

Space: The Final Frontier Using the DMAIC Framework to Recover Space for Laboratory Expansion and Increase Patient safety

Cost

Eipers, Angela, A.A.

The Immunostains Laboratory in the Division of Anatomic Pathology performs immunohistochemistry (IHC), in-situ hybridization (ISH) and mass spectrometry based proteomic tests for clinical diagnosis. Each year approximately 195,000 IHC and ISH tests are performed and the lab experiences a steady 10% annual increase on average. The lab moved into its current space in 2007 and used a single platform for testing on 9 automated instruments. The lab has expanded to 20 automated instruments using two platforms. Both platforms were located in 3 separate areas and inefficiencies in managing each platforms inventory existed. Over-processing activities in receiving patient specimens (microscopic slides) in five locations often resulted in rework and errors. With space at a premium, the lab needed to recover space for 2 digital slide scanners and 6 instruments and allow for growth. The DMAIC framework and LEAN tools were used to recover space and increase efficiency. The 5S tool assisted in organizing supplies in platform-specific areas resulting in a \$5,000 savings. One central area designated to receive specimens has resulted in less rework and labeling errors. Other benefits include recovery of 0.5 technologist efforts from the redesign and allowed for reallocating resources to perform testing. This has eliminated the need to request incremental staff to accommodate annual increases. This Quality Improvement project has resulted in a more efficient laboratory, cost savings, and capacity for growth. Most important, the lab works continuously to increase the value of its services and improve patient safety so the needs of the patient come first.

Medicare Annual Wellness Visits Offered at No Cost to our Patients

Cost

Donna Fenton, CMA (AAMA) CPHQ

Medicare is encouraging patients to obtain this FREE Medicare service. Medicare's goal is health promotion and disease prevention. The use of the recommended preventive services increases the chance that disease will be identified in an early stage, treated, managed and in some cases cured. Proven preventive services can improve the quality and length of lives of seniors as well as reduce the cost to the healthcare system. The RN and patient work together to develop or update a personalized prevention plan based on current health and risk factors. The appointment is scheduled 2 weeks prior to annual physical exam with a provider. The Medicare Wellness Coordinator visit will review a comprehensive medical/family history, establish a list of current medical providers, measure vitals including BMI, screen or review functional ability and level of safety offer immunization and recommend referrals. The use of an RN in this role reduces costs and increases awareness for our Medicare patients.

Optimizing the Efficiency of the TLX-4 Multiplexing Autosampler

Cost

Thomas Hartman, BA

The Thermo Fisher TLX-4 multiplexing autosampler allows 4 parallel High Turbulence Liquid Chromatography (HTLC) systems to be analyzed using one tandem mass spectrometer (MS/MS). Since each HTLC system operates independently, multiple methods can be staggered and run simultaneously to quadruple the output of the MS/MS. This is achieved by dedicating the MS/MS to each channel during its elution step. MS/MS productivity is maximized and the downtime that is typical in traditional single-channel LC-MS/MS systems, which don't fully utilize detector capacity, is greatly reduced.

In theory, four different HTLC methods with total run times of 6.5 min and MS/MS data acquisition windows of 1.5 min can be multiplexed without delaying consecutive injections for any of the four independent channels. However, due to differences in our various HTLC methods being multiplexed in addition to complexities within the TLX-4 software, our throughput wasn't quadrupled as expected. The TLX-4 wasn't able to inject each channel successively and stack all channels as theorized. Consequently, consecutive injections on each channel occurred every 8.5 to 9.5 min rather than every 6.5 min.

Optimization was achieved by reducing the data acquisition window for each method from 1.5 to 0.5 min. This greatly increased the stacking efficiency of the independent channels and reduced the time between consecutive injections on each channel to approximately 7 min. A modest improvement in turn-around-time (TAT) was realized, but most importantly a 22% reduction in solvent and instrument usage was achieved which equates to approximately 20 fewer hours of run-time per day.

Cost and Turn Around Time Savings Gained Through the Redevelopment of Three High Volume UV-HPLC Assays to HTLC-MS/MS

Cost

Eric Korman, B.A. Biology

Background: The anticonvulsant drugs Levetiracetam, Lamotrigine and Felbamate are three of the highest volume assays in the Toxicology and Drug Monitoring Laboratory with a total of 85,938 samples analyzed in 2011. These three assays were redeveloped from manual liquid-liquid extractions and data analysis by ultra violet high performance liquid chromatography (UV-HPLC) to online extractions and analysis via high turbulence liquid chromatography tandem mass spectrometry (HTLC-MS/MS).

Method: All three assays were validated on the new HTLC-MS/MS platform following standard Department of Lab Medicine and Pathology validation procedures. Cost and turn around time (TAT) analysis was preformed using staffing requirements and by comparing TAT data for the two methods.

Conclusion: These method redevelopments resulted in substantial cost savings by halving the number of technologists needed to manually extract the specimens and review the results. In addition to the cost savings achieved through reduced staffing, this method redevelopment resulted in a tenfold reduction in instrument analysis time which reduced TAT for all three assays. Mean TAT and percentage of samples that met same day TAT improved greatly in the three months following implementation.

Back-End Speech Recognition Technology Implementation Increases Transcription Productivity, Improves Turnaround Time Compliance, and Reduces Staffing Costs

Cost

Tanja Taff Morello

AIM: Implement back-end speech recognition technology (BESR) to increase productivity, improve transcription turnaround time (TAT) compliance, and decrease staffing costs.

BACKGROUND: To implement BESR, we collaborated with m*Modal, Digital Dictation, and the Clinical Notes team. Staff training required transcriptionists (MTs), education/quality assurance specialists, and supervisors to attend two days mandatory advanced-skills training (AST). At the end of training, efficiency consults were performed to observe trainees using the skills taught in class, ensuring they had the skills needed to optimize BESR. A total of 391 MTs were trained (17 per training period).

METHOD: We studied 43 MTs who completed AST and subsequently used BESR for > 12 months. We compared the study groups baseline average productivity rate to the groups current 4-week rate and also compared baseline and current TAT compliance rates. The average pre-BESR minutes transcribed per FTE per month were 2070; average post-BESR minutes transcribed were 2232. The average pre-BESR TAT compliance was 68.5%; post-BESR compliance was 85.9%. The cost benefit of the 7.8% increase in productivity in MTs using BESR for > 12 months translates into 22 fewer FTE needed if all MTs used BESR > 12 months (annual potential cost savings of \$1.4 million).

