Data-Driven Transformation to an Oncology Patient-Centered Medical Home

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Introduction

The implementation of electronic medical records (EMRs) is occurring at a rapid pace, in part because of the incentives afforded by the Centers for Medicare and Medicaid Services through the Health Information Technology for Economic and Clinical Health Act.¹ As physicians and hospitals are implementing these systems, there are mixed opinions as to their success in improving patient care, physician and staff efficiency, and control of health care costs.² Certainly, structured data fields³ and reports allow for exchange of patient information within and outside a practice or health care system; however, the merging of an efficient user workflow and standardized data collection and presentation is key to enable consistent evidence-based decision making at the patient-physician locus.

Consultants in Medical Oncology and Hematology (CMOH) is a nine-physician community practice serving four locations in suburban Philadelphia, Pennsylvania. In its quest to build a clinically integrated practice offering high-quality, value-based hematology and oncology care, it implemented an oncology-specific EMR in 2004 (CMOH used the Elekta Mosaiq system [Elekta, Stockholm, Sweden] and prior to choosing Mosaiq discovered similar deficiencies in other EMR vendors' offerings). Despite positive response from the chemotherapy nurses and administrative assistants of the practice, the physicians were dissatisfied because of the failure of the EMR to support the essential workflow and processes of the delivery of care. It became a labor-intensive process for the clinicians to tease out the information necessary to longitudinally view, manage, execute, and communicate the plan of care. The EMR fell short in the compilation and presentation of consumable, relevant data on which all physicians must base clinical decisions. Through a series of interactions between the lead physician, clinical director, and information technology (IT) engineer, a new clinical decision support software, Iris, was developed to create a manageable, efficient IT work environment for the entire physician-led care team. This software, an overlay of the EMR database, merged patient-centered medical home-based standards of care⁴ with the workflow of a hematology-oncology practice, facilitating the standardization of data collection and presentation, clinical decisions, documentation, communication, and coordination. In addition, the software was designed to report clinically related quality and performance measures that drove desired patient- and payer-centric outcomes.

Methods

To better understand the physician challenges, the IT engineer shadowed one physician during his clinic hours to observe the number and type of keystrokes needed to review all pertinent data necessary for clinical decision making with each patient interaction, including performance status, intercurrent symptoms, previous therapy, current medications, radiographic and laboratory results, and comorbid conditions. On average, 23 steps were required to gather the information from the various tabs, screens, and sources within the EMR before stepping into the examination room. During the visit, the physician referred back to the prior screens to review pertinent data with the patient and family to discuss the plan of care. Because documentation of the visit in the EMR system was challenging at the point of care, the 23-step process was repeated at the time of documentation completion.

Over a 6-month period, the physician, IT engineer, and clinical director developed, tested, and refined a software system for collection and presentation of all pertinent data in a single scrollable screen for use by the physician at the point of care. All medical, clinical, and office staff were trained in the new workflow, promoting standardization of processes, which minimized variation throughout the practice.

Iris was specifically engineered to: one, reduce a physician's actions to only that which are clinically relevant; two, have a streamlined user interface on a single scrollable page to absorb the complete history and present status of a patient; three, facilitate the prompt completion and dissemination of a universal document to all involved stakeholders; and four, enhance reporting capabilities and measurement of quality, use, service, and outcomes. This physician-centric software has been continuously updated to enhance its functionality and data reporting capabilities since 2005.

