Honoring Industry Leaders In Health IT Adoption For Improved Patient Care

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EHR ACHIEVEMENT

HIMSS15 Annual Conference & Exhibition

April 12 - 16, 2015

HIMSS Analytics STAGE 7

Dear Friends,

The organizations highlighted on these pages are among an elite group at the leading edge of health IT, achieving Stage 7 status on the HIMSS Analytics EMR Adoption Model℠ and/or the Ambulatory EMR Adoption Model℠. They have demonstrated superior implementation and utilization of heath IT that has directly resulted in organization-wide advancement in patient care and operational efficiencies.

As market leaders, HIMSS and HIMSS Analytics share the dedication and commitment to moving the industry forward through the optimization of health IT that these Stage 7 organizations exemplify. Join us in congratulating them on their success.

Regards,

H. Stephen Lieber, CAE
President and CEO,
HIMSS

John P. Hoyt, FACHE, FHIMSS
Executive Vice President,
HIMSS Analytics

Congratulations on leading the way in health IT adoption for improved patient care.

HIMSS Analytics Stage 7 Cocktail Reception is brought to you in part by:

Cerner Epic

STAGE

EHR Achievement

HIMSS Analytics EMRAM Stage 7

HIMSS Analytics Stage 7 status is awarded to hospitals and clinics that have reached the highest level on the EMR Adoption Model (EMRAM) and the Ambulatory EMR Adoption Model. The EMRAM identifies and scores hospitals and clinics using a progressively sophisticated eight stage model (stages 0-7) that charts the path to a fully paperless environment. This prestigious industry award was introduced in 2009 by honoring 15 organizations that had attained Stage 7 in their EMR journey.

In April, 2015 HIMSS Analytics welcomes 32 healthcare organizations into the Stage 7 ranks.

2014 **Stage 7** Recipients

Altru
Altru Hospital
22 Ambulatory Facilities

ARCare
38 Ambulatory Facilities

Baylor Scott & White Health
Baylor Scott & White College Station Hospital
Baylor Scott & White Health McLane Children's Hospital
Baylor Scott & White Health Temple Hospital
8 Ambulatory Facilities

Beaumont Health System
Beaumont Hospital – Troy
209 Ambulatory Facilities

Cedars-Sinai
Cedars-Sinai Medical Center

Centura Health
Centura Castle Rock Adventist Hospital
Centura Ortho Colorado Hospital
Centura Parker Adventist Hospital
Centura Penrose Hospital
Centura Porter Adventist Hospital
Centura St. Anthony Hospital
Centura St. Anthony North Hospital
Centura St. Anthony Summit Medical Center
Centura St. Francis Medical Center

The Cerner Healthe Clinic
3 Ambulatory Facilities

Children's Hospital of Orange County
Children's Hospital of Orange County

Cincinnati Children's Hospital Medical Center
Cincinnati Children's Hospital Medical Center
14 Ambulatory Facilities

Cleveland Clinic
40 Ambulatory Facilities

Edgerton Hospital & Health Services
Edgerton Hospital & Health Services

Kaiser Permanente
350 Ambulatory Facilities

Lakeland HealthCare
4 Ambulatory Facilities

Lancaster General Health
67 Ambulatory Facilities

Mercy Health
Mercy Hospital of Defiance
Mercy Hospital West
Mercy Memorial Hospital
The Jewish Hospital
261 Ambulatory Facilities

Metro Health
MetroHealth Medical Center
18 Ambulatory Facilities

MultiCare Health System
Allenmore General Hospital
Tacoma General Hospital
107 Ambulatory Facilities

NCH Healthcare System
NCH Downtown Naples Hospital
NCH North Naples Hospital

Novant Health
9 Ambulatory Facilities

Ochsner Medical Center
Ochsner Medical Center - North Shore

Ohio State University Wexner Medical Center
30 Ambulatory Facilities

Ontario Shores
Ontario Shores Centre for Mental Health Sciences

Rockford Health System
10 Ambulatory Facilities

Southern Medical Health Systems
Springhill Medical Center

Sparrow Health System
Edward W. Sparrow Hospital
26 Ambulatory Facilities

SSM Health
St. Mary's Janesville Hospital
St. Clare Hospital & Health Services - Wisconsin

Stamford Health
Stamford Hospital

Sutter Health
Sutter Health
Memorial Medical Center
7 Ambulatory Facilities

Texas Health Resources
Texas Health Harris Methodist - Fort Worth Hospital
Texas Health Presbyterian Hospital Dallas

TriHealth
Bethesda Butler County
Bethesda North Hospital
TriHealth Evendale Hospital
Good Samaritan Hospital
128 Ambulatory Facilities

University of Iowa Health Care
21 Ambulatory Facilities

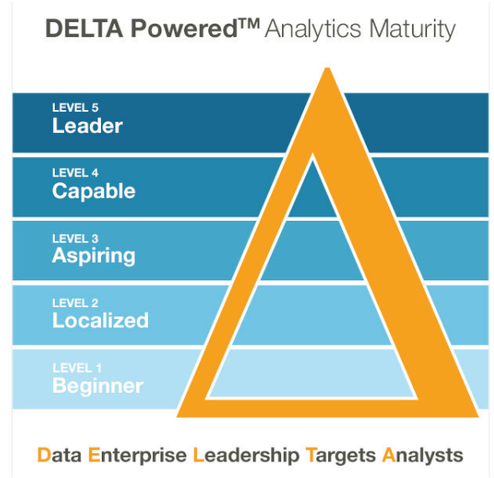
University of Missouri Health Care System
2 Ambulatory Facilities

University of Texas Southwestern
Clements University Hospital
Zale Lipshy University Hospital
7 Ambulatory Facilities

Winona Health
3 Ambulatory Facilities

Got data?

In the era of Big Data your healthcare organization has access to more information than ever before – but what are you doing with it? **HIMSS Analytics' DELTA Powered™ Suite** helps you assess your organization's analytical maturity to ensure you're able to optimize the data you have to get the results you want.



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Know. Understand. Prepare. Change.

Altru Health System

Profile

Altru Health System is a community of over 4,200 health professionals and support staff, including 216 physicians and 63 mid-levels (nurse practitioners and physician assistants) committed to caring for the region for more than 100 years. Serving more than 200,000 residents in northeast North Dakota and northwest Minnesota, we provide an array of services to meet the needs of patients of all ages and levels of health.

There are 45 physician specialties and care is offered in three hospital locations, 12 Grand Forks practice locations including Altru Cancer Center and 12 regional practice locations.

As a member of the Mayo Clinic Care Network, we are helping to bring Mayo Clinic's knowledge and expertise to the Red River Valley. Together, we share a common philosophy, commitment and mission to improve the delivery of health care through high quality, data driven, evidence-based medical care and treatment.

The Challenge

Altru Health System has always placed a high value on Information Technology. Altru has a long history of being on the 100 Most Wired Hospitals list, an achievement built on vendor-provided solutions enhanced vigorously through in house development. Similar to many organizations, we reached the point where the existing functionality couldn't provide answers to ever-increasing industry demands and our development potential wasn't able to meet the growing EMR needs. Altru has always placed a strong emphasis on system integration. Our Enterprise vision was based on the core design of a single, integrated record for each patient across various care settings while allowing for enterprise wide implementation of registration, scheduling functionality and seamless corresponding billing workflows. Our existing system included a heavily manual paper requisitioning process for professional billing. This had to be eliminated and replaced by a solution that could produce accurate claims, allow paperless collection processes and streamline data entry while reducing the number of our A/R days. Our existing order management and documentation capabilities were flawed by inconsistency and inefficient, error-prone paper flows and heavy usage of dictation.

Implementation Overview

In 2008, we embarked on a system selection process that resulted in naming Epic as our vendor of choice. We signed the contract in November of 2008 and that marked the beginning of a Clinical and Business Transformation process that culminated with a "Big Bang" Go Live on April 1st of 2010.

The scope of the implementation included all of Altru Health System's facilities. The following application modules were part of that implementation scope: Enterprise Registration, Enterprise Scheduling, Hospital and rofessional Billing, HIM, EpicCare Inpatient Clinical System, EpicCare Ambulatory Electronic Medical Record, Inpatient Pharmacy, Emergency Department, Radiology RIS, Operating Room Management System, Anesthesia Information Management System, Nurse Triage, Laboratory, Oncology Information System, Obstetrics/L&D Information System.

Altru has been filmless since 2007 and part of our Epic implementation scope was a full PACS/Epic/RIS/Transcription integration involving all modalities.

Resulting Value / ROI

Altru Health System has successfully qualified for E-Prescribing incentives offered by CMS.

Altru has qualified to receive the maximum incentive available for our Eligible Hospitals and Eligible Providers through the Meaningful Use program. We completed our attestation for Stage 1 (both years), Stage 2, Year 1 and we are well positioned for successful attestation for Year 2 of Stage 2.

Immediately after go live, we significantly reduced our dictation/transcription by over 70% resulting in reduced costs for chart handling, paper charts and other supplies. We also freed up over 19,000 square feet of chart filing floor space to be used for other health system needs. As a result of our providers documenting

"Altru Health System has invested a lot of time and effort into improving technology that we use to serve our patients. We are pleased to have received this top Stage 7 designation, as it acknowledges the effort that our staff have put into our EMR initiative. We believe our current system has us prepared to meet future health care challenges for years to come."

Mark Waind, CHCIO, Administrative Director of IS, Altru Health System

online into the EMR our HIM staff has been reduced saving the organization over $2.5 million in salaries per year. HIM alone has seen over $10 million dollars saved over the last 4 years. Reduced number of duplicate procedures: We have realized significant savings and witnessed significant decreases in the number of unreimbursed procedures. Outside of the obvious money savings this effort has provided, it also has helped improve our patient satisfaction.

One of our strategic goals was to extend our EMR functionality to our care partners within our region, namely to the network of Critical Access Hospitals in order to improve the sharing of information and improve longitudinal care. We have managed to quickly extend Epic to eight Critical Access Hospitals creating an amazing conjunction of interoperability, care coordination, ability to exchange data and streamline incoming referrals while affirming the foundation for an excellent population health management system.

Overall, significantly improved financial returns – increased charges, reduced billing costs, increased collections, and notable improvements in coding. Furthermore we have reduced number of AR days from ~80 to 40 or less.

The ability to collaborate easier with other organizations on research and other projects such as the Statin Choice Decision Aid with Mayo Clinic and the Cardiovascular Wizard Study – (Provider and patient decision support that prioritizes actions to reduce CV risk) with Health Partners.

Lessons Learned

Providers should work with their vendor to determine how far in advance they can populate patient charts with clinical data, so that providers do not have to start with a clean slate during their first electronic visit with the patient. Despite fairly ambitious conversions we still had to conduct chart abstraction – due caution should be exercised so that staff with proper clinical background are performing the actual abstraction.

Reducing patient volume during the initial "go-live" period reduces staff anxiety. It's best to schedule all appointments during this period as if they were new patient appointments or cut workload up to a reasonable degree and then ease back to full productivity when appropriate.

Our choice of "Big Bang" implementation as unorthodox as it seemed to us initially was indeed the right choice. The shorter the transition from paper charts to electronic health records, the better the chance of success. If the transition is too slow, the practice may get frustrated and revert back to paper records. In addition, hybrid processes that rely in part on electronic tools and stay in part manual are very error prone and a possible source of frustrations.

An implementation frequently follows the psychological roller coaster of the Gartner Hype-Cycle, in which unrealistic expectations reach a peak just prior to implementation. A "trough of disillusionment" and a recovery phase may be sped up by proper and realistic and transparent settings of expectations, timely planning for change management and proper preparation for workflow changes.

Lack of unconditional leadership support with the skills, knowledge and engagement to manage the project or absence of a strong clinical champion may be detrimental to the project. Physician leadership is the key. Lack of staff to provide sufficient real-time support during go-live when the risks are greatest, the learning potential is highest and when staff need training the most may lead to costly mistakes and put patient safety in jeopardy.

ARcare

Profile

ARcare is a private, non-profit organization designated as a Federally Qualified Health Center (FQHC) providing affordable primary medical and dental care to the residents in rural Arkansas and western Kentucky through a network of more than 50 primary care clinics, dental clinics, pharmacies, wellness centers, HIV Care and HIV Case Management. In Kentucky, we operate as KentuckyCare.

The Challenge

Within an extremely agile timeframe, we experienced major problems with the training of clinical staff. This included initial understandings of workflow, process and technology. They wanted to be a part of the change but did not “get it.” Our challenge was how to put together a method for all communities of professions to have input AND be a part of complex change management activities.

Implementation Overview

The answer to our challenges was a complete governance overhaul that included:

- Standardized workflow across the enterprise
- Communication that embraced change, including the possibility of failure
  - o Testing failures can often lead to better than expected results in shorter periods of time
- Re-examination of training methodology and re-training of the entire clinical staff
  - o The KMS (Knowledge Management Systems) education department created new three-day training programs for all clinical staff
  - o Feedback was gathered at each session and utilized to improve the learning experience at future sessions
- Removing people from their personal comfort zone so that each person being trained brought a different perspective to the sessions
  - o Working in small groups, each three-day training program was rolled out across each clinical facility
  - o We now provide ongoing, mandatory training for ALL staff on a regular basis to ensure we continue optimal performance
- As a result, we experienced improvements and increased satisfaction almost immediately that continued to grow with each successive session.

Resulting Value / ROI

The entire experience helped the organization recognize and develop an appreciation for the fact that change can and should be a positive experience. ARcare has developed a level of confidence across the organization where employees are less reluctant or fearful of change. Learning from failure was slightly painful but resulted in a valuable outcome.

In addition to immediate satisfaction across our employee spectrum, our patient satisfaction increased because our staff was more functional with the technology in place and felt comfortable exhibiting the use to patients.

We have been able to leverage our educational resources to now include all aspects of patient and employee engagement where technology is utilized. This includes hands-on learning, web-based and distance learning and skills determination and remediation. This has greatly reduced and in some cases eliminated the angst created through not viewing technology as a tool. The focus is now on information rather than technology.

Five months after going live with the new system we achieved Stage 6 on the HIMSS Analytics EMR Adoption Model℠. One year later we became the first FQHC and the second free-standing ambulatory practice, not tethered to a hospital system, to achieve the highest level of EHR usage, EMRAM Stage 7.

Lessons Learned

Many healthcare professionals are simply not comfortable communicating a lack of understanding with technology or, more often, the need for additional training to colleagues. We assumed that peer trainers that had been involved in the overall process would be effective in teaching their colleagues and this was not the case. We found that most people had objections to process with other colleagues. Not everyone has the natural ability to teach and understanding complex technology and process and being able to explain it to others is quite different.

10 Beaumont Health System

Profile

General Beaumont Health System (BHS) is a three-hospital regional health system located in south eastern Michigan with 1,778 licensed beds, more than 20,200 employees and 3,100 physicians, including 553 employed physicians in the Beaumont Medical Group and more than 2,500 private-practice physicians. In addition to its hospitals in Royal Oak, Troy and Grosse Pointe, Beaumont has 54 community-based sites of care in the metropolitan Detroit area including multi-specialty medical centers, family practice and internal medicine practices, five nursing centers, home care services and hospice.

Beaumont Health System realized the importance of an Electronic Health Record during the mid-1980's, resulting in the implementation of Health Data System's Misys product. The transition from Misys to Epic began with Beaumont's 2006 rollout of Revenue Cycle. This was quickly followed in 2007 with the implementation of the first Ambulatory offices, the ASAP trackboard and the IP Willow Pharmacy module. In 2009 the rollout of Epic continued with the EC, Nursing Clinical Documentation, Radiant and IP Clinical Documentation, this also marks the end of Beaumont's transition away from Misys. Since 2010, Beaumont has continued to implement Epic modules and improve functionality including: CPOE, myBeaumont Chart, OpTime, Meaningful Use, Physician Documentation, Stork, BCMA, Dialysis, Care Everywhere, Anesthesia, Breast Milk Barcoding and Blood Product Matching. In 2011, Soft Lab Suite was also implemented and interfaced with Epic.

HIMSS Analytics EMR Adoption Model℠ Stage 7 was awarded to Troy Beaumont Hospital and 209 Ambulatory clinics on November 11, 2014.

The Challenge

A corporate-wide initiative focused on providing more direct patient care while decreasing the amount of nondirect patient care. The hypothesis for the project was based on the premise that with a reduction in the physical therapists non-value added time, that BHS could create a new service for the patients called "mobility units." This service would provide patients with more intense therapy more frequently, and in a timelier manner; thereby creating high quality, high-value focused care to improve patient outcomes. The goal was to eliminate wasted time by the therapists and provide more direct patient care. The team realized that this goal could only be accomplished by driving clinical behavior with the EHR.

Implementation Overview

Physical and Occupational Therapy initially utilized a Kaizen approach for this project. Multi-disciplinary teams were formed to observe workflows of physicians, nurses, physical and occupational therapists associated with PT/OT patient care. The Kaizen process challenged these teams to look at what was currently in place and make improvements. As observed by the team, a number of online tools were already available to patient caregivers through the use of the EHR documentation flowsheets, notes, consult orders and a summary page, as well as discharge recommendations.

One of the programs implemented as a result of the Kaizen process was a hospital-wide mobility program which is a multi-disciplinary approach designed to assess the function of each patient and develop an individualized mobility plan leveraging the entire care team. The mobility program includes all of the adult ICUs and many of the specialty units. While the program is a collaborative multi-disciplinary approach, each unit must integrate unit specific needs and disciplines, focusing on how to link various workflow processes together. The entire process is enabled by the integrated EHR, as each of the disciplines documents electronically and communicates via a shared patient plan of care.

As part of implementing this program, the PT/OT team created a number of new online tools and processes aimed at improving communication, saving time and improving patient care. These include:

- Multi-disciplinary rounding tools developed and customized for specific patient populations to help determine appropriate care plans and better enable the documentation of patient progress
- Unit specific mobility templates built to facilitate multi-disciplinary communication
- Customized PT/OT Summary Report to reduce the time necessary to review patient's online charts before treatment.

In addition to new online tools, the following improvements were made to facilitate using the EHR to improve the mobility program and PT/OT staff productivity:

- Order and Order Set Revisions
- New Clinical documentation for assessments in documentation flowsheets and Smart Text
- Customized System Lists to better align the right therapist to the right treatment
- Clinical Decision Support including Best Practice Advisories and use of standing order
- inclusion/exclusion criteria
- Dashboard for rehabilitation residents to prioritize patients to treat and complete follow-up

Resulting Value / ROI

A number of metrics were chosen to monitor the effectiveness of the mobility program. These include the following:

- Time spent reviewing charts – There was a measured reduction of 5-15 minutes per chart reviewed, thus saving approximately 30 minutes of chart review time per therapist per day increasing the number of patients that can be seen each day.
- Missed treatments – Over a two year period, the percentage of missed treatments dropped steadily from 75% to 13%.
- PT/OT productivity – There has been up to a 20% increase in the number of patients seen per day which translates to an increase in the billed units per therapist per 8 hour day resulting in increased revenue generated by the PT/OT department
  LOS – There has been a reduction in the average ICU LOS of 0.8 days/month per patient, average total
- LOS for the ICUs has decreased by 3.2 days/month per patient. In the MPCU there has been a decrease of .5 days/month per patient with the overall LOS decreasing by almost 2 days/month per patient.