CONCLUSION: Implementation of BESR resulted in productivity gains, improved TAT compliance, and decreased staffing costs. Post-BESR implementation, we have absorbed losing 1-2 FTE per month for the last six months without replacement FTE. We look forward to implementing BESR across the remainder of the Office Support Services transcription team to see further gains.

Radiology Process Improvement: Computed Tomography (CT) Lean Project

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Kenneth Aakre, BS, RT(R)

Background: Due to the reduction in, and bundling of, Computed Tomography (CT) reimbursement rates and financial capital constraints within Radiology practices, a CT outpatient practice redesign was performed using Lean/Six Sigma methodologies. Previously, patients were scheduled to an individual CT scanner. Patients arrived for their exam to one of three buildings, were assessed by nursing, and imaged on the scheduled scanner. The current redesign aligns with Departmental and Mayo strategic goals to improve and demonstrate quality, safety, service and value.

Aim: Reduce CT operations direct expense by 10% through re-design of CT outpatient workflow by December, 2012.

Methods: Value stream mapping, Failure Modes Effects Analysis, Demand/Capacity analysis.

Results: The Gonda 3 CT redesign allowed for patient scheduling to an interpreting Radiologist instead of a specific CT scanner. Contrast assessments and nursing protocols were streamlined. A patient pull system was created to allow for load balancing of the CT scanner fleet. A space re-design concept was created to allow for efficient use of space, reduction in cost per square feet from \$72 to \$55, and reduction from 9 to 5 process steps. This has the potential for a reduction in staff and equipment depending on a future master space planning. The process improvement reduced the scanner fleet by one, with a soft savings of \$1.7 million. This should allow for a reduction of direct expenses by 10%.

Simulation Process Optimization: The Staffing-to-Workload Collaborative

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Samuel Allen

We sought to optimize the staffing-to-workload process at the Mayo Clinic Multidisciplinary Simulation Center (MCMSC). In order to determine the most efficient staffing-to-workload model, our goals were to:

1. Identify skill sets and number of people required to staff the dynamic demands of the MCMSC
2. Develop a tool to help align staff requirements with course complexity
3. Optimize room and personnel resource utilization toward optimal learner experiences
4. Determine a method to forecast staffing needs
5. Develop a cross-training model

Using the DMAIC methodology our team:

1. Defined: project goals and proposed a plan to capture and track data
2. Measured: current state data to establish a baseline
3. Analyzed: current drivers and variables in order to assign task-based criteria
4. Improved: designed and implemented multi-user tracking tool for capture of per-task real time data
5. Controlled: and monitored impact at intervals via process tools

Conclusions: As a result of this project we: 1) defined areas of cross coverage as well as tools for process assessment and staff orientation, 2) designed an on-going method for future forecasting of demands and resources and 3) aligned sim center functions with the academic calendar. Understanding the internal relationships and variables of this complex adaptive system facilitated process optimization.

Quality Measurement and Reporting: Staffing to Workload Collaborative - Movement Toward a Strategic Business Model

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Rita Black, RN

Background: The Quality Measurement and Reporting Team is part of Quality Management Services. Our team consists of 12 RNs, 8 abstractors, 5 reporting specialists, and 4 observers. Our purpose is to report data regarding Mayos quality and safety initiatives. We enrolled in the Staffing to Workload Collaborative for the following reasons: 1) Assess our resources to ensure staffing levels align with the required workload while maintaining quality output. 2) Explore ways to level the workload throughout the week, month, and quarter.

Methods: We developed and instituted use of a Midas Focus Study Time Tracking tool. The tool is used for capacity planning, and to calculate project and overall productivity ratios. Staff members participate on one of four teams: Right Data, Right Interpretation, Right Time, and Right Person. The goal of the teams is to identify gaps in our current work processes, and implement new processes which include automation, elementizing data, and innovative report delivery.

Conclusions: Efficiencies were gained by process improvements. The Rapid Response Team automated reporting achieved an 80% reduction in report time. Cross training and writing Standard Operating Procedures has allowed the reporting specialists to be more efficient and provide cross coverage. We continue to identify processes that could benefit from report automation. Core Measure defects have been identified in a new automated report for the process owners for the purpose of patient improvement efforts. Another new automated report summarizes the defects for leadership. Combined staff efforts have increased teamwork while enhancing contributions of each role.

Staffing to Workload in the Component Laboratory

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Erin Brach, BS

Component Laboratory performs blood product manufacturing, inventory management and donor testing to support the care of patients. The laboratory coordinates with two internal customers: Donor Services for donor collections and Transfusion Laboratory for issuing blood. The lab works with an external laboratory to complete infectious disease testing of donor samples. When a team formed to take over scheduling responsibilities within the lab, the team saw an opportunity to design the schedule based on work availability. A staffing to workload project was initiated, with objectives to create a staffing model aligned with work demand and to improve the balance of work.

The DMAIC methodology was used for the analysis. The current schedule was reviewed to determine available staff. Tasks performed at each workstation were identified. Volume data was collected from multiple weeks/months accounting for seasonal variation. Process timings measured with the workload-recording system were used. Using the volumes and timings, total workload demand was calculated. The minimum staff required to complete the work was determined using the workload demand.

A future state schedule was designed based on the workload, allowing the lab to perform work as it becomes available. Performing the work as it becomes available created capacity within the lab for additional activities and improved turn-around times. The new schedule has realized benefits for the staff, including: predictability, transportation and work-life balance. By establishing a staffing model based on expected workload, the staff experience less stress and are more willing to help each other out, improving teamwork and satisfaction.

A coordinated patient transport system for ICU patients requiring surgery: Impact on operating room efficiency, cost, and ICU workflow. Contact information: Michael J. Brown, M.D., Assistant Professor of Anesthesiology, Mayo Clinic, Rochester, MN, brow

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Michael Brown, MD

Purpose: Transfer of intensive care unit (ICU) patients to the operative room (OR) environment is a resource intensive, time consuming process that often results in patient throughput inefficiencies, deficiencies in information transfer, and suboptimal nurse to patient ratios. Implementation of a coordinated patient transport system (CPTS) may improve OR efficiency and ICU staffing ratios while reducing non-value added institutional cost.

