The Business Value of Automating Evidence-Based Medicine: Southeast Alabama Medical Center

CASE STUDY

Sponsored by: Wolters Kluwer Health

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OVERVIEW

This IDC Health Insights case study identifies the key benefits from the use of the Wolters Kluwer Health ProVation Order Sets automated order set management and evidence-based medicine tools and content in the clinical environment. This case study covers the experience with order set tools at Southeast Alabama Medical Center (SAMC). Like many U.S. providers, SAMC is currently implementing an electronic health record (EHR) and computerized physician order entry (CPOE) system to advance clinical safety and gain access to federal incentives from demonstrating meaningful use of these technologies under the American Recovery and Reinvestment Act (ARRA) of 2009. ARRA creates tight deadlines for providers to adopt meaningful use technologies and at the same time streamline their processes, cut costs, and improve quality. The implementation of CPOE in a hospital is a complicated endeavor that requires the coordination of clinical and IT staff to move from a manual ordering process to an electronic ordering process and at the same time convert many years' worth of clinical knowledge captured in paper-based order sets into electronic format for use in the CPOE system. This case study examines the sources of, and attempts to quantify, the return on investment (ROI) from using order sets, order set management tools, and a repository of clinical content to accelerate and improve the order set development process and use of evidence-based medicine in CPOE implementation. Table 1 provides a summary of the case study highlights.

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TABLE 1

Business Value Highlights

Category	Description
Organization	Southeast Alabama Medical Center
Location	Dothan, Alabama
Challenge	Build an order set infrastructure that will allow it to optimize workflows and prepare for CPOE implementation
Solution	Wolters Kluwer Health ProVation Order Sets
Cumulative benefits	• $5.05 million for three-year period • Three-year ROI of 463% • Payback in 15.4 months after engagement
Specific annual benefits	• $1.3 million in physician productivity • $373,760 in unit secretary productivity • $4,572 in operating profit

Source: IDC Health Insights, 2011

SOUTHEAST ALABAMA MEDICAL CENTER

SAMC is a 400-bed nonprofit regional medical center that is headquartered in Dothan, Alabama, and serves southeast Alabama, southwest Georgia, and the Florida Panhandle. SAMC was founded in 1957 and currently has 277 providers with privileges at the hospital, but it will soon become a teaching hospital, adding students to the clinical staff. SAMC is currently in the process of implementing an EHR and CPOE system. The implementation of the HIS began in the 1999–2000 time frame; the hospital has updated and added capabilities to the system over time and is currently seeking to implement the EHR and CPOE capabilities required to qualify for ARRA incentives.

SAMC is well on the road to becoming a paperless clinical environment. When IDC Health Insights interviewed SAMC in April 2011, physician orders and progress notes were the only components of the medical record still on paper. SAMC plans to go live on CPOE to facilitate electronic ordering in 2011. The Wolters Kluwer Health solutions in use at SAMC are ProVation Order Sets and UpToDate decision support clinical content and technology. SAMC is a longtime user of UpToDate's clinical content, which physicians already reference on a daily basis.

The CPOE Implementation Process

The movement of clinical content stored in paper-based order sets to automated order sets in CPOE is a critical step during implementation because poor design, inaccuracies, and omissions will affect provider workflow in the new CPOE system, thereby reducing productivity and potentially introducing medical errors. In many cases, incomplete or poorly designed order sets will lead to failed CPOE implementations when providers are not able to work productively in the new system and/or cannot find and use the order sets they are accustomed to using. Order set migration is one of the most time-consuming steps in CPOE implementation, and delays in migration will lead to delays in implementation time lines, which may result in the loss of ARRA subsidies in the near term and Medicare penalties after 2015.

To migrate clinical content successfully, providers are forced to compile and examine all of the paper order slips for all of the clinical departments in the organization, reconcile them, and design workflows in the new system that approximate the content of the existing order sets while creating a balance with the organization's goals for introducing new practice patterns that will improve care quality and patient safety. Order set programming in CPOE systems can be complex, costly, and time consuming. Consolidating and merging order sets may be desirable to control CPOE implementation costs, but providers must do this carefully to preserve successful workflows and efficient practice patterns. Ideally, order sets should reflect the current best practices in the industry, as stated in the medical literature, but should be customized for local practice patterns and staff competencies. Ongoing maintenance of order sets is required because they need to be updated with emerging medical research to ensure they reflect the current evidence-based guidelines for care delivery and care quality in the hospital.