Lessons Learned

- Include IT Technical team members in Kaizen observations so the right team members are available to work with the team when planning changes and improvements.
- Include all potential stakeholders when making changes so the downstream effect of the changes is known in advance. A robust communication plan must be initiated when making changes to the EHR.
- Pilot changes with a multi-disciplinary group. This allows for revisions to occur without impacting a large number of staff.
- When a multi-faceted solution is required, incorporate all changes at the same time. This allows for better scope and requirements documentation to better define the request and EHR solution.
- After a successful pilot, implement using a big bang approach. At times the team allowed for a slow rollout of changes to occur which resulted in inconsistent workflows. A more defined implementation, incorporating multiple changes would have resolved this issue.

12 Cerner Healthe Clinics

Profile

Since opening in 2006, the Healthe Clinic has provided Cerner associates and their families patient-centered, integrative quality care in a nurturing environment. As a Medical Home, the clinic's care team continues fulfilling its vision of transforming the health care delivery process and experience through personalization and technology. Members of the Medical Home develop a mindful clinician-patient partnership built around trust, respect, and shared decision-making.

Cerner associates and their families have the option of using the onsite Healthe Clinic, Pharmacy and full-service Fitness Center at three Cerner campuses in the Kansas City metro area. Services provided at the Healthe Clinics include primary care, urgent care, health coaching, behavioral health, maternity navigation, chiropractic, laboratory and pharmacy services. Members can schedule appointments online and utilize secure messaging with providers through a personal health management platform.

The Healthe Clinics achieved HIMSS Analytics Ambulatory EMR Adoption Model℠ Stage 7 recognition on October 24, 2014.

The Challenge

In 2005, Cerner Corporation leadership created a plan to address the specific needs for the health and care of their insured population and control the upward trend of health expense. Central to their strategy was the opening of the first Healthe Clinic in 2006 at Cerner's World Headquarters location in Kansas City, with the mission of delivering higher quality care and changing the patient experience.

Leveraging Cerner's intellectual property and EHR solution technology, the Healthe Clinic features highly automated care delivery. The EHR serves as the lever to deliver higher quality care and gain organizational knowledge using Cerner solutions in a live environment.

Implementation Overview

The suite of solutions implemented within the Healthe Clinics include the EHR, CPOE, Clinical Documentation, Physician Documentation, PHR, Patient Portal and Retail Pharmacy, all of which went live upon opening in 2006. The clinic acts as a living lab, serving as early adopters for Cerner solutions and partnering in edge-of-innovation projects. Recent projects include PowerChart Touch, self-registration kiosks, team-based care model, personalized musculoskeletal programs, and population health solutions.

"Our own associates and their families are receiving the highest quality health and care in addition to the most personalized experience possible delivered through the technology that they have created. Receiving the Stage 7 distinction was validation that we truly are among the elite of those innovating at the edge to maximize for the now and innovate for the next."

Dr. David Nill, Cerner Vice president and Chief Medical Officer, Healthe at Cerner

STAGE

Resulting Value / ROI

- The Healthe Clinics are completely paperless environments, eliminating need for file storage space and staff to manage.
- Care delivery is highly transparent to the consumer. 80% of members utilize the patient portal which offers ability to message directly to provider; view personal health record; request prescription refills and renewals; complete eVisits and direct book appointments.
- Integration with onsite Healthe Fitness Centers using direct messaging resulted in a higher compliance rate with plan of care for injury rehabilitation.
- Successfully implemented team-based care using multi-contributor care coordination note.
- Hypertension control rates above 70%, driven by real-time feedback via alerts, ranked physician leaderboards and team-based care delivery.
- To demonstrate the continued success of our health and care initiatives, in a cohort analysis of 1,900 Cerner Health Benefits members, from 2009-2013, 72% either maintained or reduced their clinical risk factors, all while aging five years.
- Members with three or more risk factors decreased by 9%.
- Clinic users spend on average $49 less per member per month as compared to all other plan members in the Kansas City community as a result of high quality, efficient service.
- Pharmacy generic dispensing rate is 81% and continues to rise each year.
- The Healthe Clinics are actively data sharing across the Lewis and Clark Information Exchange (LACIE).

Lessons Learned

- Utilizing digital signage is an effective way to address change management and engagement.
- A well-organized governance structure is critical to physician adoption and ensuring clinical appropriateness of design and build.
- Better understanding of the ever-changing end user devices used to interact with the EMR and overall impact on staff workflows.
- Do not make the workflow fit the technology – technology should fit the ideal workflow.
- It takes experience to strike the optimal balance in decision support between active and passive alerting, minimizing pop-up fatigue.

14 Children's Hospital of Orange County

Profile

CHOC Children's regional healthcare network includes two inpatient facilities, four centers of excellence (Heart, Neuroscience, Orthopaedics and Hyundai Cancer Institutes), five primary care clinics, over twenty specialty care clinics/centers, a research institute, and a wide variety of community education and outreach programs. CHOC Children's Hospital in Orange is a 279-bed tertiary care facility with 11,500 annual admissions offering a range of medical and surgical services as well as pediatric, cardiovascular, and neonatal intensive care units. The 67-bed NICUs include a 12 bed Extremely Low Birth Weight (ELBW) Baby Unit which has seen significant improvements in outcomes for these preterm infants since opening in 2010. CHOC Children's is among the best children's hospitals in various specialties identified by U.S. News and World Report and is a Leapfrog Top Hospital. CHOC earned the Gold Level CAPE Award from the California Council of Excellence, the only children's hospital in the state to ever earn this distinction and for the second time, the PICU earned the Pediatric Beacon Award for Critical Care Excellence.

CHOC was also pleased to be validated as HIMSS Analytics EMR Adoption Model℠ Stage 7 on January 7, 2015.

The Challenge

Between May 2010 and May 2012, CHOC Children's reported 45 breast milk handling errors: 3 where the wrong breast milk reached the wrong baby; 16 labeling errors where the error was detected prior to administration to the patient; and 26 storage errors where correctly labeled milk was stored in the wrong patient's bin. As a result, a multi-disciplinary team reviewed the entire breast milk handling process, identifying 282 potential failure points and determining the root causes for the top 85 potential failure points. Primary concerns were that the process was unclear and cumbersome for the bedside nurse; that there were inadequate double checks at key points in the process; and that, due to the frequency of breast milk handling, there was risk of human error and confirmation bias. Furthermore, of the 85 targeted potential failure points, 55% were unlikely to be detected. CHOC Children's administers approximately 7,000 individual breast milk feeds per month. As a children's hospital, breast milk may be administered on any inpatient unit; however, the NICU is the largest user of breast milk within the facility. A NICU nurse could handle breast milk 12 times per shift creating the risk of confirmation bias and reduced sensitivity to the potential risks.

Implementation Overview

To improve patient safety and reduce breast milk administration errors, CHOC Children's implemented centralized breast milk handling and breast milk bar code scanning. It was determined that these efforts alone would address 75 of the top 85 potential failure points (88%).

Three bar code scanning systems were evaluated by a multi-disciplinary team. The system selected allowed for the greatest degree of customization and several months were spent making the system specific to the very intricate breast milk handling program that had been initiated during the 10 months prior. Direct interface with the hospital EMR was planned to reduce risk and improve patient safety through three primary areas. First, the system would automatically calculate the exact amounts of breast milk and additives for each 12 hour batch eliminating the need to manually calculate, thus decreasing the risk of human calculation error. Second, the bar code scanning would replace the two person double check at the time of preparation, feeding, and discharge, again reducing the risk of human error and improving efficiency. Finally, it would automate the labeling process reducing the risk of error with regards to the handwritten expiration dates and times. In addition to improving safety, the interface was also designed to provide a real time inventory for the staff to share with mothers so that more milk could be brought in from home before running out.

Resulting Value / ROI

PATIENT SAFETY: As noted in the original assessment, the vast majority of potential failure points were unlikely to be detected with the prior systems. The centralization of breast milk handling and use of bar code scanning provided a framework for closer scrutiny to breast milk handling processes and allowed for tracking of breast milk administration errors and near misses. Error rates dropped to 5: there were no incidents where breast milk reached the wrong patient; 1 labeling error which was detected prior to administration to the patient; and 4 breast milk storage errors where correctly labeled breast milk was stored in the wrong patient's bin.

However, during the first year, the system recorded 110 wrong milk to wrong baby near misses. Bar code scanning also improved safety by eliminating manual calculations of additives. In addition, bar code scanning prevented 193 incidents of expired breast milk from being fed during the first year. Prior to bar code scanning, there were no reported incidents of expired breast milk being administered; however, there were no monitoring systems in place to detect such issues. Thus, implementation of bar code scanning highlighted a potential problem area that was not adequately monitored under previous processes.

PATIENT SATISFACTION: The bar code scanning system improved patient satisfaction by providing a realtime breast milk inventory to help avoid either running out of milk or a mother having to make a last minute extra trip home to bring more milk to the hospital. The system sends the inventory data outbound to the EMR where the nurse can easily access it and share with the family. In addition, mothers can sign up for automatic text messaging where the bar code system sends a text in both English and Spanish alerting them to bring more breast milk to the hospital when inventory reaches a designated level.

STAFF TIME SAVINGS: Bar code scanning resulted in a statistically significant reduction in staff time spent directly handling breast milk. The total time saved for preparation was reallocated for other direct patient care duties. In addition, scanning eliminated the need to staff two technicians at all times to be able to do a two person double-check to confirm identify on each breast milk bottle. By staffing with one technician at non-peak times, a 20 hour per week shift was eliminated resulting in direct yearly savings of ~$30,000 in salary, benefits, and related costs.

In addition to the direct time savings for the technicians, scanning resulted in other noticeable improvements in efficiency. The bedside RN was able to save time by not having to locate a second RN when the parent was not available for the double check. Furthermore, the interface between the bar code system and the EMR resulted in data automatically being charted upon scanning instead of the RN having to manually enter providing further time savings.

Lessons Learned

- The biggest lesson learned from this project was that breast milk administration errors are likely much more common than organizations realize. At the onset of the project, the team recognized that 55% of errors were unlikely to be detected by the previous systems in place; however, 110 wrong milk to wrong baby near misses and 193 expired breast milk near misses during the first year of scanning, far exceeded the suspected numbers. Discussions with other hospitals suggest that those organizations also estimate their breast milk administration errors to be 1-2 per year (similar to the number reported at CHOC prior to this project). Concrete data supporting the fact that errors are likely more common (and that without automated systems, such as bar code scanning, are unlikely to be detected), should prove very helpful to the industry as a whole and help improve the safety for all babies. Our outcome data has been published and presented via lectures and posters at professional meetings with the hopes of encouraging other facilities to take a critical look at their own safety processes in place.
- Likewise, it was suspected that the bar code system would improve efficiency; however, the amount of time and cost savings exceeded expectations.
- Approximately four months were spent customizing the system to meet the needs of the organization and the highly specialized handling practices already in place. That time was critical in the success of the implementation resulting in a very smooth go-live and very few modifications required after initiation.

Cleveland Clinic

Profile

Cleveland Clinic is a nonprofit, multispecialty academic medical center that integrates clinical and hospital care with research and education. It was founded in 1921 by four physicians with a vision of providing outstanding patient care based upon the principles of cooperation, compassion and innovation. Today, with more than 1,440 beds at its main campus and more than 4,450 total beds throughout the system, the organization is led by a physician group of more than 4,000 employed staff. Cleveland Clinic's Institute model combines specialties around individual organs or disease systems, creating integrated practice units that facilitate the highest level of collaboration and patient-centered care. As one of the largest and most respected hospitals in the country, Cleveland Clinic is consistently named as one of the nation's best hospitals in U.S. News & World Report's "America's Best Hospitals" survey, with a heart and surgery program that has been ranked No. 1 each year since 1995.

Cleveland Clinic attained HIMSS Analytics Ambulatory EMR Adoption Model℠ Stage 7 status in November of 2014.

The Challenge

One commonly sighted approach to achieving a more "value-based" healthcare model is to design and implement a series of provider-determined, evidence-based treatment standards that can help reduce unnecessary variation when applied to the care of specified patient populations. Without inhibiting the best judgment of experienced clinicians, standardized treatment plans can help ensure that quantified best practices are consistently applied while highlighting those instances where individual patient needs may vary according to situation and circumstance. Costs savings can be realized when providers safely minimize the potential for unnecessary or redundant testing, reduce time-to-treatment, and shorten the average length-of-stay associated with a patient's care cycle. And patient and provider satisfaction can be positively impacted when complications or other issues are reduced or avoided.

But to be effective, particularly in a large, multispecialty group practice, a standardized path of care must accurately reflect the accumulated experience and expertise of all the various medical professionals who participate in delivering care. These treatment plans must also be integrated into provider workflows with as little disruption as possible; enable effective care coordination over time and distance; and, for the purposes of quality measurement, continuous improvement, and payer reporting, promote accurate and detailed clinical documentation. Finally, these plans must be capable of streamlining provider communication while connecting patients to the kind of customized educational opportunities that can help reduce the anxiety caused by uncertainty and increase compliance by promoting a patient's sense of participating and engagement.

At Cleveland Clinic, our challenge was to create a process that would allow multiple providers to devise, build and deliver non-proscriptive standardized care to identified patient populations. We wanted to do this in a way that would promote best practices, create a dynamic data set to guide ongoing knowledge generation, and bring clinicians and patients together through a common set of tools. We call our solution to this challenge "Cleveland Clinic Technology-enabled Care Paths."

Implementation Overview

Cleveland Clinic technology-enabled Care Paths are an example of our group practice's effort to positively redefine our 21st century model of care. Reflecting our organization's multidisciplinary team approach and "patients first" Institute alignment structure, our technology-enabled Care Path development process includes people, process and technologies engineered to accomplish real clinical outcome, financial, and patient experience improvements. Connecting the various coordinated processes, functional requirements and information management components of each Care Path is a common information technology infrastructure that is available in all Cleveland Clinic locations and facilities. While implementation of our ambulatory Epic electronic health record (EHR) platform occurred over a decade ago, and our inpatient platform was implemented over eight years ago, our physician-led advisory teams continue guiding ongoing system modifications designed to help our caregivers deliver the highest care possible.

For our first defined technology-enabled Care Path, a total hip and total knee replacement, we assembled a multidisciplinary team that included direct care providers from our Orthopedic and Rheumatologic Institute, various application, technology and analytics experts, and administrative representatives with experience in multiple operational environments. Redesign of the care process began with the creation of a clinical Care Guide developed around best practices for these target conditions. Care redesign started in the ambulatory setting where a patient's eligibility for a procedure is determined through a standardized pre-operative patient assessment and evaluation that captures a combination of patient- and nursing-entered data. This discrete information is used to calculate a Skilled Nursing Facility (SNF) Risk Score which helps determine the likelihood that a patient will require discharge to a SNF post-operatively.

EHR tools were also developed to facilitate the standardization of care and reduction in care variation efforts, including, but not limited to documentation templates, flow sheets, and order sets. Finally, analytic outcome measures were developed in four areas: process of care; quality; patient experience; and financial and other structured reporting interactions. A transparent dashboard of all providers now functions as a management tool.

Resulting Value / ROI

Initially, there was a progressive implementation of our technology-enabled Care Paths. Patients were captured either on or off the Care Path in the EHR and measured independently. In general, patients who have been placed on a Care Path show improved outcomes when compared to patients not on a Care Path in almost all measures. While identical measures were captured for both total hip and total knee replacement patients and similar results were observed, the following information is reported for total hip replacement patients only.

Process of Care

One measure inside the process of care relates to blood utilization, and another involves the use of standardized documentation. Pre-operative assessment of anemia was determined and with other standardization efforts there was an overall 48% drop in blood utilization, and a 400% improvement in use of structured template documentation from the time the Care Path went live in 2013 through the end of 2014.

Quality

Among several metrics in this area, peri-operative measures, including those in the National Surgical Quality Improvement Program (NSQIP®) group, all-cause 30 day readmission rates, average length of stay (LOS), and percent of patients discharged home are measured as part of the Care Path experience. Of note are the 11% reduction in LOS, and 7% increase in home-going patients without significant change in readmission rates recorded for patients following a technology-enabled Care Path.

Patient Experience

Important to patients are their pain management plans and their ability to communicate with their care team. Both of these measures have remained stable for Care Path patients, despite the pressure on the quality measures above.

Financial

The final group of measures involves the overall cost of care. From 2013 to 2014, streamlining the care process efforts has afforded an average 9% per case overall cost reduction with a 3% per case drop in implant cost.

Service Improvements

Understandably, there are multiple other service improvements which accompany Cleveland Clinic's Care Path effort, including:

- A team of care coordinators follow the patients throughout their course of care, helping to communicate and facilitate the various steps in the care process
- Hip and Knee outcome scores (Hip Disability and Osteoarthritis Outcome [HOOS] and Knee Injury and Osteoarthritis Outcome [KOOS]) are obtained from patient input at various intervals to track overall progress

Lessons Learned

Building on the success of the first of Cleveland Clinic's technology-enabled Care Path initiatives, which involved the focused effort of our Orthopedic and Rheumatologic Institute, other Institutes and specialties have initiated similar development projects. Some significant lessons learned from these ongoing efforts include:

- The need to integrate technology teams directly into the operational dynamic of a multidisciplinary practice so that the clinical functions and processes that clinicians use can be translated through the EHR in the ways that the clinicians themselves determine will be most useful
- The inestimable value of close cooperation and partnership inside the multidisciplinary teams of clinicians and technology professionals who are called upon to accomplish true care redesign
- The realization that technology-enabled components of an effectively Care Path must accurately reflect the practical and dynamic clinical processes that are most effectively expressed in the best practices and collective expertise of experienced clinician caregivers

The final lesson learned during Cleveland Clinic's Care Path experience was the critical value of communication between team members, leadership, management, administration and patients. One of the greatest benefits of integrated technology systems is the connectivity created between groups and individuals. By leveraging this connectivity, and including communication efforts throughout the development, implementation, and application processes, caregivers and patients can make the patient / physician relationship the central concern of further patient-centered, technology-enabled care model redesign.

"I think of bringing together multiple caregivers with a range of skills and experience to design, build, and implement a Cleveland Clinic technology enabled Care Path as our team approach to individualized care. It effectively aligns functional IT capabilities with the practical needs of busy clinicians, as expressed by the clinicians themselves. That level of collaboration is, I believe, a model for success in any complex, demanding endeavor."

Robert White, M.D., Associate Chief Medical Information Officer, Cleveland Clinic

20 Kaiser Permanente

Profile

Kaiser Permanente is an integrated health care delivery system comprised of Kaiser Foundation Hospitals, Kaiser Foundation Health Plan, and physicians in the Permanente Medical Groups. Today we serve more than 9.6 million members in eight states and the District of Columbia. Our mission is to provide high-quality, affordable health care services and to improve the health of our members and the communities we serve.

