HIMSS Davies Enterprise Award Submission

Applicant Organization: St. Clair Hospital

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Core Item/ROI: ROI demonstrated through the benefits of having an electronic health record (EHR) integrated with revenue cycle systems and scheduling systems.

National Priorities Partnership Goal: Ensure patients receive well-coordinated care across all providers, settings, and levels of care

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Executive Summary:

From the period of FY07 through FY14, St. Clair Hospital was able to demonstrate an $89.3M return on investment (ROI) for its integrated EHR, Patient Accounting, and Patient Scheduling systems.

St. Clair first deployed an EHR system in 1990, well before any incentive programs were put in place. The hospital believes that an EHR system is necessary infrastructure to carry out our core mission of safely and efficiently caring for patients. Therefore, this case study does not attempt to show the ROI of the EHR over its 24-year history at St. Clair. Instead, when conveying the ROI associated with the EHR/Patient Accounting suite, the meaningful use incentive payments, and the payor incentive programs, we show the correlated costs associated with upgrading the existing EHR to achieve this return, as opposed to showing the entire historical cost of the EHR.

Background Knowledge:
St. Clair is a 328-bed independent, acute care facility that provides advanced, high-quality health care to more than 480,000 residents in southwestern Pennsylvania. Our mission is to provide highly valued, service-oriented healthcare to our community across the hospital's main campus and five outpatient centers.

One of the historical challenges that St. Clair has faced is a significant government-based payor concentration, with Medicare and Medicaid contracts comprising 67% of the total acute inpatient discharges (FY14 figures, the most recent completed year). Based upon gross revenues, Medicare and Medicare Advantage plans equal 52.3% of the total while Medicaid and Medicaid Managed Care amount to 5.2% of the total. Given this challenging mix of payors, it is imperative to have efficient systems for fully optimized revenue cycle performance.

In 2003, St. Clair Hospital completed a major upgrade to its Clinical and Financial systems suite, including electronic health record system, patient accounting system, and patient scheduling system. A best-of-cluster approach was used, implementing the packages from the same vendor suite, to realize synergies across these functions. By implementing tightly integrated modules from the software suite, it was believed that the Hospital would deliver better patient care, and at the same time, benefit from better financial performance.

Local Problem and Intended Improvement:
In 2006, an independent assessment of the Hospital's revenue cycle performance was conducted. It revealed that the Hospital was performing well and showing good metrics across a variety of measures, but that opportunities had not yet fully been realized from the system investments that had been made. Despite the fact that the EHR, Revenue Cycle, and Scheduling systems were well integrated and working together, the expected benefits and incremental financial return had not yet been achieved.

The assessment concluded that there were a number of areas within the revenue cycle function that had an opportunity for improved performance. Specifically, unresolved payment denials were at 1.1% of net revenue, and had room to improve. Late charges were not being properly monitored. The number of days, on average, that an account was unbilled, was 6.5 days. The collection of patient co-pays was optional and inconsistent. The average monthly late charges posted to accounts represented 9.8% of gross revenue. Overall, the conclusion was that there was a significant level of revenue cycle leakage. When the systems were implemented, it was believed that the tight integration between EHR and Patient Accounting functions would prevent leakage, lead to an optimized revenue cycle process, and generate a considerable ROI. To realize the expected gains, additional development and system refinements would have to occur, and re-training would have to take place across the EHR, Patient Accounting, and Scheduling systems to raise the level of performance.

Metric	2006 Baseline
Average Total Days in AR	32.3 days
Unbilled (DNFB) Average Days in AR	6.2 days
Denials as a % of net revenue	1.1%
Bad Debt as a % of gross revenue	0.8%
Insurance Underpayments	Baseline not calculated
Late charges as a % of gross charges	6%

An internal team was assembled to identify the changes necessary to improve revenue cycle performance and deliver ROI. With the integrated systems in place, and the EHR being designed to capture charges and provide high quality documentation to enable timely and accurate coding, it was felt that stopping the revenue leakage could deliver significant financial benefit. To achieve the goal of capturing the $1.6M annual opportunity, the following goals were established:

- Reduce overall days in AR and average days unbilled
- Redesign discharged not final billed (DNFB) process to reduce DNFB days
- Reduce Denials through implementing a proactive denials management process
- Reduce Bad Debt through improved charge entry and improved upfront collection of patient co-pays
- Identify and recover insurance underpayments

Another significant driver for our implementation strategy was the launch of the Quality Blue program in FY07. Quality Blue is a Pay-for-Performance Program that promotes a comprehensive set of clinical quality measures aimed at reducing costs and improving patient outcomes. For example, St. Clair reports on clinical quality measures associated with acute care of patients with diabetes and the prevention of C. difficile (c. diff) infection. Accordingly, developing EHR enabled workflows designed to improve these care outcomes had a direct financial benefit to the organization.

Design and Implementation / How Health IT Was Utilized:
The work involved to achieve the desired ROI was comprised of many coordinated efforts. The first area of focus was directed at the intersection of EHR functions and Revenue Cycle functions.

To avoid late, incorrect, or missing charges, the charging functions of the EHR were revamped. Optimized charge order sets were created for most areas. However, there were four areas that, due to their complexity, were particularly problematic. In the areas of Respira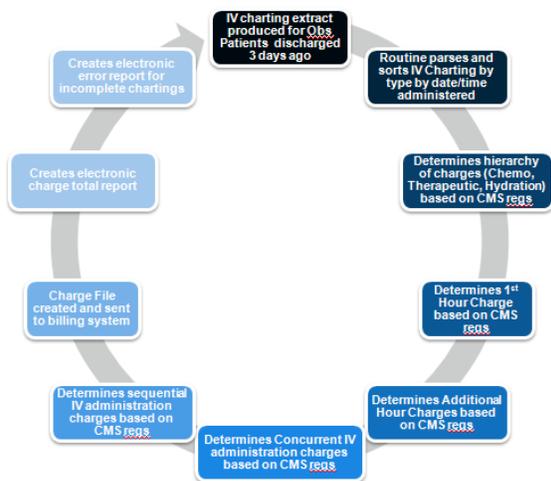tory, Observation, IV administration, and Cardiology, the calculation of the charge is determined by a number of variables, and those variables frequently lead to charge-related problems. Using the EHR's extensibility features, the system was enhanced so that the user was no longer responsible for charge entry, and instead, the system would derive the charge from the charting of the procedure. Once the procedure was charted, the system would parse the entry, and then apply the business rules to arrive at the accurate charge. In this fashion, these frequently problematic charging tasks were automated and the errors were eliminated.
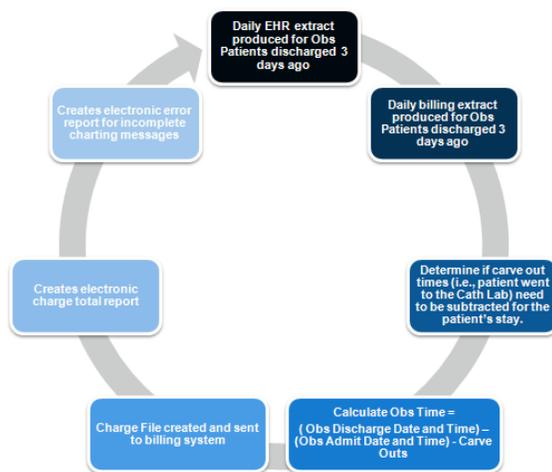
Respiratory Charge Process

- Daily extract of all Respiratory Charting from prior day
- Routine verifies all respiratory components were charted
- Determines the initial and subsequent treatment charges
- Maps all treatment codes to appropriate charge code
- All meds related to a given treatment are parsed
- Meds are assigned to the appropriate charge code
- Charge File is created and sent to billing system
- Creates an electronic charge total report
- Creates an electronic error report for incomplete charting messages.