Methods: In 2007, Mayo Clinic Rochesters Anesthesiology Department implemented a system of anesthesia provider ICU pickup with direct transfer to the OR for all ICU patients who were the first OR case of the day. This study evaluates the impact of this practice change on perioperative efficiency outcomes, ICU nurse:patient staffing ratios and non-value added cost in a before and after study design. The time intervals evaluated include: a) Pre-implementation of CPTS: January 1st, 2006-September 30th, 2007 and b) Post-implementation of CPTS: October 1st, 2007-December 31st, 2010

Results: The impact of the CPTS on operating room efficiency and perioperative non-value added cost is presented in Table 1. Removal of the ICU nurse from the patient transfer process promoted optimal ICU nurse:patient staffing ratios during the time of ICU transfer to ICU readmission. The CPTS was also associated with a reduced number of information transfer episodes.

Conclusion: In this before and after observational study, a CPTS for ICU patients requiring surgery improved OR efficiency, facilitated optimal ICU nurse:patient staffing ratios and reduced non-value added cost.

The Right Formula: Building a High Performing Team to Lead the Way to the Future

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Jan Jaspersen, MA, RN-BS

Browse the headline articles of the Wall Street Journal, the New York Times or business magazines such as U.S. News and World Report and you will find stories related to the dynamic changes and challenges facing the healthcare industry. Patient experience, affordability, quality and safety of care, overburdened providers, the technology revolution, and skyrocketing administrative costs are all components integral to transformation of the healthcare system. Mayo Clinic intends to lead the way to the future, and building high performing, multidisciplinary teams with the right knowledge, skills and acumen is critical. To remain ahead of the curve in this dynamic environment, Mayo Clinics Internal Business Consulting group, Systems and Procedures (S&P), has invested significant effort in attracting and retaining a world class staff with a rich blend of engineering skills and business acumen. This poster showcases the innovative strategies, methods and tactics adopted to build a high performing team. These include partnering with academia and professional organizations; use of social media such as email, Linked-In, and Yammer; implementation of unique advertising and marketing strategies such as a Pay-per-click campaign; optimization of website search engines; piloting of multiple job titles; the creation of an external website highlighting the cutting edge work performed by S&P staff, continually streamlining the application process, and using analytics to iteratively enhance the process and results. By recruiting new talent and leveraging the strong skills and experience of its existing staff, S&P is positioning itself to support Mayo Clinic's effort to transform healthcare, while being trusted and affordable for consumers.

Handoff-sensitive Fellow Scheduling in a Medical ICU

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Pooyan Kazemian, MS

Background: ACGME resident duty hour regulations and limits were designed to reduce the incidence of fatigue-related medical errors and improve patient safety. However, the resulting shorter shift lengths are associated with the unintended consequence of more frequent handoffs that correlate with adverse events. The challenge lies in designing appropriate scheduling schema and algorithms for residents/fellows to maintain quality patient care without compromising the duty hour regulations.

Methods: The critical care fellow rotation schedule in a 24-bed medical ICU service is studied in an academic medical center. There are 4-5 fellows rotating through the ICU each month to provide 24x7 coverage of patient care needs.

We employ mathematical modeling and optimization techniques to develop a new schedule for the fellows that complies with ACGME duty hour regulations while minimizing medical errors due to patient handoffs. The proposed model is solved using mixed integer programming (MIP) techniques to generate improved schedules. The resulting schedule is tested via simulation for validation of handoff reduction.

Conclusion: Healthcare systems engineering based approaches can support informed decision making for schedule redesign in the complex ICU environment. Our preliminary results show that it is possible to develop schedules for the fellows that satisfy the required ICU coverage and also comply with all ACGME regulations. We show how to do this with as few patient handoffs as possible. Our study provides the schedule design framework to preserve trainee wellbeing and educational experience without compromising patient safety or care quality.

Optimal Surgery Mixture Scheduling: Achieving High Service Level with Less Cardiovascular Recovery Beds

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Yariv Marmor, PhD

Background: The department of Cardiovascular Surgery (CVS) at Mayo Clinic is growing and in need for re-planning its Intensive Care Unit (ICU) and step down recovery bed needs. High surgical case variability and keeping weekends off except for urgent cases, create a ripple effect that impact the number of beds needed in the recovery area through the days of week.

Methods : In order to provide decision makers with a means to maintain high patient service level, while reducing bed capacity/utilization level, we created an optimization model that takes into account patient flow and surgeries mix in the CVS Department.

Conclusions: Our model suggests that smoothing the load is possible if we carefully change the mixture of patient with different length of stay (LOS) distribution throughout the day of week. Our result were validated using simulation.

Scheduling Nurse Only Visits

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Patricia Nuzum, RN, MEPD

The Background: Nurse-conducted appointments with patients for routine follow-up visits or other minor services are common occurrences in primary care and specialty care visits continue to increase from 10,075 visits in 2009 to 19,272 visits in 2011. The confusion surrounding billable and non-billable services created re-work for schedulers, nurses and coding staff.

The scheduling process for the nurse only visit was inconsistent. The range of services scheduled and offered varied from clinic to clinic and even from provider to provider within the same clinic. Since the variation in services resulted in inconsistent charging, patients hopped from clinic to clinic. The scheduling system did not allow for a service to be flagged as non-billable.

Methods:

- Collected data and analyzed the nurse only visits by diagnosis, payer source and department
- Examined the Relative Value Unit impact on providers
- Defined billable vs. non-billable nurse only visits
- Networked with other Mayo Clinic Health System sites
- Created 3 options for future state workflow
- Established a pilot for the process change

Conclusion: The team implemented the non-visit patient type to schedule nurse only appointments to eliminate the rework by schedulers, nurses and coding staff. Using the non-visit patient type reduced the steps of sorting, scanning and posting of charges and ensured a more compliant and consistent billing practice.

Nurse Fatigue and the Establishment of Scheduling Guidelines

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Marguerite Paradis, RN BSN

Fatigue is one of the well-recognized consequences of shift work in the healthcare industry. Nurses report varying knowledge and broad perspective on the subject yet a nurse could be considered negligent if an error occurs due to fatigue. Fatigue is a subjective state that cannot always be measured objectively. The nurse experiencing fatigue may not be fully aware of it. Fatigue has demonstrated significant negative effects on alertness, vigilance, concentration, judgment, mood, and performance. Researchers suggest errors are associated with length of shift, shift rotation and fatigue. The American Nurses Association (ANA) and American Association of Critical Care Nurses (AACN) suggest a probable important link between the number of hours a nurse works and the potential for commission of errors. According to the National Sleep Foundation (NSF), individual quantity and quality of sleep has an enormous impact on how we feel and perform. How does a health care organization address nurse fatigue in a meaningful and supportive way? Utilizing the Mayo Clinic Nursing Framework for Evidence-Based Decision Making, the Nurse Fatigue Team from Mayo Clinic Health System (MCHS) in North West Wisconsin reviewed the evidence and surveyed staff with the intent of establishing scheduling guidelines. The team took into consideration job satisfaction, flexible scheduling, health care errors, work related illness and injuries and safety in the community. Nurses were surveyed and errors and injuries were correlated with length of shift. Through this process, MCHS in North West Wisconsin is being proactive in developing scheduling guidelines that will contribute to the improved safety and quality of care.