Care for members and patients is focused on their total health and guided by their personal physicians, specialists, and team of caregivers. Our expert and caring medical teams are empowered and supported by industry-leading technology advances and tools for health promotion, disease prevention, state-of-the-art care delivery, and world-class chronic disease management. Kaiser Permanente is dedicated to care innovations, clinical research, health education, and the support of community health.

Kaiser Permanente includes over 17,400 physicians and 174,000+ staff who work in or provide support to 38 hospital medical centers, and hundreds of medical office complexes, laboratories, pharmacies, call centers and dental offices.

All eligible Kaiser Permanente ambulatory sites (350) were validated as HIMSS Analytics EMR Adoption Model℠ Stage 7 as of January 14, 2015.

The Challenge

Outpatient safety is relatively uncharted territory in the healthcare industry. Patient safety efforts have traditionally focused on the inpatient setting, where risks are more readily identified. Outpatient safety risks are less obvious. If an error occurs in the outpatient setting, it may take an extended period of time before it is recognized or has an effect on the patient. All those who receive outpatient care need follow-up monitoring and continuity of care to ensure their safety. Kaiser Permanente Southern California (KPSC) is leading the way in broadening the definition of patient safety with the creation of Kaiser Permanente SureNet. This centralized effort systematically identifies and addresses groups of patients with outpatient safety risks. Kaiser Permanente's SureNet leverages Kaiser Permanente's integrated delivery system and KP HealthConnect® to drive a new model for outpatient health care and safety.

The overall goal of the Kaiser Permanente SureNet is to centrally support front-line care by proactively identifying outpatient safety risks in order to avoid/reduce adverse outcomes for the Kaiser Permanente patient populations, including many who never present to the hospital.

This is done by:

- Leveraging Kaiser Permanente's integrated delivery system and comprehensive electronic medical record to proactively identify outpatients with certain abnormal results, medication profiles, or gaps in follow-up care and provide necessary intervention.
- Rapidly launching new SureNet initiatives, leveraging a standard launch process, electronic tools, and protocol-driven workflows, to address outpatient safety risks quickly and efficiently with system wide solutions.
- Ensuring consistent outcomes that are not contingent on local variation, priorities, budget constraints or resource restrictions.
- Facilitating the transfer of this practice nationally across Kaiser Permanente regions and to outside organizations (including community clinics) to ultimately drive a new model for outpatient health care delivery across the country.

Implementation Overview

Since inception in 2009, thirty (30) SureNet initiatives have been launched in these areas of safety risk:

- Diagnosis detection and care follow-up
- Medication monitoring including potentially harmful interactions

PROJECT HISTORY:

October 2009 – First manual Kaiser Permanente SureNet launched for patients on Digoxin. Abnormal results detected in 34 patients otherwise not detected.

Project repeated in 2010 and 2011. After its success, many new ideas surfaced that resulted in additional SureNet projects.

February 2010 – Second manual initiative launched to follow up on unrepeated abnormal creatinine lab results. As a result, 214 new cases of chronic kidney disease were identified that otherwise would have been missed.

August 2010 – Acetaminophen (APAP) Overuse Safety Net launched in response to FDA warnings about APAP overuse hazards. Interventions on 210 patients in the first 30 days reduced the risk of potentially harmful interactions by 22.2 percent.

Based on the success of these initiatives and three previously launched electronic safety nets, the KPSC Kaiser Permanente SureNet became official in 2010, with an identified infrastructure and process to support the various ongoing and new initiatives of outpatient safety risk: diagnosis detection and care follow-up, medication management including potentially harmful interactions.

The list of ideas for new projects is continually fueled by HEDIS or other publicly reported metrics, requests from physicians, frontline staff, medico-legal case learnings, risk management, medical literature, regional and service area leadership, and presentations at national conferences.

APPROACH

Kaiser Permanente SureNet is staffed by a small cross functional team consisting of pharmacists, RN and LVN's project coordinators, and data analysts. SureNet leverages KP HealthConnect®, the organization's electronic medical record, and other automated tools.

The development and spread of successful practices is standardized into the following approach:

- Each KPSC Kaiser Permanente SureNet project is overseen by a multidisciplinary Subject Matter Expert and Stakeholder (SMES) Panel, specific to the target population. Additional participants from diverse disciplines are involved, particularly when unique perspectives are needed for project success (e.g., coding, clinical specialties, health plan benefits, information systems, etc.).
- Through a rigorous development process, each idea is expanded into a detailed proposal. Upon final SMES Panel approval, an announcement is sent to all providers potentially impacted by the initiative.
- For each initiative, a list of patients and data needed are pulled from various centralized databases and electronic tools.
- Working in collaboration with providers, Kaiser Permanente SureNet team members intervene with outpatients on the provider's behalf and obtain information necessary for the provider to make clinical decisions.
- Patients are then asked to act upon provider-approved interventions, which may include completing lab work, scheduling a visit, changing medication, completing immunizations, etc.
- Each patient is tracked until either the proper follow up occurs, or is closed via documentation of patient refusal, non-compliance or contraindication in the electronic medical record.
- The majority of interaction between the team and providers occurs in the electronic medical record. Kaiser Permanente's centralized outreach infrastructure enables communications with patients that is customized by project and deployed through a variety of outreach methods such as letters, live calls, automated calls, and email.
- Using this standardized implementation process, new safety net ideas can be deployed within a few months.

Resulting Value / ROI

SOUTHERN CALIFORNIA REGION RESULTS:

ABDOMINAL AORTIC ANEURYSM (AAA) TRACKING
2011-2014

- Population 3.86 million
- Subsequent to implementation of a Best Practice Alert; 2062 new AAAs were diagnosed, with 87 identified as requiring surgical intervention
- Percentage of unscreened patients was reduced from 51.74% to 20.26% system-wide

REPEAT SERUM CREATININE

Over 5 years, 12,396 patients were identified with an elevated creatinine that was not repeated. 6,981 (56.3%) of patients completed a lab order. Among the 6,981 individuals who repeated the creatinine measurement, CKD was established in 3,668 (52.5%).

STATIN DRUG INTERACTION CONVERSION

Kaiser Permanente SureNet drove an 87% reduction in potentially harmful interactions which resulted in a significant reduction of annual rhabdomyolysis cases.

HEPATITIS C

- In 2014, 1,055 patients were identified as having had a reactive Hepatitis C antibody test (prior to confirmatory testing).
  - 663 (62%) completed lab orders
  - 264 (25%) tested positive for Hepatitis C

ELDERLY HIGH DOSE DIGOXIN CONVERSION

Since May 2013, over 1,400 patients have been switched to low dose digoxin.

"This program really speaks to Kaiser Permanente's commitment to provide the safest, most reliable care that's possible."

Michael Kanter, M.D., Director Quality and Clinical Analysis, Kaiser Permanente Southern California

STAGE

"Kaiser Permanente SureNet is great because any physician, any specialty can come up with an idea and can present it and can get it done…"

Mark Rutkowski, M.D., Southern California Regional Chronic Kidney Disease Leader

TRANSFER ACROSS THE ENTERPRISE

Kaiser Permanente SureNet was created and deployed in Southern California and then transferred across Kaiser Permanente regions nationwide. Kaiser Permanente regions are distinctly positioned to explore outpatient safety using information in our integrated electronic medical record and Kaiser Permanente's strategically aligned provider infrastructure. Regions can leverage existing quality and population care management processes and structure to create a centrally coordinated, standardized approach for addressing outpatient safety risks and generating new safety net initiatives, potentially improving care and safety for millions of patients

Lessons Learned

- Ambulatory safety is a new frontier in health care delivery that offers a unique opportunity for care improvement.
- A centralized process has allowed for improvement in decreasing variation.
- A standardized design and process coupled with the integration and electronic tools allows for rapid expansion across regions and rapid deployment of new initiatives.

24 Lancaster General Health

Profile

Lancaster General Health (LG Health) is a 631-licensed bed not-for-profit health system with a comprehensive network of care encompassing Lancaster General Hospital (LGH) and Women & Babies Hospital, including a Level III-B Neonatal Intensive Care Unit. Outpatient services are provided at the Downtown and Suburban Outpatient Pavilions, along with additional Outpatient Centers and Express and Urgent Care locations throughout the region. Pennsylvania College of Health Sciences is a private, co-educational, Middle States-accredited four-year college offering a variety of associate and baccalaureate degree and certification programs in healthcare. Other system organizations include: Affilia Home Health; Lancaster Rehabilitation Hospital, in partnership with Centerre-Healthcare; Horizon Healthcare Services; and Lancaster General Health Physicians, comprised of nearly 300 family doctors and specialists and more than 40 offices throughout the area.

Designated a Magnet hospital for nursing excellence, LGH has been recognized regionally and nationally for clinical excellence and patient safety; and ranked nationally by U.S. News & World Report as one of the best hospitals for 2013-14 and 2014-15 in four specialties.

In December 2013, Lancaster General Health achieved HIMSS Analytics EMR Adoption Model℠ Stage 7 and was validated as Stage 7 on the HIMSS Analytics Ambulatory EMR Adoption Model℠ in December 2014.

The Challenge

Lancaster General Health has been a pioneer with their adoption of medication safety technology to improve the safety of the medication use process. Despite the use of smart pump technology, manual pump programming errors were still occurring. Smart pump data was driven by the nurse choosing to engage smart pump technology and the programming of the pump within the established rule set. Unfortunately, this data set was not robust in identifying pump programming errors as the drug library rule set had no tie to the rate/dose contained within the medication order. Smart pump integration links the medication order to the infuser channel creating an environment that eliminates manual pump programming while providing a standardized approach to pump programming. By linking the pump to the medication order, a robust data set would be available to drive practice and process changes associated with the administration of intravenous medications.

Implementation Overview

Lancaster General Health began the journey to smart pump integration in 2005 by selecting the Hospira Plum A+ wireless infusion device. Working with Cerner Bridge Medical and Hospira, Lancaster General Health established a large interdisciplinary team to establish auto programming (the ability for the smart infusion pump to be programmed off the medication order). This team, consisting of a pharmacists, nurses, biomedical engineer staff, interface specialists, and other information services staff established all aspects of a technology solution that allowed the order to populate the infusion pump by a point to point unidirectional interface and wireless communication. Lancaster General Health began the implementation of an enterprise electronic health record in 2009 with Epic. At this point, development began on a bidirectional interface that would send the infusion order information to the pump as well as bring information from the infusion device into Epic (volume infused, dose titrations, stop times). The bidirectional interface has been live since 2013 across inpatient and outpatient settings throughout Lancaster General Health. This implementation enhanced patient safety and staff efficiency while creating a robust platform for organizational learning around the infusion of intravenous medications.

STAGE

"Lancaster General Health is a national leader in Smart Pump integration. Use of these integrated pumps ensures safety, efficiency, and accuracy to significantly reduce the programming error risks from traditional infusion pumps."

Thomas E. Beeman, PhD., President & CEO, LG Health

Resulting Value / ROI

- Use of a bar code driven work flow that links the patient, medication order, and the infusion channel to reduce the occurrence of manual pump programming errors. The pump programming is "checked" against the actual medication order.
- Ability to increase staff efficiency by displaying each pump adjustment in the electronic health record for the nurses to document.
- Improvement in the accuracy of the medical record by capturing the complete infusion pump activity of continuous and titratable infusions to support informed decision making.
- Ability to program from the medication order ensuring a safety net for medications that are rare in use (may not be in your smart pump drug library) or that are introduced to respond to formulary shortages.
- Introduction of a standardized, bar code driven workflow that requires the nurse to focus on the administration of one intravenous medication at a time.
- Creation of a complete data source to improve practice and processes associated with smart infusion device use.

Lessons Learned

- Smart Pump integration requires organizations to establish a three way partnership among the electronic health record vendor, the smart pump vendor, and the health care system.
- End-user adoption is achieved by understanding how nurses use infusion devices. Infrastructure investment (wireless network) and wireless pump technology are critical to the success of the integration platform.
- Smart pump integration has many interrelated parts. Identify an organizational expert to oversee testing, adoption, and vendor relationships to ensure optimal use of the technology platform.
- Smart pump integration creates a robust data source. Organizational learning should drive improvements in the day-to-day use of the pump. In addition, this technology platform is young, and health care organizations should commit to sharing knowledge to support industry adoption and prevent patient harm.

The MetroHealth System (Cleveland OH)

Profile

The MetroHealth System consists of one acute care hospital and 17 ambulatory sites with nearly 500 attending physicians, close to 400 physicians in training, 1,200 nurses and 6,500 total employees. On an annual basis The MetroHealth System records about 1,000,000 ambulatory visits, more than 100,000 emergency department visits (Level 1 Trauma Center), and approximately 28,000 inpatient admissions. The MetroHealth System is a teaching affiliate of Case Western Reserve University School of Medicine and is the essential (public) healthcare system in northeast Ohio.

HIMSS Analytics EMR Adoption Model℠ Stage 7 Ambulatory Award received: May 2014

HIMSS Analytics EMR Adoption Model℠ Stage 7 Hospital Award received: November 2014

The Challenge

The MetroHealth System was the first essential (public) healthcare system in the U.S. to install the Epic electronic health record, beginning in the outpatient setting in 1999. We wanted to continue our leadership in the implementation, adoption, and innovative use of health information systems and our commitment to health information technology as one of the keys to becoming a successful healthcare system of the future. Achieving HIMSS Analytics Ambulatory EMR Adoption Model Stage 7 status in our ambulatory settings facilitated the expansion of our health information exchange to the Social Security Administration and the Veterans Administration and helped us standardize and streamline ambulatory work flows. Achieving HIMSS Analytics EMR Adoption Model Stage 7 status in our hospital facilitated real-time/near real-time scanning and elimination of paper processes to achieve a "paperless" healthcare system, enhanced bar-code medication administration, and closed loop pharmacy medication preparation, among other quality, efficiency, and patient safety activities.

As an academic healthcare system, we also saw achieving HIMSS Analytics EMR Adoption Model Stage 7 recognition as a critical foundation for additional teaching and research opportunities. Preparing our case value studies forced us to evaluate the impact of some of our electronic health record innovation to date. It also helped us set up systems to further innovate in the future as we adapt to a rapidly changing healthcare environment.

Implementation Overview

A multidisciplinary team of administrative, operational, clinical, and technical staff began planning for our electronic health record implementation in the mid-1990s. We became the first essential (public) healthcare system to install Epic in the ambulatory setting beginning in 1999, and we have progressed over the past 15 years to achieve HIMSS Analytics EMR Adoption Model Stage 7 status. Between 1999 and 2002, we installed Epic's outpatient scheduling, registration, billing and clinical care (documentation and ordering) modules in all of our ambulatory sites. In 2004, we installed Epic's emergency department module. In 2009, we installed Epic's inpatient pharmacy system and converted to Epic in all of our inpatient clinical care areas. In 2011, we turned on Epic's health information exchange, personal health record, and e-prescribing. In 2013 we implemented bar code medication administration. In 2014, we transitioned to Epic in our operating rooms and for anesthesiology and laboratory information system.

"Because we were an early adopter of electronic health records in 1999, our 15-years to full Stage 7 implementation has closely followed Epic's development of new electronic health record modules."

David Kaelber, MD, PhD, MPH, CMIO and Vice-President of Health Informatics and Patient Engagement

Resulting Value / ROI

Ambulatory Areas

Depression Screening – implemented 9-question Patient Health Questionnaire (standardized depression screening tool) in all primary care sites to screen for depression. Increased depression screening by 15 fold and diagnoses of depression by 23%. (K Palcisco, DC Kaelber, R Cebul, and L Stokes. Using Electronic Health Record (EHR) Tools to Improve the Screening and Recognition of Depression. American Medical Informatics Association Annual Symposium. Washington DC. 2013. [Abstract Presentation])

Immunizations – implemented immunization decision support for all pediatric immunizations (our work in this area has been designated by the Epic Corporation as a "clinical program" standard), as well as developed automated messaging system to notify parents/guardians of adolescents due for immunizations, resulting in a 25% increase in adolescent immunizations. (D Bar-Shain, M Stager, A Runkle, J Leon, and DC Kaelber. Direct Messaging to Parents/Guardians to Improve Adolescent Immunizations. Journal of Adolescent Health. 2015. [Accepted])

Pediatric Hypertension – used Epic electronic health record data to extrapolate isolated finding of underdiagnosed pediatric hypertension to expose system-wide underdiagnosis of hypertension in children and adolescents (designed as one of the top 10 breakthroughs in stroke and cardiovascular medicine by the American Heart Association in 2007) (ML Hanson, PW Gunn, and DC Kaelber. Underdiagnosis of Hypertension in Children and Adolescents. Journal of the American Medical Association. 2007 Aug 22; 298(8):874-9. PMIS:17712071). Implemented clinical decision support to increase the diagnosis of pediatric hypertension by 50%. (D Bar-Shain, K Palcisco, PJ Greco, and DC Kaelber. Using advanced electronic clinical decision support to improve the quality and recognition of abnormal blood pressure values in children. Pediatric Academic Societies Meeting. Washington DC. 2013. [Oral Presentation])

Referral Completion – developed Epic electronic health record based processes to increase the 30-day referral completion rate from ~48% to ~63% throughout The MetroHealth System on all referrals. Resulted in ~6,700 additional visits and ~$1 million in increased net revenue per month throughout The MetroHealth System. (MH Fratantonio, A Masih, M Kauffman, and DC Kaelber. Data to Dollars – Using Electronic Health Records to Complete Referrals. American Medical Informatics Association Annual Symposium. Washington DC. 2013. [Abstract Presentation]).

Hospital

Acinetobacter Outbreak Support – used a suite of Epic electronic health record based tools in support of an Acinetobacter (pathogenic bacteria) outbreak. In conjunction with other efforts, these tools decreased the incidence of Acinetobacter in hospitalized patients by more than 60%. (Recognized by an Association of Medical Directors of Information System award.)

Code Status Reconciliation – one of the first healthcare systems in the U.S. to implement code status reconciliation in our Epic electronic health record at discharge. This tool led to a 50% increase in the use of Do Not Resuscitate - Comfort Care and a 100% increase in the use of Do Not Resuscitate – Comfort Care Arrest – Do Not Intubate status in the transition from the inpatient to the outpatient setting.

Duplicate Labs – implemented several duplicate lab clinical decision support tools that resulted in a 50% decrease in duplicate lab testing and saving of thousands of dollars in expenses annually. (A Noto, P Greco, and DC Kaelber. An analysis of clinical decision support for repetitive urine culturing. American Medical Informatics Association Annual Symposium. Washington DC. 2011. [Poster])

Heparin Errors – after a sentinel event related to a heparin overdose, implemented a suite of Epic electronic health record based tools and redesigned a number of Epic electronic health record processes related to heparin. In the three years since implementing these tools and changes, no heparin errors with patient harm have been identified.