IV Charge Process

- IV charting extract produced for Obs Patients discharged 3 days ago
- Routine parses and sorts IV Charting by type by date/time administered
- Determines hierarchy of charges (Chemo, Therapeutic, Hydration) based on CMS regs
- Determines 1st Hour Charge based on CMS regs
- Determines Additional Hour Charges based on CMS regs
- Determines Concurrent IV administration charges based on CMS regs
- Determines sequential IV administration charges based on CMS regs
- Charge File created and sent to billing system
- Creates electronic charge total report
- Creates electronic error report for incomplete chartings

Observation Patient Charge Process

- Daily EHR extract produced for Obs Patients discharged 3 days ago
- Daily billing extract produced for Obs Patients discharged 3 days ago
- Determine if carve out times (i.e., patient went to the Cath Lab) need to be subtracted for the patient's stay.
- Calculate Obs Time = (Obs Discharge Date and Time) – (Obs Admit Date and Time) - Carve Outs
- Charge File created and sent to billing system
- Creates electronic charge total report
- Creates electronic error report for incomplete charting messages

Supply charging was also enhanced and optimized. Prior to the improvements, the EHR was configured with supply charge screens that were difficult to use and difficult to maintain. To resolve the problem, the EHR's extensibility features were used to essentially inherit the inventory maintained in the Material Management system. The user interface was patterned after online shopping sites like Amazon to focus on convenient and intuitive supply categorization and powerful search capabilities. This provided EHR users with item data that was always accurate and up to date. The new user interface and backend processing virtually eliminated all errors associated with supply charges.

The Emergency Department was another area where the EHR had to be optimized to enable optimum revenue cycle performance, specifically to reduce denials. To avoid denials associated with improper patient types (Inpatient versus Observation) a new process was designed and implemented. Once the ED physician enters the order into the EHR ED Status Board module to indicate the patient is to be admitted, the Care Manager then begins working with the payor to determine the type of admission. The Care Manager then enters the order into the system to indicate patient type to be displayed on the EHR Status board. This confirms for the Registrar which patient type to use to complete the registration. The ED Status Board module within the EHR also establishes the correct Admitting Physician. Once the eventual discharge order is placed, the accurate patient type and accurate attending physician information streamlines the billing process and reduces delays and rework.