Capacity Management in Clinical Research

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Alexa Richie, MPH

Background: As job requirements and responsibilities increased in clinical research, coordinators assumed additional job duties normally performed by support staff such as secretarial work, scheduling, regulatory oversight and phlebotomy. These added responsibilities led to a decrease in accrual in clinical trials and overall productivity, thus leading to a decrease in revenue.

Methods: Research management met with members of administration, scheduling, and laboratory to discuss the work currently being performed by study staff. From these meetings it was determined that the respective departments could not assume the additional work load currently being performed by the study staff. Research management concluded there was a need across Mayo Clinic Florida to implement new job positions to perform these duties (e.g. scheduling, phlebotomy, secretary and regulatory) specifically for research.

Conclusion: The three research units at Mayo Clinic Florida were able to develop a new organizational structure, create job descriptions, and hire administrative assistants, dedicated schedulers, research lab personnel and regulatory specialists. This staffing model change allowed for an increase in clinical trial accrual resulting in an increase in gross revenue in the clinical departments and respective research units.

Balanced Scorecard Utilized to Monitor Laboratory Operations

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Aaron Stelpflug, BS-Biology, C(ASCP)CM

The Division of Clinical Core Laboratory Services (CCLS) strives to provide the highest quality laboratory services to patients, physicians and others served. The mission is met through two values: the needs of the patients come first and every procedure, specimen and test impacts patient care. The laboratory and its seamless operation is the fulcrum of accurate, precise and timely specimen testing to ensure these values are met. Cardiovascular Laboratory Medicine (CVLM) is a laboratory taking the next step in quality initiatives by adopting a Balanced Scorecard approach to further monitor laboratory practice. A balanced scorecard provides laboratory staff, and management alike, a visual quality indicator on a monthly basis to present a transparent and concise look at total lab functionality.

A cross functional team from the CCLS division was assembled to discuss laboratory practices and continuous improvement needs. Through six sigma methodologies, a focus on transparency and concise operations data with additional metrics such as Turn Around Time (TAT), Inventory Turnover Rate (TURNS), and Employee Safety were identified. A balanced scorecard was the best choice for multiple laboratories to inform personnel, but also create the opportunity for improvements.

Nearly 20 metrics are included on the CVLM balanced scorecard to provide laboratory staff a current measure of lab operations. Successes are acknowledged and opportunities for improvement have already begun as a result of implementing the balanced scorecard. Overall, the balanced scorecard is a tool meant to better monitor, communicate and improve laboratory operations.

Improved Pharmacy Scheduling Processes through Lean Value Stream Mapping

Healthcare Resource/Capacity Management (including patient and staff scheduling)

Kassandra Young, MS

Background: Pharmacy Services supports inpatient care at Mayo Clinics Saint Marys Hospital and Rochester Methodist Hospital. Three scheduling/staffing coordinators produce the schedules for the technicians and pharmacists and both sites. Over the past five years, Pharmacy Services staff has grown by 17% to approximately 400 individuals while coordinator full-time equivalent has remained at 3.0. Daily coordinator workload is highly variable and completing required scheduling tasks by established deadlines can be challenging.

Goal: Develop a more efficient method of scheduling within Pharmacy Services.

Methods: Current state scheduling processes were documented and analyzed using lean value stream mapping. Future state processes, incorporating the identified opportunities, were created.

Results: Future state processes incorporate seven identified improvement opportunities, including the following:

1. Relocate the coordinators to a quiet, interruption-free workspace.

Analysis revealed a statistically significant relationship between frequency of noise/interruptions and schedule production cycle time ($p = 0.001$). Relocating the coordinators to a quieter, less-accessible space is expected to decrease schedule production cycle time, minimize rework and reduce process time variability.

2. Realign work responsibilities among the coordinators.

Reallocation of work responsibilities is expected to distribute workload more evenly among coordinator staff, facilitate easier sharing of technician/pharmacist staff between hospitals when needed and reduce scheduling rework.

3. Replace certain electronic applications.

Certain applications currently used by coordinators increase the manual nature of scheduling work and cause process inefficiencies. Replacing specific electronic applications is expected to reduce schedule production cycle time, reduce rework and increase first time quality.

Medical Decision Support Tool: Timing of ARDS Resolution Unveiled (T.A.R.U. study)

Medical Decision Making

Rahul Kashyap, MBBS

Background: There are many studies on pathophysiology and treatment modality for ARDS, still there is a paucity of literature for a definition of ARDS resolution time. ARDS Resolution time could be determined as with improvement in ARDS definition variables, which may correlate with ICU mortality.

Methods: A retrospective observational pilot study in Olmsted county patients, who got admitted to Mayo Clinic, Rochester Hospitals in year 2009 with diagnosis of ARDS, were included. AECC guidelines were used for determination of ARDS onset time. Medical charts were manually reviewed for first time improvement of Pao₂-Fio₂ ratio (P: F)>200, since ARDS onset, which should have lasted for at least 48 hours or at discharge (Proposed as ARDS resolution time). Patients who died within 48 hours from ARDS onset time were excluded.

Results: Pilot study consisted of a total of 27 patients with a diagnosis of ARDS. Four patients were excluded, who died within 48 hours of ARDS onset. Median age was 62 years and 78% (18 out of 23) of them were males. The median duration of ARDS resolution was 35 hours. The proposed ARDS resolution was achieved by 15 patients. In matched paired analysis (N=15), the mean values at ARDS onset time and at proposed ARDS resolution time were respectively P: F= 147 vs. 304 (p<0.05), Pao₂= 85 vs. 121 (p<0.05), Fio₂=0.6 vs. 0.4(p<0.05), S:F = 168 vs. 246(p<0.05), PEEP= 8 vs. 12(<0.05) and OI= 11 vs. 6 (p=0.08). Unadjusted mortality was lower in patient who met ARDS resolution definition vs. who didn't {7% vs. 75% (p<0.01)}

Conclusions: Proposed ARDS resolution definition and its association with hospital mortality in a derivation and independent validation cohort is imminent.