System-wide

Health Information Exchange – The MetroHealth System has conducted health information exchange more than 250,000 times and currently exchanges information thousands of times per day with other systems that have the Epic electronic health record – the Veteran's Administration, and the Social Security Administration. We have shown that when robust health information exchange occurs, upwards of 80% of the time a test is not ordered that otherwise would have been ordered, and approximately 15% of the time, an inpatient admission does not occur that otherwise would have occurred (DC Kaelber, R Waheed, D Einstadter, TE Love, and RD Cebul. Use and Perceived Value of Health Information Exchange – One Public Healthcare System's Experience. Am J Manag Care [Special Health Information Technology issue]. 2013; 19(10 Spec No. 10):SP337-343. PMID:24511888.

Our Epic electronic health record has also generally:

1. Increased research grant funding
2. Attracted and retained trainees and attending physicians
3. Decreased malpractice cases and led to more efficient resolution of malpractice cases
4. Decreased operational costs and increase revenue in numerous way

Lessons Learned

Technical and "Non-Technical" issues – Electronic health records are 10-20% about "technical" details/issues and 80-90% about "non-technical" details/issues, which are critical to getting the electronic health records implemented and adopted.

Implementation and Post-Implementation – Although implementing electronic health records is a huge undertaking, implementation is only the "tip of the iceberg." To achieve the full value of these systems, most of the work occurs after the system is live. The staffing, resources and structure is different during the implementation and post-implementation part of the cycle, but do not overlook post-implementation. Once a system is implemented, the post-implementation phase lasts forever.

Informatics – Developing an informatics team – made up of clinical staff who understand the technical functioning of the clinical information systems – is one of the keys to successful implementation, adoption and ongoing use of a clinical information system, and seems to be frequently overlooked/undervalued.

STAGE

"We are proud to be leading the way toward high-quality, patient-centered and technology-enabled care through the use of our electronic health record. HIMSS Analytics Stage 7 recognition acknowledges MetroHealth's leadership and commitment to pushing the use of electronic health records for the benefit of our patients, our healthcare system, and all of northeast Ohio."

David Kaelber, MD, PhD, MPH, CMIO and Vice-President of Health Informatics and Patient Engagement

HIMSS Analytics

30 MultiCare Health System

Profile

MultiCare is a not-for-profit healthcare organization with more than 10,000 employees and a comprehensive network of services throughout southwest Washington. We are a 1,130 bed tertiary care organization with 2,350 credentialed providers, 608 of whom are employed. There are 42,426 admissions per year and 512,000 annual outpatient visits.

Today, MultiCare is made up of five hospitals consisting of 4 adult and 1 pediatric trauma center. These include Allenmore Hospital, Auburn Medical Center, Good Samaritan Hospital, Mary Bridge Children's Hospital and Tacoma General Hospital, numerous outpatient specialty centers, primary and urgent care clinics, as well as a variety of other services and community outreach programs.

Allenmore Hospital, Tacoma General Hospital and 107 ambulatory clinics achieved HIMSS Analytics EMR Adoption Model℠ and Ambulatory EMR Adoption Model℠ status on January 9, 2015.

The Challenge

Our strategy involved the implementation of an enterprise-wide electronic health record to create "one patient, one record"—a seamless experience for patients no matter where at MultiCare they received care. Our goal of transforming the way care is delivered at MultiCare led the executive team to conclude that an investment in leading edge technology was the key to offering the best care for our patients, to ensure patient safety, and to improve the efficiency of our care teams. To reach our goal, MultiCare decided to build our electronic health record using an integrated platform instead of selecting various systems that were the "best of breed." An integrated platform would reduce the technical challenges and need for interfaces common with non-integrated systems and our data would be held in a single repository. Another key decision was to take our concept of "one patient, one record" and expand this to include our community. We decided to offer our community providers access to the electronic health record by creating an Application Service Provider (ASP) network called CareConnect™– giving regional providers secure access to patient data outside the MultiCare delivery system.

Implementation Overview

A multidisciplinary team of healthcare operations and information technology staff spent 1996 reviewing ambulatory practice management systems with the goal to standardize to a single platform. In 1996 after much discussion regarding our strategic direction, Epic's ambulatory electronic health record (EHR) and practice management applications were selected. The ambulatory clinics went live in February 1998 with the practice management applications. The EHR was implemented at our first location in August 1998. The roll out across our ambulatory locations continued through 2000. In 2004, the enterprise suite for inpatient and acute care was selected and a formal kick-off was held in September 2005. In 2007, 3 hospitals went live with admission, discharge, transfer, billing, revenue applications, clerk order entry and an electronic medication administration record. In 2008, clinical documentation for all staff was implemented along with Computerized Physician Order Entry (CPOE).

Several modules have been implemented since that time to include Radiant, Home Health, Hospice, OpTime and Anesthesia. Bedside Barcode Medication Administration was implemented in all areas across the acute care arena with the exception of Interventional Radiology and Gastrointestinal Lab. Our current approach to implementation is big bang, with all functionality going live at one time. This approach has been used successfully in our last two hospital implementations and in all of our clinics. In addition, there is extensive device integration across the system to include monitors, ventilators and Point of Care Testing equipment. MultiCare currently has a single platform of Epic across 120+ sites of care.

"The actual 'go-live' has been less difficult than I anticipated, and there has been great support as we change habits that we've cultivated over years (and sometimes decades). Ultimately I think this will be a great step allowing easier access to charts across facilities."

Dr. Kelly McGinnis

Resulting Value / ROI

MultiCare has recognized significant benefit in many areas, to include:

Access

- Know the patient's story and ensure that the information follows the patient
- Physicians can now access immediate, accurate patient information from anywhere at any time
- Patients can access their information via MyChart powered by MultiCare
- Improved communications between clinicians

Accuracy

- 27 percent increase in documentation of the plan of care by at least two disciplines
- 30 percent increase in order legibility
- Electronic health record shows the same medications, patient history, allergies, etc. at any location where the patient is seen
- Medication reconciliation is standardized throughout the organization and built into clinical workflows

Efficiency

- 75 percent decrease in callbacks to in-house pharmacies
- 30 percent reduction in transcription volumes
- Average 30 percent decrease from disposition time to patient admitted time in the Adult EDs
- Operating Room scheduling turn-around-time under 2 minutes
- Mean laboratory order turnaround time reduced by 30 percent
- Median imaging order turnaround time reduced by an average of 50 percent

Financial Performance

- $12M in net benefit as a result of improved Patient Responsibility collections
- $5M reduction in claims with open denials
- $1,029,808 in avoidable write-offs
- $585,000 in staff reductions in Patient Financial Services
- $20M in improved cash collections

Lessons Learned

Executive Sponsorship and Ownership

The implementation of MultiCare Connect must be owned, championed, and actively supported by organizational and clinical leadership. System implementations are often seen as IT projects, but without the engagement of the clinical end-users and their leaders, success cannot be realized.

Organizational Priority and Commitment

As with any large organization, multiple initiatives and priorities will compete for the "number one" spot. The success of an implementation of this magnitude requires consistent communication to the organization about the electronic health record and the benefits it brings both to the patient and employee populations. MultiCare provided consistent messaging from the top down so that employees both understood and were excited about MultiCare Connect. Leaders were committed to meeting milestones and clearing obstacles. Even staff members in support departments who never utilize the system provided rallying encouragement during the implementation. During the first week of the 2008 go-live, several of those departments hosted cheering stations whose sole purpose was to encourage the clinical staff and give them quick breaks from their work. Booths featuring Las Vegas-style events, cooking demonstrations and the opportunity to "limbo for a latte" let those who were deep in the midst of their go-live learning curve get a well-deserved mental break and see how the rest of the organization was behind them.

Investing in People

MultiCare knows that a multimillion dollar technology investment without an investment in people is just a very expensive technology venture. Through seminars, brown bag sessions, education and communication the project team made people the heart of the implementation. Care for the patient is always at the forefront, and employees understand that their feedback is welcome and incorporated.

System-Wide Culture Change

Moving from a paper record, or even a stand-alone electronic health record, to a system-wide record requires the ability to be flexible and open to change. Leaders from MultiCare's Organizational Effectiveness Department hosted change management seminars to educate staff members on simple things like attitude and environmental changes they could make to help ease the transition. The project team also presented "road show" demonstrations on the clinical floors, at department meetings, in doctors' offices, and in the cafeterias, so that all future users could get an early look at the system and be prepared to adopt our new electronic health record.

Have Fun

Many members of the project team have worked on this initiative for years (the original implementation of the electronic health record began in our ambulatory clinics in 1998). Within the projects, we try to remember that encouragement, recognition, and time for levity are key aspects of keeping those team members engaged.

"MultiCare has been committed to advancing our EHR for more than 15 years. We believe connecting all our providers and patients in a seamless and sustainable way supports safer and more convenient care for our patients. This certification acknowledges the hard work and dedication of all of our staff members who contributed to this effort. We are well positioned for partnering with patients, providers and other health systems for healing and a healthy future." **Florence Chang, Chief Operating Officer, MultiCare Health System**

Ochsner Medical Center-North Shore

Profile

Ochsner Health System (OHS) is one of the largest independent academic health systems in the United States with 11 hospitals owned and managed, and 15 affiliated hospitals across the greater New Orleans, Baton Rouge, North Shore, Mississippi and Bayou Regions. In addition to this, OHS has 40+ health centers throughout south Louisiana and employs over 950+ physicians in over 80 medical specialties and subspecialties, as well as contracting with 1,600 active community physicians.

Ochsner Medical Center North Shore (OMC-NS) specifically is a 165 bed modern full-service regional medical center in Slidell, Louisiana with a network of over 300 physicians and specialists who deliver integrated care. It features North Shore's only Pediatric Intensive Care Unit (PICU), maternity care, open-heart surgery, 24-hour advanced emergency care and rehabilitation center equipped with Louisiana's only Lokomat robotic treadmill.

OMC-NS achieved HIMSS Analytics EMR Adoption Model℠ Stage 7 on November 6, 2014 and at that time was the only hospital to receive this designation across Louisiana, Mississippi, Alabama, Arkansas and Tennessee.

The Challenge

Ochsner Health Systems was founded in 1942 and has a long, rich history embedded around its mission and vision to serve, heal, lead, educate and innovate. It is one of the largest independent academic health systems in the United States. OHS has vowed through its vision to be a global medical and academic leader who will save and change lives, as well as shape the future of healthcare through their integrated health system, fueled by the passion and strength of our diversified team of physicians and employees. We realized that none of this could be done without continuously growing our information services and technology departments as the technology world advanced. We had no standardized or best practice content across OHS, and recognized that what software and applications we did have needed to be updated and advanced. OHS needed one highly integrated, standardized EMR across the entire system to support and meet the rapidly evolving needs in healthcare. That being said, we also needed an EMR that supported the unique workflows of our many specialties, and one that could be enhanced as needed for different specialties and departments. In addition, we needed an EMR to assist us in more efficiently integrating with community and affiliated physicians to manage entire patient populations. All of this needed to be done not only to support our mission and vision, and standardize care across our system, but also to improve end-user and patient experience, quality of patient care, and help meet meaningful use incentives.

Implementation Overview

Ochsner Health System brought together a multidisciplinary team of information services and technology staff in 2008 to begin the review and selection process of electronic medical record vendors. In 2010, the decision was to contract with and implement Epic as our EMR system. OHS decided to phase out implementation based on hospital regions in order to enable sufficient and proper support during go live and implementation periods. We took a big bang approach during each facility implementation, and formal kick-off for the overall project began in October 2010. The North shore region went live first and and formalized training began in October 2011. All North Shore clinics went live in December 2011, followed by the entire OMC-NS hospital one month later in January 2012. This included device integration in all critical care areas including ED, ICU, PACU, and OR, as well as CPOE and clinical documentation. We also pushed out Afga PACS, Pyxis, and CVIS, a home grown cardiology procedure documentation system, at go live. OMC-NS is interfaced with numerous other applications including RALS, Soft lab, Progeny, Links, GE Viewpoint, Magview mammography, and multiple procedural area interfaces. Our institution is also live with multiple health information exchange applications including Epic Care Everywhere, Ochsner Community Connect, Surescripts HISP, EpicCare Link, and My Chart Patient Portal.

Resulting Value / ROI

Bar Code Medication Administration for medications, blood products, and breast milk:

- Through the closed loop bar code scanning process that Epic ensures, OMC-NS has been able to achieve BCMA percentages over 95 % for medications and patients. This greatly increases patient safety by decreasing human errors and medication administration errors. In addition, we are now better able to track and run reports daily if needed on key metrics such as overrides, medications that are not scanning, narcotics pulled and associated discrepancies.

Medical Device Integration:

- We have greatly reduced the amount of time nursing and other clinical staff such as patient care techs and respiratory therapists spend on manually entering in data by having data from many of our bedside medical devices directly interface into the EMR. This includes all hemodynamic monitors in our critical care areas, ventilators , as well as glucometer and ISTAT data. This interfacing not only improves the accuracy of the data in the EMR by eliminating manual transcription errors, but also ensures quicker clinical decision support by having real-time data available.

Increased patient access to their medical information as well as richer, more advanced information sharing via My Ochsner patient portal :

- My Ochsner patient portal not only provides patient access to pertinent diagnostic studies, notes, and visits, but also enhances and promotes communication between patients', doctors, and other clinicians.
- OHS has even further enhanced the patient portal by becoming the first Epic System client to successfully integrate the new Apple HealthKit into its EMR. Now it is easier than ever for patients' clinical data such as heart rate and blood pressure to be uploaded and integrated into their patient record at the physicians recommendations. This ultimately drives a dramatic and positive impact on patient care and satisfaction by enhancing provider and patient access, which increases adoption by patients and then in turn, providers.

Integration and use of the EMR to impact quality outcomes:

- Effectively using Epic tremendously helped OMC-NS to promote the elimination of Catheter Acquired Urinary Tract Infections (CAUTI). OMC-NS had a CAUTI Rate of 0.92 for 2013 and wanted to focus on streamlining workflows to improve the rate. New processes were implemented, and new workflows created in our EMR to systematically review orders for insertion, duration, and necessity of indwelling catheters. Order sets were enhanced in EPIC for placement and removal of catheters with stipulations for physicians to monitor, cancel, or alter orders. In addition to this, our Infection Control Preventionist (ICP) rounds daily, monitors daily labs, and collects data for monthly reporting. Flow sheets for documentation also allow staff and physicians to accurately monitor a patient's intake and output, need for continuing foley catheter, and the patient's overall progress. Finally, best practice alerts remind physicians of timeliness of catheter removal. The outcome of all of these interventions, along with end user education resulted in a decrease in our CAUTI rates in the second half of 2013, and zero CAUTIs in 2014.
- Integration and effective use of the EMR has improved our ability to more rapidly identify the early stages of patient deterioration, intervene, and ultimately decrease our number of codes. Clinical staff needed more queues to recognize early stages of patient deterioration. Nurses received targeted education on how to best use Epic to identify these early changes in patient conditions. By teaching Epic system navigation, the activation of the Rapid Response Team (RRT) happened faster, which can ultimately improve patient outcomes. Education focused primarily on how to view real time data such as vital signs and abnormal labs. Report education helped the staff recognize trends in patient data via graphs and lists to recognize changes quickly. Additionally, nurses received additional focused training on critical value and abnormal icon identification. As an outcome of these interventions, OMC-NS showed an overall decrease in the number of codes outside of the ICU. In 2013, 48 codes were completed outside of the ICU compared to 38 codes in 2014, yielding a 21% decrease in codes outside of the ICU.
- After deterioration is recognized and the patient is transferred to ICU, our eICU program has a tremendous impact on quality outcomes and the patient experience. Not only does the eICU program provide patients with state of the art monitoring and care 24 hours a day 7 days a week, it gives our patients and their families peace of mind and virtual face time with their doctors at the touch of a button. eICU at OMC-NS is powered by Phillips eICU technology and is staffed with certified critical care nurses and intensivists. The eICU staff assists the onsite staff with an "extra set of eyes" and availability with the touch of a button. The EICU staff also assists ICU staff with real time code documentation in Epic and reminds the code staff what medications and interventions are due during the stressful code event.

The outcomes of using the eICU at OMC-NS directly assisted in saving lives, over 150 at OMC-NS alone. It was also instrumental in avoiding 7,455 ICU days at OMC-NS and helped to eliminate Ventilator Acquired Pneumonia system wide. This was achieved through enhanced communication between providers, patients and families; as well as usage of analytics and best practice warnings.

Achieving Meaningful Use Stage 2:

- Epic helped OMC-NS to become the first OHS system hospital to achieve Meaningful Use Stage 2 by streamlining processes and allowing us to meet all of the required measures. Transitions of care created a struggle for OMC-NS as it did for most of the country.

Aware of end user struggles with this measure, as well as the technical aspect of sending summaries of care electronically, a multi-disciplinary team was created to focus on this area. The follow up activity in Epic was moved to its own section in the physician discharge navigator, and physicians were educated on the requirement and new workflow. Nurses and clinical staff received education on the correct transition of care workflow and how they could help complete the necessary requirements. OMC-NS facility was able to achieve the percentage required for transitions of care, and ultimately achieve Meaningful Use Stage 2 status.

Lessons Learned

- OHS provider and administrative leader buy-in was very important throughout the course of the project. These were key players in helping set the tone for the very large change that we were undergoing. Our change management methodology was followed rigorously, which helped gain buy-in from everyone from the executive leadership teams to the front-line staff.
- Super User utilization at go live and ongoing is both instrumental and required for successful implementation and ongoing support. Super Users as OMC-NS are trained in advanced nursing functions as well as physician workflows to be that first line of support for our clinical users. Super Users should always have a clear role, and are instrumental in educating their staff on continual updates, changes, and Epic Upgrades. Super User participation from every department is key to the success of Epic utilization at OMC-NS.
- Mandatory system training was critical to our success. All users had to attend in person training prior to gaining Epic access. This was strictly enforced by leadership and administration.

"Receiving the HIMSS Analytics Stage 7 Designation is an incredible accomplishment and one that showcases our dedication to creating a seamless patient experience here at Ochsner. This recognition speaks directly to three core components of our mission: to lead, educate, and innovate. Through the hard work and dedication of our team, we have reached a level of data continuity and accessibility that continues to transform the healthcare industry."

Michael Hulefeld, Executive Vice President/COO, Ochsner Health System

The Ohio State University Wexner Medical Center

Profile

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Ranked as one of "America's Best Hospitals" for 20 years in U.S. News & World Report, The Ohio State University Wexner Medical Center (OSUWMC) is central Ohio's only academic medical center. Our expert physicians and researchers are creating the future of medicine through our leadership in personalized healthcare, giving people access to unique disease prevention and treatment options based on their own genetic makeup and lifestyle. Comprised of six hospitals, two campuses and 263 clinics, OSUWMC has a staff of approximately 16,000, with over 1,500 physicians, 900 fellows/residents and 500 advanced practice professionals.

OSUWMC achieved HIMSS Analytics EMR Adoption Model℠ Stage 7 recognition in May 2012 and Ambulatory EMR Adoption Model℠ Stage 7 status in January 2014.