Traditionally, hospitals have formed committees by specialty and clinical department to establish, update, review, and maintain order sets on a periodic basis and upon changes in best practices, as research evolves. These committees include physicians and nursing staff, representatives from the pharmacy and the laboratory, and administrators who have familiarity with utilization review, payer, and Medicare reimbursement policies. Even when reviewing only a small portion of order sets on a periodic basis, the members of these committees spend a great deal of time away from patient care. When the entire catalog of order sets is moved from paper-based format to electronic format during a CPOE implementation, the volume of content and the workload for the review team will overwhelm this system of review, leading to lost productivity, frustration among providers and staff, and, potentially, delays in CPOE implementation or health systems going live on CPOE systems with incomplete or insufficient catalogs of order sets. Just moving the

order sets to electronic formats can overwhelm the process, without even considering the effort associated with updating them to reflect current medical literature, improve processes, and maintain this high standard over time.

Some of the key technologies for making provider IT departments more efficient and helping to meet the goals for CPOE implementation are order set management tools; preconfigured, best practice–based order sets; and repositories of clinical content and guidelines. These tools have the potential to accelerate the migration of order sets from paper-based format to electronic format; to improve efficiency by furnishing tools such as online editing tools, repositories, and version control for provider and staff teams reviewing order sets; to assist in documenting the process and managing the implementation of order sets in CPOE systems; and to facilitate ongoing maintenance of the order sets. The ROI for providers using these tools will be reflected in labor and effort associated with migrating, implementing, and maintaining order sets, CPOE implementation/programming costs, and ongoing maintenance and change order requirements. Additionally, these tools allow providers to view and analyze order sets in a previously unavailable enterprise format, potentially allowing the introduction of new interventions into order sets that will lead to improvements in quality of care and lowering the cost of care for patients, payers, and the hospital.

Implementation at SAMC

The CPOE program at SAMC was started in 2010 as the organization sought to compile and standardize its paper-based order sets, migrate them to the electronic format, and introduce best practices and evidence-based medicine at the same time using the ProVation Order Sets tool. SAMC started the process of building an order catalog for implementation in its new electronic system well in advance of CPOE implementation, leaving time to build order sets in a thoughtful manner and recognizing the complexity of the clinical review process. The new electronic order sets are authored in the ProVation Order Sets tool, reflecting SAMC's intention to leverage the efficiencies created by the authoring tools in the near term while anticipating future efficiencies that will result from building integration between ProVation Order Sets and its CPOE system to implement and maintain the order sets.

SAMC began with a total of 200 paper order sets associated with the clinical departments across the hospital. It sought to rationalize its catalog of order sets by eliminating duplicates and cutting back on the number of practice- and physician-specific order sets. SAMC eventually arrived at a core set of 120 order sets that needed to be created, reviewed, and implemented in preparation for implementing the electronic ordering system. The starting point was identifying

existing order sets that were similar to SAMC's own and already included in the prebuilt ProVation Order Sets library. Then order set development teams modified the order sets as required to reflect practices at SAMC and submitted the order sets to the Quality Peer Review Committee (QPRC) for review. The QPRC process included review by representatives from the pharmacy, nursing, utilization review, and the laboratory and, lastly, by physicians. The core authoring team and QPRC reviewers had the ability to look at order sets electronically in the ProVation Order Sets tool, review the evidence behind the order sets that was provided in UpToDate, and view comments and changes from other reviewers during the process of arriving at consensus on the order set content. It was natural for SAMC to incorporate UpToDate content into the order sets because the CPOE system facilitates the use of a link to the content and providers at SAMC were accustomed to accessing UpToDate.

