are essential to the CART program's mission of improving clinical care, quality, and research.[6,7] By virtue of its design, CART establishes the groundwork for high data quality in 3 important domains—data representativeness, completeness, and validity. Data representativeness occurs when the data set is sufficiently representative of the population being studied. Because the CART program is embedded within the medical record for all VA patients receiving coronary procedures nationwide, rather than a separate data registry, it completely represents of the population it captures, namely all veterans undergoing coronary procedures at any of the VA cardiac catheterization laboratories. Data completeness in CART is facilitated by its use of nationally established data standards for recording catheterization laboratory procedural data and a user interface that facilitates easy data entry. Data validity between CART and the EHR is optimized by the tight integration of CART into clinical workflow. CART's impact on data validity, completeness, and timeliness has resulted in significant improvements in catheterization laboratory data quality, as demonstrated in a previously published analysis.[8]

Initial quality-monitoring efforts using CART data focus on 3 areas: periodic feedback of procedural data to individual catheterization laboratories for workload tracking and evaluation, coronary device surveillance in conjunction with the U.S. Food and Drug Administration (FDA), and catheterization laboratory major adverse events (MAE) peer review. Using patient and procedural data, CART generates quality benchmark reports that are fed back to catheterization laboratory directors and leadership monthly for audit purposes. The reports detail local and national catheterization laboratory workload, completeness of data entry, and complication rates (Figure 3). This reporting mechanism can assist catheterization laboratory leadership and staff in determining resource needs for workload demand,