The Challenge

OSUWMC has a long history of utilizing EMR technology and advanced analytics dating back to the early 1980s. Embracing a best-of-breed approach, we had a very complex environment that yielded many benefits and efficiencies. However, as healthcare began to evolve with a greater emphasis on the longitudinal continuity of the medical record, it became increasingly clear that a multi-system approach was becoming a limiting factor in achieving our objectives. To support these goals, OSUWMC chose Epic as our EMR system.

Implementation Overview

OSUWMC chose to pursue a strategy of implementing a comprehensive, single-vendor EMR that spanned acute and ambulatory settings and also supported both clinical and business functions. Having a single platform better supported our patient-centric strategy, which was designed to decrease multi-platform integration complexities that existed previously, when we had 169 interfaces. We also chose to pursue a strategy of building content in the system to improve patient care and minimize paper records and dictation. OSUWMC began its implementing in the ambulatory setting spanning approximately 2007-2010 with large go lives every two to three months. This ongoing implementation included comprehensive functionality spanning all specialties, 250+ clinics and a total of 2,900 physicians. Because of the success of Ambulatory and the need to retire numerous legacy systems, we executed the inpatient transition in October 2011 in a "Big Bang" fashion, when almost all applications went live on the same date. This massive go live required an all-hands-on-deck approach, with the entire organization rallying to support the go live.

Resulting Value / ROI

Advanced Decision Support for Health Maintenance

To achieve top quality performance and regulatory goals, OSUWMC implemented preventive health alerts through the use of Epic's health maintenance tools, including alerts and modifiers, which allow providers to customize preventive health reminders. Personalization of the health maintenance alerts increased the use of appropriate tests and screenings for a variety of departments, including Family Medicine and OB/GYN, and also was increasingly viewed as valuable by specialty departments. We saw both a dramatic increase in the number of modifiers used, and a steady increase in the number of users of the tool. We attribute higher levels of adoption of the modifiers in certain departments to both education and leadership. The more providers were educated about the modifiers and the more leadership encouraged their use, the more those modifiers were used. Use of modifiers improved ordering of screenings and facilitated monitoring of compliance with these required screenings, as well as identification of target populations for care.

Continuity of Care

We see the involvement of patients in their care as the first step in improving health care for an individual. Continuity with their local provider is the second step for those being discharged from a tertiary care facility. Being a medical center that serves all of Columbus as well as having outreach to all areas of Ohio, Indiana, West Virginia and Pennsylvania, communication with referring physicians can sometimes be difficult. We utilized our patient portal, a referring physician portal and the integration of the letter production and faxing system to assure the notification of patients and referring providers of the events and

decisions made at the tertiary care center during both inpatient and outpatient visits.

Another very important endeavor that we accomplished relates to outside reporting facilities. We focused on making sure that we protected our employees from duplicating entry of data if we had the data discretely to be able to report out to a reporting agency. When we implemented our Ambulatory application in 2008, one important goal for us was decreasing workloads for staff. We decided that one area where we could maximize this opportunity was in developing an interface with the Ohio Department of Public Health. No other Ohio practice sites were sending data directly to the health department from their EMR to track vaccine data. The institution is required to report this data on all patients who receive free vaccines through our Vaccines for Children program. It is also suggested but not a requirement for all other vaccines. Our interface team worked closely with the IT team of the Ohio Department of Public Health and accomplished an interface that nightly sends all appropriate vaccine data to ODH and keeps us compliant with the requirements without the need to have staff enter data into two systems. This made for a very happy group at go live, who were expecting more work and instead found more rewards. This interface has been duplicated and is now used by most of the other Ohio Epic sites to download their vaccine information to the state vaccine registry.

Quality Metrics

The opportunity to qualify for meaningful use for eligible providers and hospitals came at just the right time for us. We qualified over 95% of our eligible providers for stage one, year one and year two as well as qualifying for stage one hospital. The use of the EMR has facilitated the qualification for our sites to be NCQA-qualified patient centered medical homes as well as many of our providers being NCQA-qualified diabetic care providers. Our biggest concern in our implementation was to not fall below our present standard with quality metrics as most other institutions advised us had happened to them. We accomplished this with the building of alerts, disease specific order sets, and close supervision of expectations.

Lessons Learned

Expectation Setting for Go Live and Post-Go Live Planning

For an EMR go live, setting realistic expectations can be an overlooked step. Even the most well executed implementations have numerous challenges, periods of confusion, frustrated users and other myriad issues. At OSUWMC, the project team worked hard to ensure that leaders and users had a realistic picture about the challenges the organization would experience at go live and during the subsequent months of stabilization.

Preparation for Inpatient Go Live

Going live with our Ambulatory EMR over several years allowed us to gain implementation experience that prepared us for our inpatient "big bang" go live in 2011. Initially, the magnitude of the Big Bang go live was daunting; the scope was almost incomprehensible. However, in analyzing our organization's structure and needs, coupled with our Ambulatory success, it became clear that a big bang go live was the best option, and in hindsight, it proved to be a very good approach.

Monitoring System Metrics

After implementation, our EMR steering committee developed an optimization scorecard to help leaders monitor adoption and ROI metrics. The monthly scorecard includes color-coded key performance indicators, such as regulatory compliance and the completeness of the EMR. Having a well-informed and strategy-driven leadership team is important for maintaining and improving both our EMR system and our organizational goals.

Patient-Centric Focus for Decision Making

Complex projects have numerous options and challenging decisions, such as balancing provider efficiency, accommodating specific needs in specialty areas, fine-tuning workflows and so on. These priorities can sometimes compete with one another and yield inconsistent results. At OSUWMC, we found that a continued focus on the patient helped keep our priorities in perspective. For example, if a specialty area had a unique application or process that didn't fit into the overall continuity of data vision, we worked to develop a solution that kept the single EMR as the sole source for clinical documentation. Isolated applications or those requiring complex integration solutions were highly discouraged, because although they may meet a niche requirement, such a solution doesn't serve the best interests of the patient across the continuum of care. Having a patient-centric focus guided our decision making and led us to better, more sustainable results.

Ontario Shores Centre for Mental Health Sciences

Profile

Ontario Shores Centre for Mental Health Sciences (Ontario Shores) is a public teaching hospital specializing in comprehensive mental health and addiction services for those with complex, serious and persistent mental illness. The facility, located in Whitby (East of Toronto), Ontario, Canada has 17 specialized inpatient units and extensive outpatient and community services. The organization is staffed by approximately 1,200 employees with 326 inpatients beds, and approximately 50,000 annual outpatient visits.

Ontario Shores
Centre for Mental Health Sciences

Discovery. Recovery. Hope.

HIMSS Analytics EMR Adoption Model℠ Stage 7 status achieved: October 20, 2014

The Challenge

In 2006, Ontario Shores divested from the Province of Ontario and became one of four stand-alone public psychiatric hospitals. This was a unique opportunity for the leadership at Ontario Shores to develop a clear mission, vision, values and strategy to become a leading mental health care organization in Ontario. Part of this strategy included embarking on a journey of discovery, recovery and hope that would translate into providing exemplary, evidence-based care that is delivered in a safe and therapeutic setting, an enhanced patient experience and improved patient outcomes.

A call to action to achieve these goals resulted in the investment in a fully integrated electronic medical record. The specific goals set forth for technology selection, implementation and expected outcomes were:

- Advance best practice in mental health care through the EMR implementation
- Enhance patient safety and quality of care
- Embed mechanisms to enable standards of care and adherence to clinical practice guidelines
- Enhance overall patient experience and satisfaction
- Employ "state of the art" technology to improve patient outcomes and drive process improvement and increase efficiencies
- Enable a clinician driven solution resulting in a "user friendly" and intuitive experience for physicians, clinicians, and business/administrative users
- Enhance research capability

Implementation Overview

In late 2008, Ontario Shores began its journey to implement a fully integrated EMR system. The implementation of Meditech 6.0, a fully electronic single vendor solution, was accomplished through the financial and visioning support of the board of directors and senior leadership team. Successful implementation of both inpatient and outpatient EMR was completed by 2011, subsequently Ontario Shores was recognized as a HIMSS Analytics EMRAM Stage 6 hospital in 2012. This success was due largely to the collaborative leadership of the Clinical Informatics, IT, Professional Practice and Clinical teams.

Utilizing a big bang approach, all supporting modules including registration/ADT, pharmacy, finance, human resources, payroll, staffing and scheduling were live by 2009. By 2010, all advanced clinical modules were enabled for inpatients to allow for online documentation by physicians, nursing and all ancillary staff, supporting a truly interprofessional approach to care. Simultaneously, CPOE, e -MAR and Bedside Medication Administration (BMV) were enabled to support a closed loop medication administration process. In 2011, outpatient implementation was completed which helped to facilitate improved communication among care providers along the patients' care continuum.

The following goals have been the key drivers in the implementation of the EMR: enhance patient safety and quality of care, support a recovery-oriented interprofessional practice structure, and streamline care delivery processes and workflow based on evidence-based practices and standards. Additionally, the implementation of the EMR system has created opportunities to enable a new culture of care, increased accountability and transparency in practice, created the ability to collect more accurate data to support decision making, and improved and enhanced interprofessional communication and best practices.

Resulting Value / ROI

- Ontario Shores has been able to achieve high levels of CPOE, medication and patient ID scanning with implementation of the Meditech system. This has reduced the potential for medication errors. Current rates are 94% CPOE, 98% medication scanned, and 99% patient ID scanned.
- Fully electronic documentation and ordering has been a key enabler for reducing restraint and seclusion use at Ontario Shores. Decision-support is embedded directly within the physician orders for restraint and seclusion and reflex appropriate assessments for nursing staff. Data regarding restraint and seclusion at the organization is generated daily and shared with clinicians and administration so interventions, such as Recovery Rounds, can be implemented. From 2012/13 to 2013/14, an overall savings of $776, 633 in staffing costs has been realized as a result of the decreased use of restraints and seclusion.
- Clinical practice guidelines for the assessment and treatment of Schizophrenia have been implemented on all of the inpatient units. Decision support is embedded in physician documentation templates, so suggested orders are generated based on the information that physicians enter. Adherence to the clinical practice guidelines are monitored regularly and shared with clinicians. Physicians and clinical units can compare their performance on key indicators against that of their peers. This initiative has seen adherence with recommended metabolic monitoring protocols increase by 100% and reductions in antipsychotic polypharmacy by 20% over 6 months.
- The system provides the opportunity for data mining via SQL which has resulted in the evolution of a business analytics culture. Leadership staff have asked for, and been provided with, detailed information related to the needs of their departments to help guide their operations. We are excited about all the future quality improvement opportunities that a better understanding of our data will bring.

Lessons Learned

- A physician champion (CMIO, Medical Informaticist or similar) is a critical investment to support the transition, trials and tribulations for the medical staff - physician to physician. This leadership role had a significant influence on the clinical design and workflow to support safe and efficient patient care.
- Strong project team, clear governance and rigorous project management. Spend time upfront to plan BUT…don't just develop a project plan and then forget about it, utilize it to track progress. Update progress on project plan weekly. Identify potential slippage early and develop strategies to mitigate slippage risk. Keep the big picture in focus. It helps to know where you are at any point in time.
- Strong Change Management- involving end users are key. Frontline staff provided input throughout the project from selecting the implementation project name (Project EASIER - Easily Accessible Solution to an Integrated Electronic Record), to selecting a vendor, to participating in design teams, and acting as user champions. The other key change management strategy was focusing on workflow and practice changes – not IT system changes. Go-live support consisted of 24/7 on-unit support from end-user champions for multiple weeks. Extensive training was conducted during the initial phase of each implementation with extensive ongoing training for on-boarding of new clinical staff. Additionally, physicians receive one-on-one training as new hires and on an ongoing basis per request. This enables a culture of strong best practice rather than the system driving clinical workflows and practice. The system is only an enabler.
- Pre-work pays off. The readiness work completed around organizational culture and readiness for change played a key role in our success. Understanding the current state, mapping current processes and identifying gaps, duplication, and opportunities was time well spent. Consideration of level of computer literacy of clinical staff was also important.
- Senior Management Team support and leadership is essential.

"Achieving Stage 7 reflects the high standard of quality at Ontario Shores and demonstrates how we are advancing care for individuals living with mental illness. Our electronic medical record system improves the delivery and quality of care that we provide and standardizes clinical documentation in an environment which is efficient, secure and collaborative."

Karim Mamdani, President and CEO, Ontario Shores Centre for Mental Health Sciences

Rockford Health System

Profile

Rockford Health System, located in Rockford, Illinois, is the largest health system serving northern Illinois and southern Wisconsin. Our long tradition of care is built on a commitment to clinical excellence and cutting-edge technology. All of us work together to achieve our mission: to provide superior care, every day, for all our patients.

Rockford Health System includes:

- Rockford Memorial Hospital, a 396-bed tertiary care hospital.
- Rockford Health Physicians, outpatient clinics with locations throughout the region.
- Van Matre HealthSouth Rehabilitation Hospital, a 55-bed inpatient hospital offering a full range of rehabilitation services.
- Visiting Nurses Association, which provides a variety of home health care services to people of all ages.
- The Rockford Memorial Development Foundation, dedicated to raising funds in support of the Rockford Health System mission

HIMSS Analytics recognized 10 Rockford Health System sites as HIMSS Analytics Ambulatory EMR Adoption Model℠ Stage 7 on December 18, 2014.

The Challenge

Rockford Health System continues to optimize decision support technology within their EMR. The organization was interested in developing decision support tools for high tech diagnostic imaging that were integrated in the physician order entry workflow. The goal was to improve patient care by providing real-time alerts based on appropriate use criteria developed by the American College of Radiology.

Many times the order for high tech diagnostic imaging required modification once the patient arrived for the scheduled procedure. This occurred after the scheduling and precertification process was complete which resulted in precertification rework, delays performing the study, additional work effort by the radiology technician and overall patient dissatisfaction. Exposure to additional radiation if the incorrect imaging study was performed was also a concern. In an effort to improve quality and streamline the patient experience, the evaluation of decision support tools for high tech diagnostic imaging began.

Rockford Health System partnered with National Decision Support Company to evaluate and implement ACR Select across the enterprise. ACR Select includes appropriate use criteria supplied by the American College of Radiology. The appropriate use content and decision support feedback is integrated within the EMR's CPOE application. The system utilizes discrete indications/reasons for study that are associated with imaging procedures. The clinical algorithms associated with the coded indications and ordered procedure produce a calculated decision support score. Based on the decision support score, feedback is provided to the ordering physician with recommendations for imaging alternatives.

Rockford Health System rolled this technology out to their organization in two phases. Phase I of the project was initiated in July 2014 and included changes to the order entry workflow to select discrete/coded indications for all MRI, CT, ultrasound and nuclear medicine orders. During Phase I, the project team collected baseline data, reviewed mapping of indications/procedures and analyzed the decision support scores. They worked with ordering providers and radiologists to build additional decision support rules within the system that supported local radiology protocols. Phase II of the project began in December 2014 and incorporated the display of the decision support score for orders that were designated as 'low utility' to the ordering provider. Alternative procedures were recommended allowing the provider to select the more appropriate study.

STAGE

"A lot of thought and careful planning has gone into optimizing the implementation of the ACR Select decision support tool at Rockford Health System. I foresee the program providing useful information in a concise format for ordering clinicians as they plan for the best care for their patients."

Dr. Christopher Vittore, Radiologist

Resulting Value / ROI

Although the fully implemented system has only been live for a few months, Rockford Health System is beginning to see improvements in appropriate high tech diagnostic imaging ordering. Prior to the implementation of ACR Select, the organization was tracking the volume of orders that needed to be modified the day of the scheduled study. During Phase I of the implementation, there was a decrease in the number of modified orders which was sustained during the first phase of the install from 5.6% to 4.7%. Phase II of the implementation resulted in another decrease in modified orders. Although the system was recently implemented, Rockford Health System is encouraged by these results and is working to further refine the system to sustain these gains and achieve additional efficiencies with the use of this technology.

Lessons Learned

- Rockford Health System was able to customize and refine the decision support rules during Phase I of the implementation. Collecting the baseline data and analyzing how the providers were utilizing the system prior to rolling out the scores and feedback to the ordering provider is important for a successful implementation.
- Reconciling the appropriate use criteria with local radiology protocols requires a significant effort and multiple interactions between the build team and the radiologists. Engage the radiologists in the build and allocate time in your project plan to fully assess the calculated decision support scores.
- Engage and work with ordering providers to assure the common indications and nomenclature utilized supports their ordering practices to improve utilization and acceptance of the workflow changes.
- Rockford Health System plans to continue to use outcomes data to engage physician leaders and education providers on the use of the ACR Select tools. Optimizing the toolset to include additional modalities and expanding the decision support tools to cardiology content is also being analyzed for the future.

Sparrow Health System

Profile

Sparrow, a member of the prestigious Mayo Clinic Care Network, is mid-Michigan's premier health care organization and the region's largest private employer. Sparrow has two Lansing campuses and hospitals in St. Johns, Ionia and Carson City, as well as dozens of ambulatory care centers, Physicians Health Plan, Sparrow Physicians Health Network, Sparrow Medical Group, and the Sparrow Michigan Athletic Club. Sparrow is affiliated with Michigan State University's three human health colleges.

Sparrow Hospital, the flagship of Sparrow Health System, is the regional center for cancer, trauma, pediatrics, orthopedics, neonatal intensive care and neurological care. Sparrow is a Magnet Hospital, with a Level 1 Trauma Center, Neonatal Intensive Care Unit, a Joint Commission Certified Comprehensive Stroke Center and a Bariatric Surgery Center of Excellence. Sparrow was also ranked #1 by InformationWeek 500 in 2012 for health care technology innovations and was named to the Hospitals & Health Networks 2014 "Most Wired" List.

HIMSS Analytics EMR Adoption Model℠ Stage 7 status was granted to Sparrow Hospital and 26 of its ambulatory offices on Nov. 4, 2014, in recognition of our advanced Electronic Medical Record (EMR) adoption and use, a designation that reflects Sparrow's commitment to the highest levels of Patient safety and quality care.

The Challenge

As part of Sparrow's transition from paper-based charting supported by disparate ancillary health IT products to an enterprise-wide, highly integrated clinical information system, we saw an opportunity in our preparations for ICD-10 to promote clinical documentation improvement (CDI) among Physicians, as well as providing our coding staff with tools to facilitate enhanced clinical coding accuracy and efficiency. Like many health systems, Sparrow struggled in a paper-based charting system to ensure that Physician documentation fully reflected each Patient's conditions and comorbidities while also supporting coding requirements.

Prior to EHR implementation, our CDI approach was largely limited to conducting repeated provider educational sessions and delivering CDI queries on paper forms in the Patient's chart. Our CDI and coding processes were inefficient and the results did not adequately reflect our true case mix index, expected vs. observed length of stay, medical complexity and comorbid conditions. We knew it would be difficult for Physicians to retain and consistently document in a way that supported coding requirements, so we created intuitive, efficient, EMR workflow-integrated tools for providers to facilitate improved clinical documentation. We also provided our CDI specialists with tools to help them create and track Physician replies to coding queries. Finally, we provided our coding experts with computer-assisted coding (CAC) and decision support tools to boost the speed, accuracy and ease with which they could code hospital inpatient and hospital outpatient encounters.