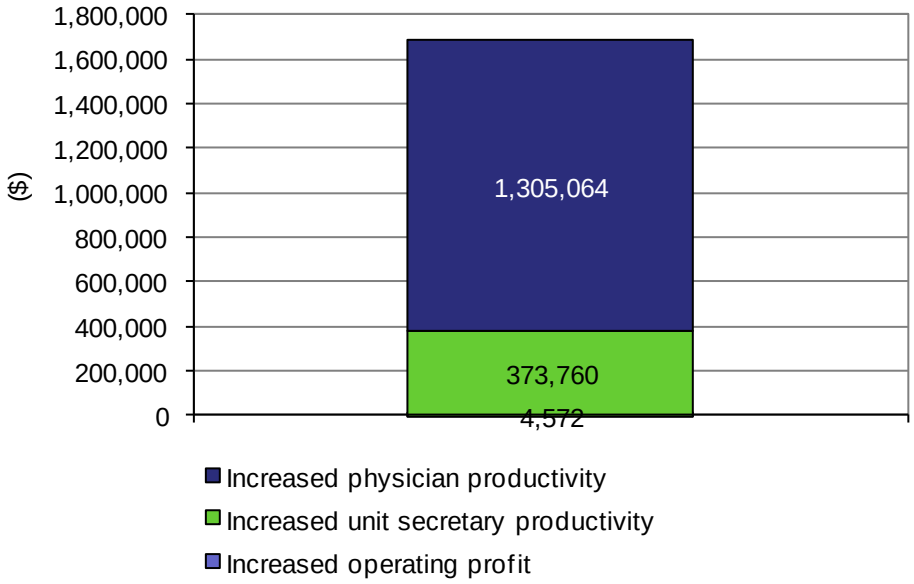
Over the course of six months, the implementation team at SAMC built all 120 order sets in the ProVation Order Sets system. At the time of our interview with SAMC in April 2011, the QPRC had reached consensus on 23 of the order sets, and an additional 74 order sets were in the first or second stage of review. The order sets will be manually transferred from ProVation Order Sets and programmed in the CPOE system, although future integration between ProVation Order Sets and the CPOE system is expected to automate the transfer of order sets from ProVation Order Sets to the CPOE system and reduce the programming required for future changes to order sets. SAMC anticipates completing review of all of the order sets before its go-live on CPOE, right on schedule.

Benefits

SAMC has realized many benefits from using ProVation Order Sets, but it states that the real value is found in automating the order process, eliminating the burden of human error, and reducing wasted time. The current process for entering orders requires providers to place lab, radiology, and pharmacy orders separately. Pharmacy orders are faxed to the pharmacy, while all other orders are submitted on paper order slips to unit secretaries who enter them in the current order management system. Although urgent orders are prioritized, it may take hours for routine orders to be entered, introducing delays that may extend the length of stay for patients. Handwriting interpretation is an issue, and callbacks and clarifications take time from all involved. The average annual savings are shown in Figure 1.

FIGURE 1

Average Annual Benefits



Source: IDC Health Insights, 2011

Improving Order Entry Process: Reducing Time Required and Freeing Up Unit Secretaries to Focus on Quality Control and Management

SAMC is migrating from a primarily paper-based system with a rigid architecture that requires the unit secretaries who are responsible for transmitting all the orders to go though each area in a linear fashion, introducing delays. With ProVation Order Sets, the unit secretaries will move from individual orders to integrated order sets where, with one click, they will order six or seven components that were typically ordered item by item in the existing paper system. The order sets implemented in CPOE will automatically generate orders for the components, including lab tests, durable medical equipment, physical therapy, pharmacy, radiology, and dietary orders. As CPOE implementation proceeds, physicians will start entering their own orders, which, coupled with the more efficient order sets, should reduce the time spent putting in orders by 80%. The role of the unit secretaries will transition from order entry to a sort of air traffic controller/order monitor, allowing their focus to move to quality control and reducing medical errors. SAMC expects to save $373,760 annually in unit secretary productivity. To preserve physician productivity during the implementation process, SAMC will start with a pilot group of physicians on CPOE and gradually move adoption across the entire clinical staff. SAMC will break in the physicians gradually and plans to

support part-time CPOE users during a period in which they will continue to use a hybrid paper-electronic system. SAMC plans to use this dual system for six months or less, if all goes well.