The Emergency Department is also a primary area of focus for improvement in up front collections. At the point of the quick registration into the system, the patients' insurance coverage is not yet known. Once it is determined, the Registrar populates the EHR's ED Status Board with an indicator that the patient has a co-pay or self pay amount due. This indicator then acts as a work queue that the Registrar can use to collect the payments. Collection is maximized by attempting to collect amounts due, prior to the patient leaving the ED.
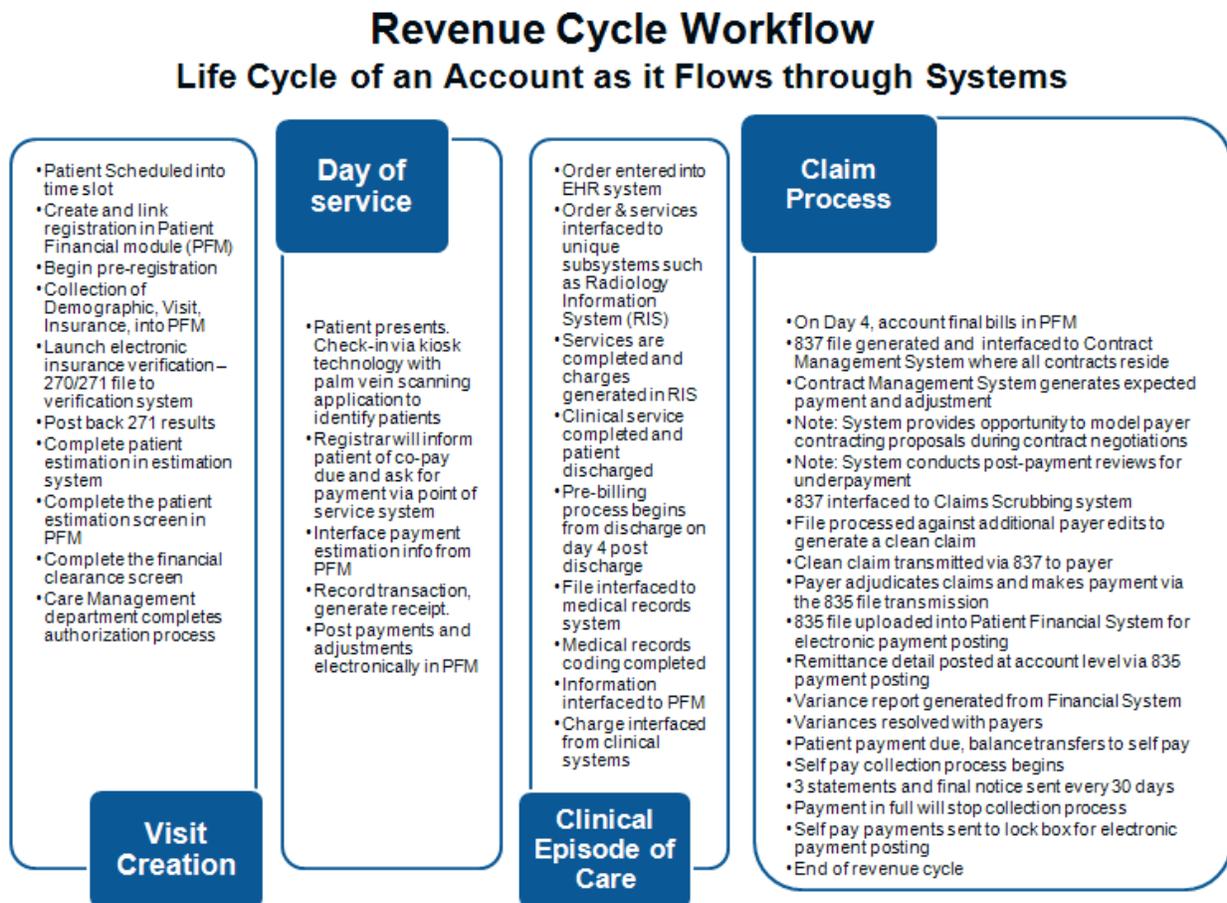
In addition to the improvements made to the core EHR, there were numerous other improvements made to other aspects of the integrated system. Upon examination, it was determined that certain aspects of the integrated system, were either not installed, or not being fully utilized.

First, the patient accounting system's inherent work queue module and contract management modules were not being utilized. Former management had made the decision to organize and prioritize work without the use of the system, and to manage contracts through a home grown system. This lead to scenarios where there was little visibility into the work being completed in these areas. The potential also existed to have resources working on tasks that were not the highest priority, or wouldn't deliver the greatest return. The work queue module was configured, activated, and utilized to prioritize tasks, for example, criteria based lists were utilized to assist in working all accounts above a certain balance, or working accounts of a particular aging. The module was also used to assign work to staff, to ensure that all essential tasks had resources assigned, which, in turn, reduced rework. Use of the work queue provided management with actionable reports and the ability to better focus resources. Later, the contract management module was activated and enable better detection and analytics on underpayments.

Next, the scheduling function was supplemented with a centralized call center such that scheduling and pre-registration tasks, including insurance verification, were completed in one call. The ability to bring in 270/271 insurance verification was activated. By confirming insurance eligibility up front there is less rework in the process and billing is streamlined.

Lastly, all revenue cycle personnel and all EHR users involved in charge related activities were retrained on how to use the systems and the new features. The training addressed knowledge deficiencies and eradicated bad habits, while accentuating proper and efficient use of the systems for charge entry, billing processes, claims transmissions, collections, and payment posting.