Our specific goals and objectives included:

- Better provider clinical documentation of disease severity, specificity, complexity, and comorbidities
- More efficient clinical query workflows for CDI specialists
- Increased Physician replies to CDI queries
- Improved coding accuracy, completeness, efficiency and timeliness
- More accurate data on case mix index, observed vs. expected mortality, expected length of stay
- Remote coding to improve coding specialist efficiency and satisfaction
- Opened space previously occupied by coders and paper charts for centralized CDI specialist team

STAGE

"The EMR has afforded us the ability to implement additional electronic tools to add efficiencies to our workflows. Overall, every area of the HIM department has been positively impacted. Achieving Stage 7 is very rewarding for all of our Caregivers. It recognizes the teamwork, efforts and dedication we have demonstrated during our journey."

Lisa Priest, RHIA; Director of Health Information Management and Patient Access, Sparrow Health System

Implementation Overview

Electronic Medical Record: We implemented registration, scheduling and revenue cycle solutions from Epic in 2010, with ambulatory EMR go-lives completed in a phased manner during 2010 and 2011. In December 2012, we completed an inpatient and emergency department Epic go-live across all hospitals, including medical and surgical units, pharmacy, surgery, labor and delivery, radiology, interventional cardiology, and critical care. Intraoperative anesthesia and hospital outpatient department go-lives followed in 2013 and 2014.

Clinical Documentation Improvement (CDI): We implemented Claro CDR2 software for CDI workflow management, tracking and reporting at Sparrow Hospital in August 2013, followed by Sparrow Specialty Hospital in May 2014. We established an ADT interface from Epic to CDR2 and created coding query standardized CDI message language. We delivered CDI refresher training for Physicians and also provided them with efficient documentation templates (cascading CDI SmartPhrases) that supported both our CDI goals and ICD-10 documentation requirements. We retired paper CDI queries and replaced them with In-Basket messages that made CDI query delivery and physician replies easier and more efficient. We also implemented EMR functionality to flag CDI queries when Physicians answered them so CDI specialists could more easily track them to completion.

Computer-Assisted Coding (CAC): We implemented the Optum Enterprise Computer-Assisted Coding Platform for both hospitals in May 2013. Optum Enterprise CAC is a natural language processing (NLP)-supported CAC solution that reads clinical documents in real-time and creates lists of supported diagnoses. The listed diagnoses contain links to the patient's EMR chart documents with highlighting of key words and phrases in each document. It also includes coding decision support to facilitate proper DRG assignment, as well as knowledge resources and flags to alert coders when new regulatory updates are available for a diagnosis. Optum Enterprise CAC also flags an account when a new document comes into the chart after CAC has been completed, enabling additional coding specialist review to ensure continued coding accuracy. Remote coding commenced in June 2014, enabling 33 staff members to work from home and liberating space for CDI specialists to work in a central location.

Resulting Value / ROI

Tangible ROI

- Medicare Case Mix Index (CMI) increased from 1.63 to 1.67.
- Positive financial impact of $5 million from September 2013 to December 2014, due to increased Case Mix Index resulting from CDI and CAC-supported workflows.
- Percentage of charts reviewed by CDI specialists increased from 80 percent to 100 percent using the same number of CDI specialists, even after adding Sparrow Specialty Hospital and Patients insured by Blue Cross.
- Physician response rate to CDI queries increased from a baseline of 60 percent to 92 percent after implementation of EMR-supported CDI and CAC processes. These processes are now completely electronic.
- Average coding turnaround time after discharge decreased by three days.
- Decreased days in Accounts Receivable (AR) and increased days cash-on-hand.

Intangible benefits:

- Increased Physician buy-in with a standard CDI query approach
- Better reporting of physician CDI query response rates
- Decreased charting delinquencies
- Caregiver satisfaction increased, attributed to higher efficiency with electronic tools and workflows

Lessons Learned

1. Successful implementation with desired results requires understanding and agreement around business processes and how health IT systems can support them. Identifying and overcoming communication barriers to ensure understanding and promote buy-in is one of our key success factors.
2. Executive level support and involvement were critically important to our successful CDI program.
3. Remember the value of Plan-Do-Check-Act (PDCA) cycles of improvement and continue to get feedback and fine tune systems and processes after implementation.
4. Communicating the advantages and expected benefits to affected Caregivers throughout the implementation process creates positive engagement, anticipation and commitment.
5. Involving frontline Caregivers during system build and testing helps ensure successful implementation, improved processes and high user satisfaction.

"Achieving the highest level of EMR and health IT adoption improves quality and safety as well as Patient satisfaction and value. We could not have achieved this without an amazing, dedicated team, focused on innovation that matters for our Patients and the community."

Tom Bres, Senior Vice President & Chief Administrative Officer, Sparrow Health System

Stamford Hospital

Profile

Stamford Hospital is a 305-bed, not-for-profit provider of comprehensive healthcare services in lower Fairfield County, Connecticut. Affiliated with New York-Presbyterian Healthcare System, Stamford is a major teaching affiliate of the Columbia University College of Physicians and Surgeons. Along with 441,237 annual visits and 75,271 ED visits, Stamford has provided $87.4 million in uncompensated care (2013).

In October 2014, Stamford Hospital received the Planetree Distinction Award for Leadership and Innovation in Patient-Centered Care, placing it among only seven of the 350 Planetree facilities in the world to achieve this level. Under construction is a new 640,000 square-foot, state-of-the-art hospital opening in 2016.

Stamford Hospital achieved HIMSS Analytics EMR Adoption Model℠ Stage 7 status in March 2014.

The Challenge

Beginning with our 2007 implementation of CPOE, Stamford was looking for ways to use electronic health records to improve the lives of both patients and our caregivers. Whether focusing on error reduction, patient safety initiatives, documentation improvement, business intelligence, workflow efficiency or going paperless (to name a few), Stage 7 represented a rallying point of technological improvement with information sharing. Our technology adoption couldn't have been successful without the help of our physicians, nurses and support staff.

Implementation Overview

Stamford Hospital took a collaborative, phased approached to the implementation of our Meditech EMR:

Contracted with Meditech	10/2004	ICU Vital Signs integration	1/2011
Financial Implementation	1/2005	ePrescribing & Discharge Process	9/2012
PCS/OE/LAB/ITS/EMR	10/2005	Physician Desktop	10/2012
CPOE (phased Implementation)	8/2007	Stage 1 Meaningful Use	10/2012
Physician Documentation	8/2009	ED – PDOC & Dragon	1/2013
Med Reconciliation	8/2010	Stage 1 Year 2 Meaningful Use	9/2013
Bedside Medication Verification	9/2010	HIMSS Stage 7	3/2014
Awarded HIMSS Stage 6	1/2011	Stage 2 Meaningful Use	10/2014

Resulting Value / ROI

- Stamford reduced unnecessary urinary catheter use and the incidence of hospital acquired catheter associated urinary tract infections. Following development and implementation of electronic order sets, templates and nurse driven checklists, urinary device days were lowered by over 40% and urinary tract infections were reduced by over 60%.
- Implementation of BMV in the ED has reduced the risk of Medication errors by enabling the nurses to electronically verify the 5 rights of medication administration. We now provide routine reporting by unit on BMV compliance across the organization.
- The implementation of downtime access to the medical record has allowed all caregivers to provide uninterrupted care to the patients.
- Continued evolution of our Data Warehouse and Business Intelligence systems allow us to turn our data into actionable, repeatable information in order to improve the decision-making process and data quality.

Lessons Learned

- When going on the journey to become paperless, it is important to implement continuous monitoring to ensure old habits become extinct. It's very easy for printing to get reintroduced and paper documents to creep back into a binder.
- Achieving HIMSS Analytics EMR Adoption Model Stage 7 was not an "initiative" but rather the recognition of years of work across the entire organization. Our technology and process adoptions couldn't have been successful without the help of the entire organization. Everyone had a voice in the process and shared in the accomplishment.
- Educate. Educate. Educate. Foster an environment of required training so that everyone is at the same of level in using the established workflows and technology. The delivery of care in an electronic world can quickly become inefficient if everyone isn't on the same page.
- Do not underestimate the commitment and challenge of attaining HIMSS Analytics EMRAM Stage 7.
    - Start early and plan enough time for your paperless journey
    - Plan a budget for hardware devices and other items needed to meet and sustain measures
    - This is more than an implementation to meet Stage 7 requirements. This is a story of transformation and continuous improvement sustained over time
    - Staying paperless requires an ongoing sustainability plan with communication

Sutter Health

Profile

Sutter Health is an integrated delivery network of more than 5,000 physicians and 48,000 employees providing comprehensive care to over 3,000,000 patients annually in more than 100 communities in Northern California. Sutter Health supports our communities with acute and ambulatory care settings, home health and hospice services, outpatient surgery and specialty care centers, medical research and training programs.

Sutter Health attained both HIMSS Analytics EMR Adoption Model℠ and Ambulatory EMR Adoption Model℠ Stage 7 status in January of 2015.

The Challenge

Sutter Health is guided by four key themes:

- Patients at the center of everything we do
- Uncompromised pursuit of excellence
- Enable caregivers to excel at giving care
- Lead the transformation of health care

As the largest geographically contiguous, non-profit system in the United States, we aim to deliver a consistent, high value patient experience in the geographically and socioeconomically diverse communities we serve. According to our CEO Patrick Fry, a tremendous amount of health care expense—perhaps more than one fifth—is largely due to poorly coordinated care, over treatment and variation. The challenge before us was to design a health information technology implementation strategy that would support a patient-centric, evidence-based care delivery model that promotes essential clinical collaboration between interdisciplinary teams, reduces unwarranted clinical variation, and engages patients to be co-partners in improving their health. Upon this framework, we want to empower our clinical teams to leverage health IT to innovate how care is delivered.

Implementation Overview

Sutter Health has partnered with Epic Systems Corporation since the late 1990s. The first Sutter Health ambulatory care clinics implemented Epic in 1999. Sutter subsequently launched one of the nation's earliest implementation of Epic's MyChart, My Health Online, in 2001. In order to support a consistent, seamless patient experience, Sutter Health extended the early implementation of the Epic electronic health record (EHR) as a single instance across our ambulatory and acute care delivery network. Today, this represents the largest single instance of the Epic EHR in the world with over 10 million patient records. We also have a single instance of Epic MyChart, My Health Online, with over 60% actively enrolled ambulatory patients and over 1 million patients using this service to access their data and collaborate with their care teams to improve the health of their families. This ecosystem of integrated care teams and engaged communities of patients has empowered Sutter Health to create new opportunities for care delivery.

"Ultimately, it is all about how we can serve our patients and their families, not the technology."

Albert Chan, MD, MS, Chief Medical Information Officer, Palo Alto Medical Foundation

Resulting Value / ROI

- Each Sutter Health patient enjoys a singular, fully integrated medical record shared and leveraged by every care team member across the care continuum from ambulatory to acute care settings across the enterprise.
- Over 700,000 of Sutter Health's patients have established CareEverywhere linkages to exchange over 11 million clinical documents, improving the care coordination and safety of the patient care with our community partners.
- Launch of My Health Online has created new opportunities for clinical care, convenience and patient outreach. To date, over 1 million patients have exchanged 4 million secure patient messages, booked 1 million appointments and viewed 25 million lab results. Patient messages are typically answered in less than 4 hours. Sutter Health today receives 23% of its total patient payments via My Health Online. Delivery of patient-centric decision support via My Health Online has led to efficient and cost-effective advances in patient outreach, leading to a three-fold increase in patient adherence to mammogram and cervical cancer screening recommendations and discovery of over 140 previously undiagnosed hepatitis C patients now potentially eligible for treatment to achieve sustained virological response (cure).
- Implementation of a prescription renewal "wizard" to add clinical decision support such as biometric and condition specific laboratory data to every refill encounter improves patient safety and provider efficiency.
- Ambulatory Computerized Provider Order Entry now accounts for 99.58% of all orders.
- Implementation of EHR documentation tools and voice recognition software reduced transcription costs by over $4 million.
- Implementation of EHR tools reduced mortality from severe sepsis or septic shock from 19% to 11% within 4 months of implementing a novel clinical decision support program.
- Two Sutter Health physicians, David Butler and Albert Chan, have received the Epic PACAcademy Award (Physician of the Year), awarded annually to a physician member of the Epic community, selected by his/her peers, in recognition of outstanding contributions to the Epic community.
- Sutter Health was recently ranked as California's top health system in health care quality by the Lewin Group.

Lessons Learned

- Every clinical transaction, from direct patient encounters to online clinical interactions, provides us an opportunity to care for and delight the patient.
- A common, health IT-enabled care delivery platform has integrated a geographically dispersed health system under a singular goal of improving the care experience through reduction of unnecessary variation and fostered new opportunities for innovative health care delivery.
- Full benefits realization of health information technology investments require continuous reinvestment in our people and the system itself. We have committed 25% of our Meaningful Use Incentive Dollars to both sustainably improve the EHR skill level of our end users and redesign EHR-enabled workflows to promote provider efficiency and patient safety.

TriHealth Inc.

Profile

TriHealth Hospitals and Ambulatory practices consist of two acute-care hospitals with 750 adult-staffed beds, two short stay surgical hospitals, two free standing outpatient surgery centers, 60 outpatient service locations and over 150 physician practice locations. In addition, TriHealth employs over 550 physicians, has over 1800 provider on the medical staff, and 11,000 employees. TriHealth is committed to patient centered clinical quality and safety through the use of advanced clinical information systems.

TriHealth achieved HIMSS Analytics EMR Adoption Model℠ and Ambulatory EMR Adoption Model℠ Stage 7 status for 128 physician practices and all 4 hospital locations on July 16, 2014.

The Challenge

In 1999 Bethesda North and Good Samaritan hospitals joined in a partnership with the Cincinnati community to form what is now known as TriHealth, Inc. The focus of the TriHealth partnership was to provide a solid foundation of integrated care across the continuum of a patient's health needs within the greater Cincinnati area. In an effort to provide excellent patient care, TriHealth implemented automated health information through MEDITECH and various ancillary systems which were on the leading edge among its peers.

TriHealth recognized the need for a more integrated system for a comprehensive patient health record that could follow the patient from the ambulatory clinic settings throughout their inpatient hospitalizations within the hospitals regardless of visit or stay type (surgery, emergency or inpatient admission) and back to the ambulatory clinic settings. The TriHealth strategic goal was to provide a comprehensive record whereby clinicians and providers could access the patient health record to obtain a total picture of relevant patient information. It was clear that the current clinical and financial systems currently in existence at TriHealth would not be able to provide the depth and breadth of what TriHealth was determined to achieve.

Implementation Overview

The TriHealth Information Systems Steering Committee (ISSC) developed the TriHealth IT Plan in an effort to meet business and patient safety goals from an information system infrastructure and functionality standpoint. It was concluded that the existing core systems were insufficient to meet organizational goals related to supporting TriHealth's expanding integrated services. An application system selection initiative was launched. The result, after diligent study on current information systems available was to select and implement Epic Systems clinical, financial and supporting applications.

The scope of this initiative was to add Revenue Cycle applications to our TriHealth employed practices that were already live with EpicCare Ambulatory on April 1, 2012 and the enterprise suite of products to go live for the Good Samaritan Hospital on June 1, 2012 and Bethesda North on July 1, 2012.

Additionally, integration with Passport, Interqual, Quadex, Epoint, Hyland/OnBase, RPACS/CPACS, Tracemaster EKGs, CareFusion PFTs, Pyxis, McKesson, SwissLog, Capsule Device Integration and Healthbridge were included in the scope of this implementation.

Resulting Value / ROI

- With the implementation of discrete documentation with EpicCare Inpatient Note Writer and Note Templates as well as the high adoption/use of Dragon and Powerscribe, we have reduced transcription by 67% for a total cost savings of $2.1MM. We had 5 FTE's in Medical Records/Transcription retire without being replaced and 10 FTEs were eliminated.
- Device integration for hemodynamic monitoring, anesthesia, ventilators and dialysis machines has improved the efficiency of the nursing staff and allowed for more accurate documentation related to key variable sent to Epic through device integration.
- The ability to use clinical programs and clinical decision support across the enterprise to leverage existing documentation to alert care providers of change in patient status, risk for adverse events, health maintenance tasks and drive clinical decision making has increased the quality of the care provided to our patients. Reduction in rapid responses, catheter days and ICU LOS are just a few of the results noted.
- Clinical decision support through Best Practice Alerts and alerting embedded in order sets has helped TriHealth realized 12% reduction in blood transfusion, reduced ICU LOS by 1.3 days and reduced cost per care of these patients by $12,600.
- With the implementation of clinical decision support in key locations in provider workflows, TriHealth has performed in the top percentile nationwide in core measures.
- With standardize documentation and scoring tools across the hospital and physician practices related to high risk readmission patients, TriHealth has reduced 30 day readmission rates 16%, increased referrals for discharge services 120%, home care referrals increased 36% and overall readmissions for all patient populations was reduced by 2%.
- Patient engagement through the use of MyChart across the hospital and ambulatory practices has increased with a total of 80,000 active patients and 151,000 messages sent to providers.
- Chronic disease management programs within EpicCare Ambulatory have allowed Trihealth to standardize disease protocols and build them into Health Maintenance. Integration of these protocols into MyChart to enhance patient engagement in their care has helped TriHealth continues to lead the community by greater than 10% related to patient compliance with these programs.

Lessons Learned

- Spend time developing the IT staff to be prepared to start taking support calls at go live. Epic project plans necessitate IT staff to focus on week by week tasks and individual assignments. This makes support challenging when staff need to immediately switch from build to support. Making sure staff understand security, printing, all workflows for support area are documented, and understanding how to resolve common issues would help staff be more prepared at go live.
- Identifying physician champions for all specialties with communicated authority to make decisions for the section is critical. While having workgroups helps to make decisions more quickly, having individuals who can make decisions specific to specialties is needed for review/approval of clinical content.
- Ambulatory and Hospital based teams need to understand decisions and impacts to workflows across the enterprise. Changes to master files, profiles and system definitions impact all areas and having processes to communicate these changes is key to not effecting build by different clinical teams.
- Super user training programs are critical to the success of the go live. Having dedicated staff in each department who have a higher level of training in the system that can support their peers is needed for a successful implementation of this size.
- Training should be tailored more to "a day in the life" of a care giver instead of task driven scenarios. Clinical staff struggled with applying what they learned, particularly in the surgical areas once the system was live.

University of Iowa Hospitals and Clinics

Profile

University of Iowa Hospitals and Clinics is an 873-bed tertiary care facility with 1,432 physicians, 6,100 staff and 32,000 annual admissions. It is Iowa's only comprehensive academic medical center, providing specialized multidisciplinary care in more than 200 specialties. University of Iowa Hospitals and Clinics has nationally recognized programs in ophthalmology, orthopedics, otolaryngology, cancer, cardiology, neurology/ neurosurgery, transplant, nephrology and gynecology.