Time-Metrics Associated with successful achievement of Central Venous Oxygen Saturation Goals in Severe Sepsis and Septic Shock

Or other Health Care Delivery Processes

Rahul Kashyap, MBBS

Rationale: The present study aims to identify associations of each additional hour of delay in applying time-sensitive bundle elements, with the EGDT bundle failure of achieving goals in central venous oxygen saturation ($ScVO_2 > 70\%$).

Methods: In a retrospective cohort of patients with severe sepsis and septic shock admitted to the medical ICU we identified 172 adult patients who were treated with EGDT. We employed unadjusted logistic regression models to examine the odds of bundle failure with regards to each additional hour of delay of five fundamental elements of the EGDT bundle: Time to first Central Venous Pressure (CVP) measure, antibiotics, red blood cell (RBC) transfusion and initiation of inotropes and vasopressors.

Results: Our results suggest that every additional hour of delay in establishing two of the five EGDT elements was associated with incremental odds of failure to achieve the $Scvo_2$ goal of 70%. Each hour of delay in obtaining a CVP time was associated with an additional failure odds ratio [OR] of 1.08 (95% CI 1.00 - 1.34 $P=0.04$) and each hour of delay administering antibiotics was associated with an additional failure OR of 1.12 (95% CI 1.03 - 1.21 $P=0.01$). Delays in initiation of inotropes and vasopressors were not associated with odds of $ScvO_2$ goal failure. Delays in RBC transfusion were linked with an incremental OR of failure 1.08 (95% CI 0.99 - 1.16 $P = 0.06$), approaching but not meeting statistical significance.

Conclusion: We conclude that specific time-sensitive areas of improvement in severe sepsis and septic shock resuscitation; these time points or Take times as defined in Quality Improvement science can be utilized as targets of Quality Improvement and surveillance in the treatment of severe sepsis and septic shock.

DOES IMPLEMENTING A DVT/PE PROPHYLAXIS SYSTEM REDUCE THE INCIDENCE OF HOSPITAL VTE/PE?

Or other Health Care Delivery Processes

Jenna Lovely, PharmD, BCPS

Background: Venous thromboembolism prophylaxis (VTEP) is essential component of care. This study evaluated multi-phase quality improvement efforts to improve VTEP regimens using ordersets and electronic reminders on the rates of pharmacologic and mechanical prophylaxis and on the incidence of hospital acquired venous thromboembolism (VTE).

Methods: All inpatients age 18 years of age or older in a two hospital teaching institution from 2005-2011 were included. Interrupted time series analysis was used to compare the rates of prophylaxis and hospital-developed VTE in four time periods: 1) Baseline: 1/1/2005 - 12/31/2006 2) Paper order sets with VTEP sections: 1/1/2007 - 2/9/2009 3) Electronic order sets with mandatory VTEP sections: 2/10/2009 - 12/16/2009 and 4) Electronic reminder: 12/17/2009 - 3/31/2011. Pharmacologic and mechanical prophylaxis data and opt out documentation was extracted from the electronic records by patient day. Hospital VTE rates were based on administrative data excluding VTE present on admission.

Results: After the electronic reminder logic implemented, the percent of days with prophylaxis plans increased from 80.3% to 86.6%. Mean monthly rates of VTE decreased from 4.8 per thousand discharges (23.4 VTE/month) at baseline to 5.7 (28.1/month) at paper-based to 5.3 (23.7/month) at electronic orderset to 4.1 (17.2/month) in electronic reminder phase ($p=0.002$). Improvements were seen in both surgical (6.8/1000 baseline, 5.7 final) and medical patients (2.8/1000 baseline, 2.1 final).

Conclusions: Prior VTEP projects resulted in marked improvement, but not until both mandatory electronic order sets and electronic reminders were implemented across the system that significant improvements were observed in VTE outcomes.

Parallel Tissue Collection and Processing for Clinical and Research Practice at Mayo Clinic: Utilizing the Frozen Section Laboratory Practice

Or other Health Care Delivery Processes

Jolene Summer Bolster

Introduction: The Tissue Request Acquisition Group (TRAG) was established in mid 2008. Its inception was due to the complex landscape of prospectively collecting thousands of research tissue specimens, while ensuring the integrity of clinical samples for accurate diagnosis. Research tissue collection would be performed in parallel within the unique clinical surgical pathology settings at Mayo Clinic. This abstract summarizes our experience with this process.

Methods: The TRAG composition includes pathologists, pathologists assistants, laboratory supervisors, laboratory assistants, research coordinators, and a laboratory operations manager. Bimonthly meetings review all IRB approved protocols for tissue collection which will be funneled through Mayos Frozen Section Laboratories (FSLs), Autopsy Laboratory (AL) and Gross Cutting Laboratory (GCL). TRAG review ensures that the tissue request conforms to the standards of research tissue as deemed by the IRB, Biospecimen Subcommittee, and federal regulations. TRAG approval results in a customized lab logistics plan. Protocol specific tissue templates seamlessly facilitate accurate tissue procurement, which does not interrupt the routine flow of tissue handling for diagnostic purposes. TRAG data, including number of IRB protocols, specimens requested, specimens collected, tissue type, turnaround time (TAT), and reasons for unfulfilled collections are housed in a laboratory database.

Results: At completion of 2009, the first full year of tracking data, there were 3,492 fulfilled collections for 38 protocols. At the conclusion of 2011, fulfilled collections increased to 4,684 for 82 protocols. Tissue types also increased from 43 to 60 in this same time period. In the last 2 years the top 10 tissue types have remained the same, but with varied rank.

Conclusions: We have built a streamlined, effective means of prospectively collecting human tissue for research without compromising diagnosis for our patients. The process has proven successful and has been expanded to include tissue acquisition from our Autopsy and Gross Cutting Laboratories as well.

A Descriptive Analysis of the Factors Influencing Physician Assistant Specialty Selection

Patient Access

Michael P. Halasy, M.S., P.A.-C.

Objective: Recent trends in the Physician Assistant (PA) workforce suggest a move towards specialization. This study aims to provide leaders and policy makers with data regarding specialty selection factors.

Methods: This was a web-based cross-sectional study of certified PAs that were randomly selected by the National Commission on the Certification of Physician Assistant (N = 30,000). Chi Square analysis was performed on 2,020 completed survey responses. The sample resembled that of the population and the American Academy of Physician Assistants census data.