The resulting revenue cycle workflow is diagramed below:

Revenue Cycle Workflow
Life Cycle of an Account as it Flows through Systems

Visit Creation
- Patient Scheduled into time slot
- Create and link registration in Patient Financial module (PFM)
- Begin pre-registration
- Collection of Demographic, Visit, Insurance, into PFM
- Launch electronic insurance verification – 270/271 file to verification system
- Post back 271 results
- Complete patient estimation in estimation system
- Complete the patient estimation screen in PFM
- Complete the financial clearance screen
- Care Management department completes authorization process

Day of service
- Patient presents. Check-in via kiosk technology with palm vein scanning application to identify patients
- Registrar will inform patient of co-pay due and ask for payment via point of service system
- Interface payment estimation info from PFM
- Record transaction, generate receipt.
- Post payments and adjustments electronically in PFM

Clinical Episode of Care
- Order entered into EHR system
- Order & services interfaced to unique subsystems such as Radiology Information System (RIS)
- Services are completed and charges generated in RIS
- Clinical service completed and patient discharged
- Pre-billing process begins from discharge on day 4 post discharge
- File interfaced to medical records system
- Medical records coding completed
- Information interfaced to PFM
- Charge interfaced from clinical systems

Claim Process
- On Day 4, account final bills in PFM
- 837 file generated and interfaced to Contract Management System where all contracts reside
- Contract Management System generates expected payment and adjustment
- Note: System provides opportunity to model payer contracting proposals during contract negotiations
- Note: System conducts post-payment reviews for underpayment
- 837 interfaced to Claims Scrubbing system
- File processed against additional payer edits to generate a clean claim
- Clean claim transmitted via 837 to payer
- Payer adjudicates claims and makes payment via the 835 file transmission
- 835 file uploaded into Patient Financial System for electronic payment posting
- Remittance detail posted at account level via 835 payment posting
- Variance report generated from Financial System
- Variances resolved with payers
- Patient payment due, balance transfers to self pay
- Self pay collection process begins
- 3 statements and final notice sent every 30 days
- Payment in full will stop collection process
- Self pay payments sent to lock box for electronic payment posting
- End of revenue cycle

Value/Derived Outcomes - Hard ROI

As shown in the graph below, through better use of the integrated EHR, Patient Accounting and Scheduling systems, the Hospital was able to generate incremental net revenue improvements over each prior year, through advancements in recovery of underpayments, increases in collections, and reduced denials. Due to the incremental nature of the gains, the overall cumulative benefit from the FY07 – FY14 period is $64M. These gains could not have been achieved without the tight integration between the EHR and Patient Accounting systems, and the improvements made to workflows within the systems. The ROI gains have been sustained over a multi-year period and are expected to continue.
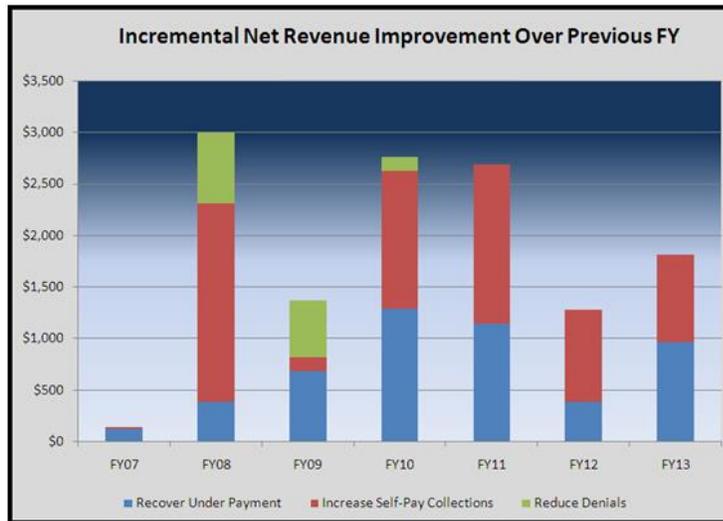
Likewise, the Hospital's operating margin has also steadily increased over the period of EHR and Revenue Cycle improvements. There are a multitude of initiatives that go into margin growth, but efficient systems and optimized revenue cycle processes certainly contribute.

	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14 Dec YTD
St. Clair Consolidated	3.17%	3.98%	4.51%	4.66%	5.33%	6.28%	4.08%	5.92%

Additionally, St. Clair Hospital has been able to achieve ROI through payor incentive programs. For the Meaningful Use program, the Hospital was required to upgrade to the certified version of the EHR. This required additional software purchases and implementation. After implementation, the hospital successfully met all Meaningful Use Stage 1 measures and successfully attested in October of 2011, 2012, and 2013.