HIMSS Analytics EMR Adoption Model℠ Stage 7 status achieved: 11/25/2014

The Challenge

University of Iowa Hospitals and Clinics has a rich history of using information technology to support clinical delivery. Internally developed software addressed most of the needs of the organization from the 1970s to the early part of the 21st century, when it was recognized that it could no longer provide sufficient software development support to meet the rapidly evolving needs of healthcare. The enterprise identified the need for a highly integrated solution that provided a robust set of common patient management tools that could be utilized by all staff and also supported the unique workflow requirements of specific care providers and clinical specialties. The organization recognized it needed to standardize many basic patient management processes across the enterprise in order to meet its clinical quality and patient safety objectives, and believed a robust clinical information system would be instrumental in driving that standardization. As an academic- and research- oriented organization, University of Iowa Hospitals and Clinics was also seeking a solution that could leverage the tremendous amount of transactional data associated with clinical care to support teaching its students and trainees on optimal patient management strategies and advancing the science of medicine through clinical research.

Implementation Overview

A large, multidisciplinary team of healthcare and information technology staff dedicated 2005-2006 to reviewing enterprise class clinical information systems and vendors. In fall of 2006, a decision was reached to contract with Epic Systems for their enterprise suite of applications. Formal project kick-off occurred in 2007 with operating room management. Radiology went live in 2008, and inpatient pharmacy, ICU device integration, clinical documentation and CPOE went live across the institution in 2009. Additional clinical modules, including patient and referring physician web portals, have been rolled out across the enterprise. The institution is live or installing all clinical solutions provided by our vendor across all areas of the organization.

Resulting Value / ROI

- **Ability to respond quickly to drug recalls and shortages:** Shortly after the CPOE go live, the Heparin used as a flush for vascular access catheters was recalled. Using the EHR in one afternoon we were able to identify all inpatients being treated with the recalled Heparin and replace all impacted Heparin inventory within a few hours. We routinely rely upon the EHR to direct physicians when certain medications are in limited supply or have been recalled.
- **Patients' access to their medical information:** Implementation of the EHR patient portal, which provides patients with access to their diagnostic studies, notes and visits, has had a dramatic and positive impact on patient satisfaction scores relating to access to medical information. This has resulted in patients being better informed about the care we are providing.
- **Documentation compliance:** As in many large health care organizations, we struggled to comply with our policies regarding completing patients' history and physical documentation prior to surgical procedures. With the support of the institution's leadership and the

documentation tools of the EHR, we were able to use the EHR and retrain all of our surgeons in just over two weeks. The EHR has allowed us to closely monitor documentation performance to the point that our compliance routinely exceeds 95%.

- **Laboratory utilization:** Our organization has worked for many years to reduce unnecessary and inappropriate laboratory testing. Using the EHR and CPOE, we have been able to direct providers' laboratory ordering behavior to significantly reduce unnecessary and duplicative laboratory testing, resulting in fewer blood draws from patients and a decrease in expenses associated with these tests. We have also been better positioned to provider physician-level reports on laboratory ordering behavior to drive the desired practice changes.
- **Use of bar codes for medication and blood product administration:** We have been able to dramatically reduce patient identification errors and medication / blood product disbursement errors in patients using bar code scanning technology in our EHR. We are also better positioned to provide routine safety reports regarding this activity within the enterprise.
- **Bedside medical device integration:** We have been able to greatly reduce the amount of time our nursing staff spends transcribing data from bedside medical devices into the EHR by directly interfacing the flow of data from the devices into the EHR. We have also been able to improve the accuracy of the data in the EHR by eliminating manual transcription errors, and we have been able to use this real-time data to drive clinical decision support.

Lessons Learned

- It is critical for the institution to invest in securing dedicated time from physicians, nurses, pharmacists and other members of the care delivery team to support the clinical systems. At the University of Iowa Hospitals and Clinics, this team is directed by the Chief Medical Information Officer and is given advanced training in the EHR. It provides invaluable direction to IT staff regarding systems configuration, implementation and training. It is also focused on optimizing the use of the system by specific providers (for example, pediatricians, behavioral health, emergency medicine).
- A standard system change management structure must be in place. This should include a group of system users to advise IT on which system changes to make and when. System users should clearly understand what types of system enhancements require vendor engagement and what enhancements can be completed by institutional IT staff. System customizations that deviate from the vendor development roadmap must be avoided. Institutions should prioritize use of the most current version of the products.
- System training should be focused on the care delivery team rather than on specific types of providers. System training should be mandatory for all system users prior to system implementation and on a regular interval after implementation.
- Go live is one step in the journey to an all-digital clinical delivery environment. It is not the final step. Do not delay system implementation in the hopes of achieving a perfect configuration. Recognize significant system optimization can only occur after staff members have been using the system in their daily activities.

"We are delighted to receive this recognition of our focus on using advanced information technology to improve clinical quality and patient safety. Stage 7 designation is testament to the dedication and hard work of our teams of clinicians and information technology professionals. With this strong foundation, I am confident that we will continue to advance clinical care."

Kenneth P. Kate, CEO, University of Iowa Hospitals and Clinics

UT Southwestern Medical Center

Profile

UT Southwestern Medical Center is one of the premier academic medical centers in the nation, integrating biomedical research with exceptional clinical care and education. The institution's faculty includes many distinguished members, including six who have been awarded Nobel Prizes since 1985. Approximately 2,360 full-time, 291 part-time, and 1,335 volunteer faculty are responsible for groundbreaking medical advances and committed to translating science-driven research quickly to new clinical treatments. UT Southwestern physicians provide medical care in over 60 specialties to about 92,000 hospitalized patients and oversee approximately 2.1 million outpatient visits a year. UT Southwestern serves the most complex patient population in the Dallas Fort Worth Metroplex and excels in quaternary and tertiary care through an integrated delivery network of two hospitals and a 1700 multi-specialty physician group.

Both HIMSS Analytics EMR Adoption Model℠ and HIMSS Analytics Ambulatory EMR Adoption Model℠ Stage 7 status achieved in October, 2014.

- 612 Patient Beds
- 50 Outpatient and Specialty Clinics
- Operating funds including research $2.24 billion.

The Challenge

In 2002, UT Southwestern recognized the importance of providing world class clinical care on its own campus to the community that it served, alongside the world class research and teaching that existed. UT Southwestern made significant investments to achieve this goal through the purchase of hospitals, construction and expansion of ambulatory buildings, and the expansion of the faculty to provide comprehensive clinical services. UT Southwestern's vision for clinical excellence was founded on the idea that interdisciplinary care teams led by leading faculty should easily traverse the inpatient and outpatient settings to provide the highest quality, patient-centered care. Our campus had long witnessed the challenges to patients and care teams when there are poor handoffs between care settings, lack of access to a comprehensive view of the patient, and inconsistent communication between members of the care team. In addition, UT Southwestern was committed to driving standardized, evidence-based care pathways for our patients and developing the analytics necessary to measure and ensure their ongoing effectiveness. In order to achieve this clinical vision, UT Southwestern developed a comprehensive IT strategy centered around two major strategic investments: a single, comprehensive, electronic medical record system that would serve both inpatient and outpatient settings and a single, aligned, analytics infrastructure that would provide data for performance management and improvement. We continued with that goal over 12 years, progressively implementing Epic modules as they became available, and even partnering with Epic as an alpha or beta site for some modules, in order to accomplish our goal.

Implementation Overview

EHR Solution: Epic

Multi-Year Phased Approach for Epic Implementation

- Started implementation with Epic Ambulatory, HIM, Registration and Scheduling from 2002-2006
- After hospital acquisition, continued with Inter-op, Pharmacy and Inpatient CPOE from 2006-2008
- Continued Implementation with Inpatient CPOE, Professional Billing and Oncology from 2008-2011
- Continued with additional Specialty Modules, ADT and Hospital Billing from 2011-2013

Resulting Value / ROI

- Seamless, integrated master patient record between inpatient and outpatient settings
- Attested for Stage I & II for Meaningful Use incentive programs for both Eligible Providers and Eligible Hospitals in earliest possible years
- Patient Quality Programs (PQRS, DSRIP and Patient Centered Medical Home)—able to successfully participate in each

Timeliness of data

- Automated billing where possible
    1. Over 90% of nursing charges are tied to documentation flowsheets
    2. 100% operating room charges are tied to surgical case documentation
    3. 100% Emergency room facility fee calculations are tied to documentation
    4. Decreased billing turnaround times and charge entry lag
    5. Enabled immediate availability of clinically relevant patient data throughout the continuum of care—inpatient, ambulatory, ED, OR.
    6. Clinical data available remotely via mobile device access, both by providers and by patients

Efficiencies

- Write information once, use many times
- Internal references/closing loop
- Streamlined release of information
- Reduced charge days for ED patients by 80%
- Reduced charge audits for ED patients by 85%
- Recaptured an average of $220 per ED patient
- Charges tied to documentation virtually eliminated Anesthesia charge chart audits and reduced Anesthesia charging delays by 6%
- Increase in reimbursements
    1. Physician charge capture as result of clinical documentation, with ability to monitor for missing charges and timeliness of charge entry. ICD10-compliant physician charge capture achieved 22 months prior to CMS requirement
    2. More accurate level-of-service calculations supported by documentation
    3. Improved hospital charge capture

Patient safety

- Legible patient information
- Shared information such as medications, allergies, and problems, for all caregivers in all care settings
- Discrete data available for clinical decision support
- Secure electronic transfer of care documents
- Ensured 100% compliance with SCIP 1 and SCIP 2 Measures

Enhanced patient communication

- 42% of our patients use the patient portal to electronically message providers
- External sharing/interoperability
    1. 1100 to 1500 electronic exchanges of patient data with other facilities monthly
- Reporting and Analytics
    1. One database for all clinical events and financial transactions
    2. Simplifies extraction to a core data warehouse for combination with non-EHR data

Lessons Learned

Prioritization of implementation: start with core/foundational functionality (e.g. registration, ADT) and move to clinical areas, or go big-bang

Advantages to staging implementation

- Allows issues to be identified and resolved by module, with whole-team focus on the specific area/module being implemented

Balance local customization vs. standardization

- Use as an opportunity to standardize process and workflow unless a business case exists for customization at the specialty level
- Avoid over-customization at the individual provider level

Governance

- Set enterprise-wide guiding principles for the EHR and its interaction with other clinical systems

Design with analytics and reporting in mind

- Identify a single enterprise data storage location for key data elements, taking the workflow for recording into account

Early adopter/vendor partner

- Con: Work through product growing pains
- Pro: Influence direction of product/module

Maximize upgrades

- Stay up to date with product

Winona Health

Profile

Winona Health is an increasingly unique entity; a rural healthcare system created in 1894 by local citizens and physicians and still owned and operated by its community. For 120 years, its community-led Board of Directors, providers, staff and volunteers have remained dedicated to meeting the healthcare needs of its community, adapting and expanding its services and facilities. Nestled between three large tertiary care centers, WH continues to thrive because of its ongoing commitment to its mission – being devoted to improving the health and well-being of its family, friends and neighbors. Winona Health provides care through primary care clinics, surgical and specialty clinics, an urgent care clinic, emergency department, 99-bed hospital, skilled nursing home, assisted living apartments, home care, paliative care and hospice services. In 2013, Winona Health earned the Performance Excellence Network's Excellence Award, which is based on the nationally-recognized Baldrige criteria. It has also been recognized 10 times as one of the Most Wired small and rural hospitals.

HIMSS Analytics Ambulatory EMR Adoption Model℠ Stage 7 status achieved January 27, 2015.

The Challenge

Winona Health has been a pioneer in health information technology adoption to improve patient care since 2001 when it was among the first health care organizations to develop an integrated electronic medical record system. Recognizing the importance of high quality data and information for providers, staff, patients, suppliers, and partners, Winona Health invested resources to build the infrastructure needed to manage its clinical and business systems with integrated technology – one of its strategic advantages. Accuracy, integrity, reliability, timeliness, security, and confidentiality are key requirements of both clinical and business processes. Understanding the value of strategic partnerships, Winona Health signed a 10-year agreement in October 2010 with an EMR vendor. Through this partnership, the EMR vendor manages Winona Health's IT systems in alignment with its strategic goals: Leveraging IT systems to decrease waste, increase productivity and workflow, and improve safety.

Implementation Overview

Winona Health's partnership with Cerner began in 2001 with the introduction of a patient portal for the community and the first phase of a fully integrated EMR project. In 2002, two of the partnering clinics went live with Powerchart Office. The initial project included nursing and physician documentation as well as support applications. In 2003, the hospital went live with a shared EMR with the addition of many applications over several years to further integrate the EMR (materials, hospital billing, registration, imaging, lab, HIM, etc.). The remaining clinics went live in 2004 adding more integration for the healthcare system. In 2012 Winona Health's clinics transitioned from a foreign system for registration, scheduling and billing to a fully integrated, Cerner-created, one patient bill and one patient experience across all areas of the organization. CPOE was added in 2013 with evidence-based order sets in preparation for Meaningful Use Stage 2. In 2014, the healthcare system went live with physician documentation, integrated with Dragon dictation, supporting the need for single-piece flow while providing patients with timely documentation at each visit.

Resulting Value/ROI

The EMR supports Winona Health's innovative new program, the Community Care Network (CCN), which works to prevent readmissions and lower the total cost of care. In partnership with Winona State University, the program trains student health coaches to work with clients in their homes to help identify barriers and opportunities for improving their health. The first clients began the program in June 2013, and there are 48 clients so far. The EMR is critical to the program for allowing providers to:

- Identify at-risk individuals based on frequent readmissions
- Alert the team when readmissions occur
- Accept and send referrals throughout the healthcare system
- Communicate with providers to recommend changes to the client's plan of care

In its first year, the CCN has shown an 85-95 percent reduction in readmissions and preventable emergency department visits for the program's clients. This translates to a 56-percent decrease in total cost of care in the first year.

Computerized Provider Order Entry (CPOE) – In 2013, Winona Health went live with more than 220 evidence-based ordersets using Provation. Physician champions from each clinic area reviewed the ordersets and helped to engage their peers.

Beacon Grant – A multi-year grant project focusing on health information exchange with transitions of care using technology as a tool. Winona Health's partners included several health systems in southeast Minnesota. The project included peer-to-peer CCD exchanges, telemedicine visits, clinical data repository work as well as a school portal for asthma action plans. The project helped Winona Health and the partners develop process flows for exchanging data and to understand the technical investments required to successfully exchange data.

Physician documentation – The Clinical IT Committee engaged providers in the project planning from the start to ensure that workflows supported realistic patient flow. In April 2014, Winona Health went live with more than 70 providers across the organization using Cerner's dynamic documentation with Nuance's Dragon dictation. Adoption was high from the start, and transcription was able to reduce staff within one month based on the lack of transcription needs (savings of $450,000 annually in salaries and a decrease of $322,800 in annual contract costs with Nuance). Patient benefits include timelier access to provider notes along with standardized workflow and note content.

Increased mammography screening – In June 2013, mammography reminders were sent to 3000 patients as part of Stage 2 Meaningful Use requirements to engage patients in their health resulting in an increase in mammography.

Meaningful Use – Successful attestation for Stage 2 Meaningful Use for both inpatient and eligible providers.

Patient Portal – Adding patient requested features to MyWinonaHealth, such as online appointment scheduling, health reminders, online bill pay, and appointment reminders.

Lessons Learned

Accountability is critical in the adoption of new systems. Winona health focuses on accountability through clear, transparent communication at daily “focus boards” where adoption and application issues with new processes are addressed and problem-solved.

Other key elements for success:

- It is critical to have clinical IT staff embedded in departments to support users
- Structured governance is essential for decisions to be made
- Use of a lean management system leads to high adoption rates
- Projects must align with the organization’s strategic plan and cascade to front-line staff
- An integrated IT vendor partnership leads to shared commitment and accountability
- Flexibility is required in structuring the content of the EMR in order to meet the needs of both patients and providers.

“Achieving HIMSS Analytics EMR Adoption Model Stage 7 is very rewarding, because our goal is to improve healthcare for our patients. It’s always about the patient. This achievement has been an ongoing team effort, and it reflects that our data-driven, lean management culture is embedded throughout our organization. Our IT partner is completely integrated with our staff and that close collaboration is key to our ability to leverage IT when it comes to patient care.”

Daniel Parker, MD, Medical Staff Chief, Winona Health

For more information about Winona Health: www.winonahealth.org.

Additional Stage 7 Recipients

Baylor Scott & White Health
Baylor Scott & White College Station Hospital
Baylor Scott & White Health McLane Children’s Hospital
Baylor Scott & White Health Temple Hospital
8 Ambulatory Facilities

Cedars-Sinai
Cedars-Sinai Medical Center

Centura Health
Centura Castle Rock Adventist Hospital
Centura Ortho Colorado Hospital
Centura Parker Adventist Hospital
Centura Penrose Hospital
Centura Porter Adventist Hospital
Centura St. Anthony Hospital
Centura St. Anthony North Hospital
Centura St. Anthony Summit Medical Center
Centura St. Francis Medical Center

Cincinnati Children’s Hospital Medical Center
Cincinnati Children’s Hospital Medical Center
14 Ambulatory Facilities

Edgerton Hospital & Health Services
Edgerton Hospital & Health Services

Lakeland HealthCare
4 Ambulatory Facilities

Mercy Health
Mercy Hospital of Defiance
Mercy Hospital West
Mercy Memorial Hospital
The Jewish Hospital
258 Ambulatory Facilities

NCH Healthcare System
NCH Downtown Naples Hospital
NCH North Naples Hospital

Novant Health
9 Ambulatory Facilities

Southern Medical Health Systems
Springhill Medical Center

SSM Health
St. Mary’s Janesville Hospital
St. Clare Hospital & Health Services - Wisconsin

HIMSS Analytics and the North American Stage 7 organizations would also like to congratulate the following international organizations that have achieved Stage 7 status.