As a rapid-learning cycle tool, Iris monitored: functionality of the mutually reinforcing care team; adherence to evidence-based guidelines, staging compliance, screening, and prevention; medication reconciliation; disposition of triage and symptom management; documentation and communication turnaround; coordination and tracking of tests and referrals; longitudinal tracking of performance status and palliation of symptoms; discussions regarding goals of therapy and end-of-life care through shared decisions; use of patient and referring physician portal; and management of specific at-risk populations. These and other process improvements enhanced

Table 1. IT-Supported Processes Drive Value in Oncology Patient–Centered Medical Home

Consultants in Medical Oncology and Hematology*	2007	2008	2009	2010	2011
Clinical nurse triage management and enhanced access					
No. of calls	2,102	2,594	3,261	3,965	4,375
Patients seen within 24 hours	197	261	345	435	352
Symptoms managed at home, %	76.1	77.1	77.6	75.8	81.2
Use measures					
NCCN guideline compliance, %	87	90	93	94	96
ER use PCPPY	1.64	1.27	1.11	0.91	0.81
Hospital admissions PCPPY	1.08	1.05	0.87	0.6	0.53
Hospice length of stay, days	—	—	26	32	35
ER evaluations occurring in last 30 days of life, %	—	—	—	23	20
Admissions occurring in last 30 days of life, %	—	—	—	39	36
Documentation turnaround time, days	—	> 28	28	3.8	1.9

Abbreviations: ER, emergency room; IT, information technology; NCCN, National Cancer Comprehensive Network; PCPPY, per chemotherapy patient per year.

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physician efficiency, improved coordination, and reduced unnecessary resource use.

Results

Modification of the processes of care and the effective use of technology enabled this practice to meet the National Committee for Quality Assurance criteria for a level-III patient-centered medical home,⁴ and in 2010, CMOH was the first oncology practice to be recognized as such. At the same time, it achieved American Society of Clinical Oncology Quality Oncology Practice Initiative certification. CMOH has labeled its model of care the oncology patient–centered medical home.⁵

Iris provides the infrastructure necessary to enable the oncology patient–centered medical home, enhancing: one, patient access; two, continuity of symptom management; three, organization of data to facilitate decision making; four, communication, tracking, and coordination of care; five, reduction in emergency room use and hospital admissions per chemotherapy patient per year; six, performance status–driven approach to goals of therapy and end-of-life care; and seven, systematic measurement of physician performance focused on the success of palliation of symptoms, staging completeness, screening compliance, adherence to National Comprehensive Cancer Network treatment guidelines, and so on (Table 1).⁶

Discussion

CMOH found the implementation of an EMR alone does not improve health care delivery. Rather, it is the merger of clinical operations, workflow, and technologic infrastructure delivering relevant, consumable data to providers that drives quality improvement, demonstration of results, and enhancement of the value of cancer care. Iris, as a customized software overlay, allows for the streamlining and standardization of care, tracking multiple disease-management data points in patients with comorbid conditions and facilitating the identification

and measurement of potential complications of therapy and disease.

In 2005, RAND projected an annual savings of \$81 billion with the adoption of health IT (HIT) but has now found that underperformance of health care savings through EMR implementation was a result of several factors, including sluggish adoption of HIT systems, along with systems that are hard to use and aren't interoperable, and a failure by providers and hospitals to adjust care processes to better benefit from HIT.²

CMOH designed Iris to match the physician-centric processes and workflow required in delivering patient-centered hematology-oncology care rather than altering its processes to match those suggested by poorly designed HIT systems. Not doing so would have been a major deterrent in the ability of CMOH to meet the call of health care reform to focus on patient needs, value, quality, and demonstration of results.

As the use of EMR systems increases, new standardized quality measures that incorporate patient- and payer-centric outcomes need to be developed universally, and data must be collected in a manner that will not distract the physician-led care team from the delivery of quality patient care. The IT industry needs to understand the importance of incorporating these standards to promote exchange among multiple systems and to produce reliable outcome data to effectively advance the delivery of cancer care.

Authors' Disclosures of Potential Conflicts of Interest

Although all authors completed the disclosure declaration, the following author(s) and/or an author's immediate family member(s) indicated a financial or other interest that is relevant to the subject matter under consideration in this article. Certain relationships marked with a "U" are those for which no compensation was received; those relationships marked with a "C" were compensated. For a detailed description of the disclosure categories, or for more information about ASCO's conflict of interest policy, please refer to the Author Disclosure Declaration and the Disclosures of Potential Conflicts of Interest section in Information for Contributors.

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