ROI on Meaningful Use Stage 1

Investment		Return	
Capital Spent to Upgrade EHR:	$844k	CMS MU Stage 1 Incentive Payment in Year 1:	$3.2M
Wages & Benefits Expense to Implement Upgrade:	$416k	CMS MU Stage 1 Incentive Payment in Year 2:	$2.5M
		CMS MU Stage 1 Incentive Payment in Year 3:	$1.6M
Total Investment:	$1.26M	Total Return:	$7.3M

St. Clair also participated in the Highmark QualityBlue pay-for-performance program which focused on a number of quality initiatives. Highmark is the Hospital's largest commercial payor. The EHR facilitated meeting many of the quality metrics through changed workflows, clinical decision support, and analytics. As a result, the hospital earned the performance award in each of the years of participation.

Lessons Learned:
- Once systems have been implemented and activated, it is advisable to circle back and assess both system performance and user proficiency. Even when the implementation is smooth, and users are not asking for additional training, there can be knowledge deficits and lack of skill in using all the capabilities of the system.
- When user proficiency on the system can lead to greater ROI, there has to be a willingness to make further investment in training.
- Departmental decisions to bypass capabilities of the system can go undetected for periods of time. Doing system assessments can reveal unused or underutilized modules within the system.
- To optimize ROI on the investments made in the system, there has to be organizational buy-in and recognition that many departments and clinical areas directly impact revenue cycle performance.
- Accurate and timely charge entry can be challenging for some clinical areas. Routine charging within the EHR must be fast, flexible and well organized so that time is not wasted doing searched. Entry of complex charges should be automated so that the

proper business rules are applied, and users are relieved of the burden of tracking all of the variables that go into the charge equation.

Financial Considerations:

Overall, St Clair Hospital's total capital investment and ongoing operational costs associated with the implementation of the enterprise-wide electronic health record totaled just under $33 million dollars.

Category	FY04 – FY14 ($ in thousands)
Capital Costs: • **Software, Implementation (consulting), MU modules, optional modules, interfaces, etc.** • **Patient Accounting System Hardware** • **Hardware (incl refreshes) Workstations, COWS, Handhelds**	$3,100 216 2,400
Software Support Fees: EHR	7,800
Software Support Fees: Patient Accounting System	965
Remote Hosting Fees	9,200
Subscription Fees for Revenue Cycle modules	1,000
Meds Verification Implementation	331
Internal Staffing: • **IT Implementation & Configuration salary and benefit expense** • **IT Maint, Support, Troubleshooting salary and benefit expense** • **User Training (users, super users, core team, trainers)**	5,500 925 1,550
Total	**$32,987**

The costs associated with optimizing the EHR and Patient Accounting systems for optimal revenue cycle performance are shown in the table below. The labor expense was significant, however, existing staff were applied to the project, and there was no net increase in I.T. positions associated with the project. It should also be noted that patient accounting staff was reduced by 1.0 FTE as a result of the efficiencies gained through system improvements.

St Clair has seen significant return on investment stemming not only from federal quality improvement incentive programs and private payors, but also as result of significant cost avoidance through improved care outcomes. To date, St Clair has seen $89M in total return on investment associated with EHR enabled quality improvement, improved documentation, processes, and efficiency, and lowered costs associated with EHR-enabled workflow.

Category	FY07 – FY14 ($ in thousands)
Revenue Cycle Improvements (cumulative incremental impact)	$64,000
Meaningful Use (3 years)	7,300
Quality Blue Program	11,600
Other ROI	
• ED Patient Throughput	4,000
• Reduction in ADEs	57
• Auto-Charting of Med Administrations	562
• Diabetes LOS savings (FY14)	248
• Diabetes LOS savings (FY13)	348
• C.diff LOS savings (FY13)	622
• C.diff Probiotic (FY14)	641
Total:	$89,378