Results: Chi square analysis demonstrated that primary care PAs were influenced by non-financial factors, including the opportunity to make a difference and establishing long term patient relationships ($p < 0.001$). Specialty PAs were influenced by financial factors such as salary and/or bonuses ($p < 0.001$).

Conclusion: Increasing reimbursements to primary care PAs may not increase selection of primary care. Policies focused on eliminating barriers in primary care and improving the primary care educational experience of PAs may prove more effective.

They Have the Technology: Results from 300 OB Patient Connectivity Surveys

Patient Access

Daniel O'Neil, MSIE, MBA

The objective of our project was to evaluate expectant parents access to- and comfort with- communication technologies and Obstetric (OB) virtual interactions using a survey.

A 25-item questionnaire was developed by Center for Innovation (CFI) designers based on consensus among OB clinicians. The 1-page paper survey was distributed for 5 days in December, 2011. The survey was designed to evaluate which technologies might be useful for patients interaction with OB. We determined the percentage of patients who would volunteer to redesign the experience. We explored patient willingness to use texting, e-mail, instant messaging, video calls, Facebook, smart phone applications, online portal or online groups.

Surveys were completed by 294 expectant mothers waiting for visits. The mean age of responders was 29.7 \pm 4.9 years with due dates from October 2011 (post-partum) through August 2012.

Most respondents had access to a computer, internet, and cell phone (95%, 97%, 99%, respectively), while 60% owned smart phones with internet and applications. Most felt likely or certain they would connect with providers by email (92%), text (68%), Facebook (42%) and smartphone (56%). About 1 in 4 might participate in future OB quality improvement efforts (27%).

In a cohort of young, technologically-familiar OB consumers, use of non-didactic (‘‘distance’’) methods of patient interaction were appealing, especially for established electronic methods such as e-mail.

Depending on patient preferences, some face-to-face encounters could be replaced by distance technologies. These measures may better fit with patients expectations and circumstances, and spare didactic clinical capacity for higher-risk, higher-complexity patients.

Refining the Visit Care Process: A Fresh Look at the Standard Rooming Process for Employee and Community Health (ECH)

Patient Flow

Dawn Francis, BSIE, MSIE

Following an in-depth enterprise-wide analysis of the rooming process between 2006-2009, the Mayo Clinic Rochester Outpatient Care Team implemented an approved Standardized Process. Since that time the individual ECH primary care provider groups introduced variation in the visit process to make that care model fit their individual needs. This resulted in a lack of standardization across ECH sites, a variety of expectations for care team tasks and an inconsistent product for our patients.

The Refining the Visit Care Process multidisciplinary team identified and implemented an efficient and reliable process at point of care, markedly reducing variation in patient flow, rooming times, and actual work being done. The process also solidified the provider/care team/patient partnership for provision of quality care. The process improvement focused on needs of the patient rather than on any single ECH facility, site of care, or provider of care. It provides accountability for quality/safety, service, and value of care. Redesign improved ECH staffs ability to deliver high value care consistently and reliably optimize access to services for every patient, every time. The refined process provides/defines personnel tasks/care expectations and consistent technological support across sites, ensuring a higher value care model and system process for patients and care team members.

Motion Analysis Model of Care

Patient Flow

Christine Huyber, CCRP

Background: The timeliness of the Motion Analysis Laboratory's clinical gait report completion is not consistent in availability to the referring provider.

The year 2011 saw an increase of 79% in clinical Motion Analysis Laboratory's gait appointment referrals. A backlog ensued of clinical gait patient data to interpret.

Methods: Examination of the process from the time the clinical gait appointment was scheduled through delivery of information to the referring provider was generated. Data interpretation was found to be the constraint.

Delivery of clinical data interpretation to the referring provider for clinical gait appointments is optimal at a one-week turn around time, two weeks as a maximum window.

First steps in implementing change focused on the Motion Analysis Laboratory's calendar, looking to maximize on our ability to deliver high quality care through standardization of processes. A Work Load Unit (WLU) was developed to predict the amount of data interpretation time needed per clinical gait appointment.

The WLU was integral in building a four-week reoccurring calendar cycle for appointment types seen in the Motion Analysis Laboratory. This four-week calendar cycle allows adequate time between appointments for interpretation.

Conclusions: The calendar has proven to be a first step in staff satisfaction by eliminating backlog for data interpretation. We currently do not have any clinical appointment data greater than two weeks out for interpretation.

Canadian Patient Experience

Patient Flow

Kate Larson, RN-BSN

There are more than 2,000 Canadian patients that seek care at Mayo Clinic each year to form a major portion of the international practice.* Through the work of this multidepartmental group, a DMAIC framework was used to evaluate the Canadian patient experience in the timeliness of appointment scheduling and all associated communication to standardize process flow and customer service, with a goal to achieve the highest levels of patient satisfaction.

The initiation of new appointment request processes, standardization of appointment confirmation, nurse communication prior to arrival, and a five touch point process are predicted to bring improvement to future patient satisfaction surveys. Canadian patient satisfaction surveys from June 2012 will be compared to surveys sent in 2008. Successful outcomes of this project will allow transfer of applicability to other international and national patient populations.

*Includes: Rochester, Jacksonville and Scottsdale sites.

Effect of a Physician Assistant as Triage Liaison Provider on Patient Throughput in an Academic Emergency Department

Patient Flow

David Nestler, MD MS

BACKGROUND: Overcapacity issues plague Emergency Departments (EDs). Studies suggest triage liaison providers (TLPs) may shorten patient length of stay (LOS) and reduce the proportion of patients who leave without being seen (LWBS), but these results are not universal. Previous studies use physicians as TLPs. We evaluated whether a Physician Assistant (PA), acting as a TLP, would shorten LOS and decrease LWBS rates.

METHODS: We used an observational cohort controlled before-and-after study design with predefined outcome measures, comparing eight pilot with eight control days. The TLP evaluated all Emergency Severity Index (ESI) level 3, 4, and 5 patients, excluding pediatric and behavioral health patients.