Improving Patient Care: Reducing Order Errors and Callbacks for Clarification Saves Doctors' Time, Freeing Up More Time to Spend with Patients

Physicians' time is the most precious and expensive commodity in a hospital. SAMC recognized significant physician productivity savings from using ProVation Order Sets. During the order set development period, the other members of the QPRC review team reached consensus before the physicians reviewed the order set, optimizing the physicians' time.

The current manual ordering system is rife with errors because the unit secretaries have to translate the doctors' written orders, which can lead to mistakes and delays. Most often, these mistakes result in duplicate lab tests or the wrong machines or equipment trays being delivered to the patient's bedside. Although these types of errors occur in less than 2% of instances, they inconvenience patients and take doctors' time away from patients. With ProVation Order Sets and CPOE, errors are all but eliminated. The major time savings for physicians comes from using order sets for medications and multiple order set components. Unlike all other orders that are created and entered by the unit secretaries, medication orders to the pharmacy are currently created by the physicians and faxed to the pharmacy to prevent medication errors. As a result, physicians need to provide frequent clarifications (an estimated hour per day for each doctor). Clarifications usually take place over the phone, pulling physicians away from patients. IDC estimates that ProVation Order Sets reduces clarifications by 70%, returning 148 hours per year to the physicians and saving SAMC $1.3 million annually.

Improving Patient Care: Speeding Time for Orders to Be Fulfilled so Patients Are Not Waiting, Reducing Errors (Duplicate Lab Orders, Misordered Machines, etc.) and Delays That Extend Length of Stay

The manual nature of the current system creates wasted time and delays in service to patients. In the current workflow, physicians go to the nurses' station, take a chart, go to the patient's room, see the patient, make their determinations, write the orders, leave the chart on the unit secretary's desk for the orders to be entered, and then move on to the next patient. Several physicians use rolling carts; they take the charts for all of their patients in a given unit and they roll from one room to the next, review the chart, interview the patient, write their recommendations and orders, return the chart to the cart, and roll to the next room. As a result, charts may arrive on the unit secretary's desk anywhere from 30 to 90 minutes after the first order was written in a chart.

Often the doctor will write an order for a final physical therapy visit or diagnostic test and authorize the patient's discharge to take place after the order is completed. A chart that sits for an hour or two on a secretary's desk will delay the completion of the order and the patient's discharge. In extreme cases, a test may be overlooked or delayed being entered into the system; the delay or scheduling issues may result in the inability to complete the order during the day and the patient will need to stay in the hospital to complete the order the following day. For SAMC, these extensions to length of stay add up to about 36 lost days per year. Because these are unauthorized extra days, payers do not cover the stay and the hospital suffers the lost revenue. SAMC expects ProVation Order Sets and automated order entry with CPOE to reduce overstays, saving about $76,000 annually. IDC converts revenue gains to operating profit so that this value can be combined with other costs savings — in this case more than $4,500 per year.

Return on Investment

IDC projects that SAMC will realize a three-year ROI of 463% from its use of the ProVation Order Sets solution. Payback on the initial investment (made in 2010 and 2011) occurred in 15.4 months once the solution was fully deployed (see Table 2).

TABLE 2

Three-Year ROI Analysis

Category	Metric
Benefit (discounted)	$3,428,586
Investment (discounted)	$609,170
Net present value (NPV)	$2,819,416
ROI	463%
Payback	15.4 months
Discount percentage	12%

Source: IDC Health Insights, 2011

CONCLUSIONS

The implementation of ProVation Order Sets at SAMC, coupled with the planned implementation of CPOE and integration of the CPOE system with ProVation Order Sets, will result in savings in the form of improvements to productivity for staff working on order set and CPOE implementation, efficiency of clinical and administrative staff working in the hospital, reduction in delays in providing care to patients, and costs associated with delays. Additional soft benefits will include avoiding medical errors, improving the quality and cost of care by accelerating the implementation of evidence-based medicine, and improving patient and staff satisfaction with the hospital. Initially, savings will come from automating the order set development process, consolidating order sets, and creating multiple element order set capabilities in the hospital with ProVation Order Sets tools. In the long term, implementation of CPOE across the hospital and the subsequent integration of ProVation Order Sets with the CPOE system will increase efficiencies even further, as order set management and maintenance is automated.