Hospital Dénia “Marina Salud”
Dénia, Comunidad Valenciana
Spain

Radboud Universitair Medisch Centrum
Nijmegen, Gelderland
The Netherlands

Seoul National Univeristy Bundang Hospital
Gyeonggi-do, Seoul
South Korea

Universitätsklinikum Hamburg-Eppendorf
Hamburg, Hamburg
Germany

Peking University People’s Hospital
Beijing, China

Sheng Jing Hospital of China Medical University
Shenyang, China

2014 **Stage 6** Recipients

Adventist Health
Adventist Medical Center - Hanford
Adventist Medical Center - Portland
Castle Medical Center
Central Valley General Hospital
Feather River Hospital
Frank R. Howard Memorial Hospital
Glendale Adventist Medical Center
San Joaquin Community Hospital
Simi Valley Hospital & Health Care Service
Sonora Regional Medical Center
St. Helena Hospital Clearlake
St. Helena Hospital Napa Valley
Tillamook Regional Medical Center
Ukiah Valley Medical Center
Walla Walla General Hospital
White Memorial Medical Center

Allina Health
Regina Hospital

Aria Health
Aria Health - Bucks County Campus
Aria Health - Frankford Campus
Aria Health - Torresdale Campus

Ascension Health
Columbia St. Mary's - Ozaukee Campus
Columbia St. Mary's Hospital Milwaukee
Genesys Regional Medical Center at Health Park
Jane Phillips Medical Center
Peyton Manning Children's Hospital at St. Vincent
St. John Broken Arrow Hospital
St. John Medical Center
St. John Owasso
St. John Sapulpa
St. Joseph Medical Center
St. Mary's Medical Center
St. Mary's Medical Center
St. Mary's of Michigan Medical Center
St. Thomas Midtown Hospital
St. Thomas Rutherford Hospital
St. Thomas West Hospital
St. Vincent's Medical Center

Atlantic Health System
Morristown Medical Center
Newton Medical Center
Overlook Medical Center

AtlantiCare
AtlantiCare Regional Medical Center - City Campus
AtlantiCare Regional Medical Center - Mainland Campus

Auburn Community Hospital
Auburn Community Hospital

Avera Health
Avera De Smet Memorial Hospital
Avera Flandreau Hospital
Avera McKennan Hospital & University Health Center
Avera Sacred Heart Hospital
Avera St. Luke's Hospital

Barnabas Health
Clara Maass Medical Center
Community Medical Center
Monmouth Medical Center
Monmouth Medical Center Southern Campus
Newark Beth Israel Medical Center
St. Barnabas Medical Center

Bassett Healthcare
Bassett Medical Center
Cobleskill Regional Hospital
Little Falls Hospital
O'Connor Hospital
Tri-Town Regional Hospital

BayCare Health System
BayCare Alliant Hospital
Mease Countryside Hospital
Mease Dunedin Hospital
Morton Plant Hospital
Morton Plant North Bay Hospital
South Florida Baptist Hospital
St. Anthony's Hospital
St. Joseph's Children's Hospital
St. Joseph's Hospital
St. Joseph's Hospital - North
St. Joseph's Women's Hospital

Baylor College of Medicine
16 Ambulatory Facilities

Baylor Scott & White Health
Baylor Scott & White Hillcrest Baptist Medical Center
34 Ambulatory Facilities

Beacon Health System
Elkhart General Hospital
Memorial Hospital of South Bend

Beebe Healthcare
Beebe Healthcare

Billings Clinic
Billings Clinic Hospital
Stillwater Billings Clinic
12 Ambulatory Facilites

Broward Health
Broward General Medical Center
Broward Health Coral Springs
Broward Health Imperial Point
Broward Health North

Burgess Health Center
Burgess Health Center

Carilion Clinic
Carilion Stonewall Jackson Hospital

Carolinas HealthCare System
2 Ambulatory Facilities

Catholic Health Services of Long Island
St. Joseph Hospital

Central Florida Health Alliance
Leesburg Regional Medical Center
The Villages Regional Hospital

CHE Trinity Health
Mount Carmel New Albany Surgical Hospital
Seton Health - St. Mary's Hospital
St. Agnes Medical Center

Children's Healthcare Services
Children's Hospital & Medical Center

Children's Hospital Colorado
Children's Hospital Colorado

Christiana Care Health System
Christiana Hospital
Wilmington Hospital
27 Ambulatory Facilities

Citizens Memorial Healthcare
1 Ambulatory Facility

Community Medical Centers
Community Medical Center - Clovis
Community Regional Medical Center
Fresno Heart & Surgical Hospital
1 Ambulatory Facility

Connecticut Children's Medical Center
Connecticut Children's Medical Center

Covenant HealthCare
Covenant Medical Center

Deaconess Health System
51 Ambulatory Facilities

Duke LifePoint Healthcare
Maria Parham Medical Center

Duke University Health System
Duke Raleigh Hospital

Elliot Health System
31 Ambulatory Facilites

Flagler Health Care System
Flagler Hospital St. Augustine

Fort HealthCare
30 Ambulatory Facilities

Gundersen Health System
46 Ambultory Facilites

Hallmark Health System, Inc.
Lawrence Memorial Hospital
Melrose-Wakefield Hospital

Hammond-Henry Hospital
Hammond-Henry Hospital

Harris Health System
7 Ambulatory Facilites

HCA - Hospital Corporation of America
St. Mark's Hospital

HealthEast Care System
Bethesda Hospital
St. Joseph's Hospital
Woodwinds Health Campus

HealthPartners, Inc.
Amery Regional Medical Center

HealthSouth Corporation
Fairlawn Rehabilitation Hospital
HealthSouth Deaconess Rehabilitation Hospital
HealthSouth Mid America Rehabilitation Hospital
HealthSouth MountainView Regional Rehabilitation Hospital
HealthSouth Rehabilitation Hospital - North Memphis
HealthSouth Rehabilitation Hospital at Drake
HealthSouth Rehabilitation Hospital of Arlington
HealthSouth Rehabilitation Hospital of Fort Worth
HealthSouth Rehabilitation Hospital of Huntington
HealthSouth Rehabilitation Hospital of Largo
HealthSouth Rehabilitation Hospital of Sarasota
HealthSouth Rehabilitation Hospital of Spring Hill
HealthSouth Rehabilitation Hospital of Western Massachusetts
HealthSouth Rehabilitation Hospital of Wichita Falls
HealthSouth Southern Hills Rehabilitation Hospital
HealthSouth Sunrise Rehabilitation Hospital
HealthSouth Western Hills Regional Rehabilitation Hospital
Kansas Rehabilitation Hospital
Regional Rehabilitation Hospital
The Rehabilitation Institute of St. Louis
Van Matre HealthSouth Rehabilitation Hospital
Wesley Rehabilitation Hospital

Hemphill County Hospital
Hemphill County Hospital

Hendrick Health System
Hendrick Medical Center

Hendry Regional Medical Center
Hendry Regional Medical Center

Henry Ford Health System
Henry Ford Hospital
Henry Ford Kingswood Hospital
Henry Ford Macomb Hospital
Henry Ford West Bloomfield Hospital
Henry Ford Wyandotte Hospital

Heritage Valley Health System
Heritage Valley Beaver
Heritage Valley Sewickley

Highlands Health System
Highlands Regional Medical Center

Holy Spirit Health System
Holy Spirit Hospital

Hudson Valley Hospital Center
Hudson Valley Hospital Center

Hurley Medical Center
Hurley Medical Center

Indian River Medical Center
Indian River Medical Center

Infirmary Health
Mobile Infirmary
North Baldwin Infirmary
Thomas Hospital

Inova Health System
67 Ambulatory Facilities

Jackson County Health Care Authority
Highlands Medical Center

Jackson Health System
Jackson Memorial Hospital
Jackson North Medical Center
Jackson South Community Hospital

Johns Hopkins Medicine
All Children's Hospital

JPS Health Network
52 Ambulatory Facilites

Jupiter Medical Center
Jupiter Medical Center

Kaiser Permanente
15 Ambulatory Facilities

KershawHealth
Kershaw Health Medical Center
at Camden

Knox Community Hospital
Knox Community Hospital

La Rabida Children's Hospital
La Rabida Children's Hospital

Lahey Health
Winchester Hospital

Lawrence Memorial Hospital
16 Ambulatory Facilities

Lehigh Valley Hospital & Health Network
Lehigh Valley Hospital

Lexington Medical Center
Lexington Medical Center

Lucile Packard Children's Hospital
Lucile Packard Children's Hospital Stanford

Margaret Mary Health
Margaret Mary Community Hospital

Marion General Hospital
Marion General Hospital

Marshall Health System
Marshall Medical Center North
Marshall Medical Center South

Martin Health Systems
Tradition Medical Center

Mayo Clinic Health System
Mayo Clinic Health System - Albert Lea
Mayo Clinic Health System - Austin
Mayo Clinic Health System - Chippewa Valley
Mayo Clinic Health System - Eau Claire Hospital
Mayo Clinic Health System - Fairmont
Mayo Clinic Health System - Mankato
Mayo Clinic Health System - Menomonie
Mayo Clinic Health System - New Prague
Mayo Clinic Health System - Northland
Mayo Clinic Health System - Oakridge
Mayo Clinic Health System - Red Wing
Mayo Clinic Health System - Springfield
Mayo Clinic Health System - St. James
Mayo Clinic Health System - Waseca
Mayo Clinic Health System - Waycross
76 Ambulatory Facilities

McAlester Regional Health Center
McAlester Regional Health Center

Memorial Health Care Systems
Memorial Hospital

STAGE 6

HIMSS Analytics

Memorial Healthcare System
Joe DiMaggio Children's Hospital
Memorial Hospital Miramar
Memorial Hospital Pembroke
Memorial Hospital West
Memorial Regional Hospital
Memorial Regional Hospital South

Memorial Hospital of Sweetwater County
Memorial Hospital of Sweetwater County

Mercy Health
Mercy St. Anne Hospital
St. Charles Mercy Hospital

Mercy Medical Center
Mercy Medical Center
32 Ambulatory Facilities

Metro Health
Metro Health Hospital
15 Ambulatory Facilities

Moundview Memorial Hospital & Clinics
Moundview Memorial Hospital & Clinics

Mount Ascutney Hospital & Health Center
Mount Ascutney Hospital & Health Center

Mount Sinai Medical Center of Florida
Mount Sinai Medical Center of Florida

Mountain States Health Alliance
Unicoi County Memorial Hospital

MultiCare Health System
MultiCare Auburn Medical Center

Munson Healthcare
Mercy Hospital - Cadillac
Mercy Hospital - Grayling
Munson Medical Center

Nanticoke Health Services, Inc.
Nanticoke Memorial Hospital

National Institutes of Health Clinical Center
The National Institutes of Health Clinical Center

Navicent Health
Medical Center of Peach County, Navicent Health
Medical Center, Navicent Health

New York Methodist Hospital
New York Methodist Hospital

North Kansas City Hospital
North Kansas City Hospital

Northwestern Medical Center
Northwestern Medical Center

Northwestern Memorial Healthcare
111 Ambulatory Facilities

Novant Health
Novant Health Charlotte Orthopedic Hospital
Novant Health Huntersville Medical Center
Novant Health Matthews Medical Center
Novant Health Presbyterian Medical Center

NYU Langone Medical Center
17 Ambulatory Facilities

OhioHealth
25 Ambulatory Facilities

OSF HealthCare
OSF St. Elizabeth Medical Center

Owensboro Health
Owensboro Health Regional Hospital

Palmer Lutheran Health Center
Palmer Lutheran Health Center

Palomar Health
Palomar Health Downtown Campus
Palomar Health Palomar Medical Center
Palomar Health Pomerado Hospital

Parkland Health & Hospital System
Parkland Memorial Hospital

Parkview Health
Parkview Hospital - Randallia
Parkview Huntington Hospital
Parkview LaGrange Community Hospital
Parkview Noble Hospital
Parkview Orthopedic Hospital
Parkview Regional Medical Center
Parkview Whitley Hospital
Parkview Women & Children's Hospital
152 Ambulatory Facilities

Penn State Milton S. Hershey Medical Center
The Milton S. Hershey Medical Center

Piedmont Healthcare
Piedmont Atlanta Hospital
Piedmont Fayette Hospital
Piedmont Henry Medical Center
Piedmont Mountainside Hospital
Piedmont Newnan Hospital

PIH Health
PIH Health Hospital

Pioneers Memorial Healthcare District
Pioneers Memorial Hospital

Premier Health
Atrium Medical Center
Upper Valley Medical Center

ProHealth Care, Inc.
Oconomowoc Memorial Hospital
Waukesha Memorial Hospital
27 Ambulatory Facilities

Providence Health & Services
Providence Centralia Hospital
Providence Everett Medical Center
Providence Holy Cross Medical Center
Providence Holy Family Hospital
Providence Hood River Memorial Hospital
Providence Kodiak Island Medical Center
Providence Little Company of Mary Medical Center - San Pedro
Providence Little Company of Mary Medical Center - Torrance
Providence Medford Medical Center
Providence Milwaukie Medical Center
Providence Mount Carmel Hospital
Providence Newberg Medical Center
Providence Seaside Hospital
Providence St. Joseph Medical Center
Providence St. Joseph Medical Center
Providence St. Mary Medical Center
Providence St. Patrick Hospital & Health Sciences Center
Providence St. Peter Hospital
Providence St. Vincent Medical Center
Providence Tarzana Medical Center
Providence Valdez Medical Center
Providence Willamette Falls Medical Center
St. Joseph's Hospital

Reading Health System
Reading Hospital

Regional Medical Center
Regional Medical Center

Riverview Hospital Association
Riverview Hospital

Robert Wood Johnson Health Network
Robert Wood Johnson University Hospital
Robert Wood Johnson University Hospital at Hamilton

Rochester Regional Health System
74 Ambulatory Facilities

Saint Luke's Health System
Saint Luke's Cushing Hospital
Saint Luke's East Hospital
Saint Luke's Hospital of Kansas City
Saint Luke's North Hospital - Barry Road
Saint Luke's North Hospital - Smithville
Saint Luke's South Hospital

Samaritan Regional Health System
Samaritan Hospital

SCL Health System
Good Samaritan Medical Center
Holy Rosary Healthcare
Lutheran Medical Center
St. Francis Health Center
St. James Healthcare
St. Joseph Hospital
St. Mary's Hospital & Regional Medical Center
St. Vincent Healthcare

Scottsdale Healthcare
John C. Lincoln Hospital - Deer Valley
John C. Lincoln Hospital - North Mountain

Sentara Healthcare
Martha Jefferson Hospital
73 Ambulatory Facilities

Sharp HealthCare
Sharp Chula Vista Medical Center
Sharp Coronado Hospital & Healthcare Center
Sharp Grossmont Hospital
Sharp Mary Birch Hospital for Women & Newborns
Sharp Memorial Hospital
Sharp Mesa Vista Hospital

South Nassau Communities Hospital
South Nassau Communities Hospital

Southern Illinois Healthcare
Herrin Hospital
Memorial Hospital of Carbondale
St. Joseph Memorial Hospital

Sparrow Health System
Sparrow Clinton
Sparrow Ionia
4 Ambulatory Faciliites

Spectrum Health
136 Ambulatory Faciliites

St. Charles Health System
Pioneer Memorial Hospital
St. Charles Madras
St. Charles Medical Center - Bend
St. Charles Medical Center - Redmond

St. Claire Regional Medical Center
St. Claire Regional Medical Center

St. Elizabeth Healthcare
St. Elizabeth Edgewood
St. Elizabeth Florence
St. Elizabeth Fort Thomas
St. Elizabeth Grant
111 Ambulatory Facilites

St. Lawrence Health System
Gouverneur Hospital

St. Luke's Cornwall Hospital
St. Luke's Cornwall Hospital - Cornwall
Campus St. Luke's Cornwall Hospital - Newburgh Campu

St. Peter's University Health System
St. Peter's University Hospital

Stony Brook University Medical Center
51 Ambulatory Facilities

Sutter Health
Alta Bates Summit Medical Center - Summit Campus
California Pacific Medical Center - St. Luke's Campus

Menlo Park Surgical Hospital
Sutter Maternity & Surgery Center of Santa Cruz

Tallahassee Memorial HealthCare, Inc.
Tallahassee Memorial Hospital

Tenet Healthcare Corporation
Resolute Health Hospital

Texas Tech University Health Sciences Center School of Medicine
21 Ambulatory Facilities

The Children's Hospital of Philadelphia
The Children's Hospital of Philadelphia

The Good Samaritan Hospital
The Good Samaritan Hospital

The University of Arizona Health Network
The University of Arizona - South Campus
The University of Arizona Medical Center - University Campus
16 Ambulatory Facilities

The University of Kansas Hospital
The University of Kansas Hospital

The University of Pennsylvania Health System
Hospital of the University of Pennsylvania
Penn Medicine Chester County Hospital
Penn Presbyterian Medical Center
Pennsylvania Hospital

Trinitas Health
Trinitas Regional Medical Center

Trinity Mother Frances Health System
Mother Frances Hospital - Jacksonville
Mother Frances Hospital - Tyler
Mother Frances Hospital - Winnsboro
63 Ambulatory Facilities

Tuality Healthcare
Tuality Community Hospital

U.S. Department of Veterans Affairs Health System
Louis Stokes Cleveland VA Medical Center
Portland VA Medical Center
Washington DC VA Medical Center

UAB Health System
University of Alabama Hospital - Birmingham
1 Ambulatory Facility

UMC Health System
University Medical Center

UNC Health Care System
Chatham Hospital
Rex Healthcare
UNC Hospitals

UnityPoint Health
UnityPoint Health - Allen Hospital
UnityPoint Health - Blank Children's Hospital
UnityPoint Health - Finley Hospital
UnityPoint Health - Iowa Lutheran Hospital
UnityPoint Health - Iowa Methodist Medical Center
UnityPoint Health - Jones Regional Medical Center
UnityPoint Health - Methodist Medical Center of Central Illinois
UnityPoint Health - Methodist West Hospital
UnityPoint Health - Proctor
UnityPoint Health - St. Luke's
UnityPoint Health - St. Luke's Hospital
UnityPoint Health - Trinity Bettendorf
UnityPoint Health - Trinity Moline
UnityPoint Health – Trinity Muscatine
UnityPoint Health - Trinity Regional Medical Center
UnityPoint Health - Trinity Rock Island

University Health Care
University of Utah Hospital

University Hospitals Health System
UH Ahuja Medical Center
UH Bedford Medical Center
UH Case Medical Center
UH Conneaut Medical Center
UH Geauga Medical Center
UH Geneva Medical Center
UH Richmond Medical Center

University of Florida Health
UF Health Jacksonville
UF Health Shands Hospital

STAGE 6

HIMSS Analytics

University of Michigan Health System
University Hospital

University of Rochester Medical Center
Highland Hospital
Strong Memorial Hospital - University of Rochester
71 Ambulatory Facilites

Upper Allegheny Health System
Bradford Regional Medical Center
Olean General Hospital

Vidant Health
Outer Banks Hospital
Vidant Beaufort Hospital
Vidant Bertie Hospital
Vidant Chowan Hospital
Vidant Duplin Hospital
Vidant Edgecombe Hospital
Vidant Medical Center
Vidant Roanoke-Chowan Hospital
55 Ambulatory Facilites

Virginia Commonwealth University Health System
MCV Hospitals

War Memorial Hospital
War Memorial Hospital

Wellforce
Tufts Medical Center

WellSpan Health
WellSpan Gettysburg Hospital
WellSpan Surgical & Rehabilitation Hospital
WellSpan York Hospital

WellStar Health System
WellStar Cobb Hospital
WellStar Douglas Hospital
WellStar Kennestone Hospital
WellStar Paulding Hospital
WellStar Windy Hill Hospital

Western Maryland Health System
Western Maryland Regional Medical Center

Wilbarger General Hospital
Wilbarger General Hospital

Winona Health Services
1 Ambulatory Facility

Wood County Hospital
Wood County Hospital

Wray Community District Hospital
Wray Community District Hospital

Yukon Kuskokwim Health Corporation
Yukon-Kuskokwim Delta Regional Hospital

better knowledge better analysis better decisions

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