CONCLUSIONS: A total of 380 patients were included on pilot days and 396 on control days. LOS was shorter on pilot days (median 229 minutes, IQR 166-305) than control days (median 267 minutes [IQR 189 - 370], $p < 0.001$). Waiting room times were similar between pilot and control days (median 68 minutes [IQR 20 - 117] vs. median 71 minutes [IQR 19 - 138], $p = 0.313$), but treatment room times were shorter (median 151 minutes [IQR 94 - 223] vs. median 185 minutes [IQR 105 - 254], $p = 0.001$). Finally, a lower proportion of patients LWBS on pilot days (1% vs. 10%, $p < 0.001$). In summary, the addition of a PA as TLP was associated with a 38 minute decrease in LOS and a lower proportion of patients who LWBS. The decrease in total LOS is likely attributable to shorter duration in treatment rooms for pilot patients compared to control patients.

Vascular Interventional Radiology (VIR): A Question of Balance

Patient Flow

Sherrie Prescott, RN, BSN

Background: The primary objective of this project was to improve room utilization by analyzing the multiple factors involved in getting VIR procedures started at the beginning of the day. Baseline data showed an average start time of 08:50. Our hypothesis was simple: if procedures are begun at a specific time in the morning, rooms could be closed in a timely fashion in the afternoon when the work was done, obviating the need to pay overtime and providing the staff with a normal, predictable days end. Based on a staff survey, 08:00 was chosen as the goal for first case start time for VIR rooms at Saint Marys Hospital and on Gonda 2. Each step in the process from the time a patient arrives at the facility as an outpatient or, if inpatient, the time they are called from their room were timed and analyzed. Impediments to workflow were identified and included, availability of informed consent, patient scheduling, and pre-procedural assessment time. One significant change was obtaining the signed consent prior to the patient's arrival to the procedure, whenever possible.

Methods: PDSA, Process Mapping, Change Management

Results: By the conclusion of the project, we were able to improve our start times by 28 minutes for an average start time of 08:22. The project was ended due to the temporary closure of VIR procedure rooms at Gonda. Continued work by the team has shown that not only has VIR sustained the gains, they have improved start times by an additional 15 minutes.

Managing Late Day Work in the Ultrasound Department: A Quality Improvement Project

Patient Flow

Karen S. Sellner R.N

Background: In the 2011 Culture of Safety Survey Radiology Sonographers commented on dissatisfaction with frequently occurring overshift time, its effect on patient care and the sonographers work-life balance. Uneven patient volumes throughout the workday resulted in: (1) undesired overtime, (2) a perception of rushing to complete exams prior to shift end, (3) patients waiting as end of day staffing levels declined.

Aim: The project focused on aligning work schedules to patient demand, load leveling workflow, establishing expectations and processes to create safe and timely care by reducing end of day pressures.

Methods: A multidisciplinary key stakeholder group developed a Project Charter defining focus. Quality improvement diagnostic tools identified system defects, established a baseline for conducting tests of change as Plan, Do, Study, Act(PDSA) cycles, and introduced improved process performance expectations. PDSA cycles were accepted or rejected through a series of planned experiments. A Kaizen event was used to update and standardize processes, and an Impact-Effort Grid organized improvement options into implementation plans. Data gathered and placed in a Control Chart provided statistical analysis to monitor the process. Staff schedules were aligned to patient flow, work roles were defined, and proactive vs. reactive responses were identified as part of the improvement phase.

Results: By comparing data pre and post project, the team demonstrated improvements that were identified during tests of change. These improvements produced a more consistent work load distribution throughout the day. Sonographer overtime has decreased by 50%. Post improvement re-surveying of work-life balance is scheduled for second quarter 2012.

Quality Management System Implementation in the Areas that Support Mayos Research Program

Quality

Kris Arney, BS

Goal: The implementation of Quality Management Systems (QMS) in the areas supporting Mayos Research Program, positioning these areas to develop and implement an integrated QMS that supports Mayos Comprehensive Research Management System.

Implementation of QMS at the Work Unit / Department level results in:

- Defined processes
- Standardization of processes
- The ability to measure, control and improve core business processes,
- The ability to sustain improvements
- Proactive management of core business processes
- The foundation for continuous improvement
- An enhanced understanding of quality management

Scope: This initiative is an Enterprise Wide Initiative involving the areas that support Mayos research program administratively and technically.

Methods: Systematic, phased implementation of the 8 elements of QMS through Collaborative phased approach between the Office of Research Quality Management Services (ORQMS), Systems and Procedures (S&P) and the work units to implement the eight elements of a QMS:

- Management Commitment,
- Culture,
- QMS Administration,
- Documentation System,
- Competence, Awareness, & Training,
- Measurement & Analysis,
- Customer Service & Satisfaction,
- Continuous Improvement

Outcome/Results: Quality Management Systems provide the infrastructure necessary for work units to effectively and proactively manage their operations. The QMS empowers employees to pursue continuous improvement and be actively involved in the quality of the services they provide. Ultimately Research will be able link the localized QMSs together into an integrated systems and develop quality plans that improve the entire research management system.

Conclusions/Replication Potential: The ORQMS has developed and is using a standardized Quality Manual and Quality Management System. The process the ORQMS is using for the implementation of QMSs is standardized and is very repeatable.

Research Study Coordination Quality Management System Implementation

Quality

Kris Arney, BS

Goal: To develop and implement a formal Quality Management System (QMS) as follows:

- Define, standardize, measure, control and improve core business processes across the enterprise
- Proactively manage core business process performance and their associated service levels
- Enhance operational performance and improve customer service
- Achieve Service and Quality Excellence

Scope: The QMS will be applied enterprise-wide across the following Research Study Coordination Core Business Processes:

- Pre-Approval Process
- Subject Management Process
- Post-Approval Finance and Administration Process
- Post-Approval Regulatory Process
- Biospecimen Process

Methods: Systematic, phased implementation of the 8 elements of QMS through a collaborative effort between Research Administration, Clinical Studies Units, Research Laboratories, Office of Sponsored Projects Administration (OSPA), Research Finance, Systems & Procedures (S&P) and the Office of Research Quality Management Services (ORQMS):

- Management Commitment
- Culture
- QMS Administration
- Documentation System
- Competence, Awareness, & Training
- Measurement & Analysis
- Customer Service & Satisfaction
- Continuous Improvement

Outcome/Results: Finalization of the Documentation System; the foundation that will enable individuals engaged in Study Coordination to utilize more advanced quality methodologies to further enhance value to customers:

- Defined core business processes
- Standardized work (where possible)
- Developed and documented procedures and other working documents
- Identified potential growth opportunities

Conclusions/Replication Potential: This QMS infrastructure will ensure that staff engaged in Study Coordination will sustain the improvements made through process improvement endeavors. Implementation of a QMS also provides study staff with the system, knowledge base and culture needed to proactively manage and continually improve the quality of their work and services.

Patient Wait Time and its Influence on Patient Satisfaction

Quality

Karen Carlson, MBA, PMP

Background: The most frequent reason cited for patient dissatisfaction is a patients association of long waiting times to quality of care and access. A study was undertaken by the Organizational Excellence group to establish a patient wait time baseline in Family Medicine (FM) and secondly, to identify areas for driving service improvements.

Methods: A time flow study was conducted for a period of three weeks involving team members with stop watches capturing defined start and stops of service segments as a patient progressed through their appointment. In addition, daily nurse feedback surveys were also collected to assist with identifying bottlenecks.

Results: There were a total of 1,273 patient visits with 20 Provider and Associate Provider care teams observed from 7:30 am until their last patient of the day. Where electronically available, data was extracted from the Electronic Medical Records (EMR) database to enhance accuracy of observation data and assist in determining final recommendations. Among key findings were the importance of teamwork, consistency in training and how communication played in creating optimized and manageable patient schedules to reduce patient wait time. Beyond the identified foundational opportunities targeted for improvement, there were several secondary projects that were generated as a result; potential for change of appointment lengths, consideration of removal of Pre-Op visits from the FM schedule and a No Show analysis per Care Team

Conclusion: The time-flow study demonstrated the usefulness in reviewing the complete patient visit cycle in discovering process improvements, reducing patient wait times and optimizing schedule capacity

Characteristics of the Surgical and Procedural Practice across the Mayo Clinic Health System

Quality

Douglas Chyatte, MD

BACKGROUND: The Mayo Clinic Health System (MCHS) began more than 20 years ago as a diverse collection of separate practices spread over a wide geographical range. Today, however, patients using the MCHS for surgical or procedural health care expect a clear offer of consistent safety, quality and best practices from all MCHS sites. The purpose of the present study was to understand the barriers to consistent clinic behaviors in the surgical and procedural practices across the MCHS.

METHOD AND RESULTS: Surveys related to the surgical and procedural care of patients were sent to all critical points of accountability with the MCHS. All surveys were completed and returned. Overall, 66,875 surgeries or procedures are performed in the MCHS annually at 18 discrete sites with site volumes ranging from 61 cases/year to 9890 cases/year. Of the 139 departments performing surgery in operating rooms, more than 1/3 were dominated by private-practice surgeons rather than Mayo Clinic surgeons.

CONCLUSIONS: The surgical and procedural practice in the MCHS is high volume. Barriers to providing a clear offer of consistent safety, quality and best practices from all MCHS sites include geography, site polymorphism and disparate surgeon loyalty and motivators.

Risk Assessment and Root Cause Analysis of Genetic Sequencing Repeat Tests

Quality

Matthew Clark

Genetic sequencing continues to grow in popularity and utility in diagnostic and predictive medicine. Rapid growth sometimes leads to issues controlling the processes. The Molecular Genetics Lab was experiencing excessively high repeat rates on the sequencing work being completed. This project examined genetic sequencing laboratories individual processing steps to uncover variation and limited control of many of the testing process factors. A risk analysis was conducted on the processes uncovering several factors of the process that were not controlled well and suspected of contributing to high repeat rate. Design of Experiments (DOE) was used to verify the critical parameters so that a direct correlation to the risk analysis could be made. Some of the factors were not critical to the process; other factors were a direct source of the repeat testing issue that was being investigated. DOE also helped to clarify if the testing process parameters were incorrect and not properly centered in their respective operable range or if variation in the process steps were to blame for the excessive repeat testing. The final result was a dramatic decrease in repeat rate from 25% to consistently less than 5%. Process factors fully documented, understood and controls implemented to maintain a consistent, reliable sequencing result.

Dilution Error Elimination Project

Quality

Matthew Clark

The Automated Immunoassay Lab (AIA) is a high volume automated lab within the Department of Laboratory Medicine and Pathology at Mayo Clinic in Rochester Minnesota. Aspects of the testing process for a particular group of assays require manual intervention in the testing process. This manual intervention was leading to errors in the testing process and causing rework and revisions to results. This project examined the process utilizing the DMAIC improvement structure, performed risk analysis on the process, determining root cause of the errors and implemented several measures to control the risks discovered. The project was a learning journey for the members of the team as they discovered that what they believed to be the obvious cause of the errors was in fact just a symptom of one of the root causes. The team came away from the project with a greater appreciation for the steps involved in risk analysis. The process examined and corrected in this project has remained largely error free since the project was completed just over a year ago.

Teaching Quality Essentials: The Effectiveness of a Team Based Quality Improvement Curriculum in a Tertiary Healthcare Institution

Quality

Katlyn Cook, BS

Background: A unique quality improvement (QI) curriculum was implemented within the Division of General Internal Medicine (GIM) to improve QI knowledge through multi-disciplinary, team based education, which also met the quality requirement for the American Board of Internal Medicine (ABIM) Maintenance of Certification (MOC) and Mayo Quality Fellowship program developed by the Mayo Clinic Quality Academy.

Methods: Participants completed up to four QI learning modules developed by the Mayo Clinic Quality Academy and certified by the American Society for Quality. Participants completed pre-and post test assessments. Upon successful completion of all four modules, participants received certification as a Silver Quality Fellow as well as credit toward the quality requirement for MOC through the ABIM.

Results: Thirty three of 62 individuals (53%) completed all four modules and corresponding pre and posttest assessments. Participants substantially improved knowledge in all four quality modules. Study group participant pre-test scores averaged 71.0% compared to average post-test scores of 92.7%. Post-test scores of reference group participants compared favorably, averaging 89.2%. Staff participants described satisfaction with the QI curriculum and are currently working on QI projects throughout the division.

Conclusions: This initiative depicts the effective implementation of a multi-disciplinary, team based, QI curriculum developed in-house to address a broad range of core quality improvement knowledge and skills. This curriculum also provides physicians with the necessary tools to meet the re-certification requirements (MOC) of the ABIM. Initial assessments show substantial knowledge improvements and successful implementation of staff developed QI projects.

Reducing the Risk of PHI Exposure in a Data-Intensive Reporting Process

Quality

Jacob Elo, BSB, MBA

Background: Mayo Clinic Global Business Solutions provides health-related programs to a number of external clients. To support internal processes and provide feedback to clients on these programs, a suite of reports are created on a periodic basis. In 2010, a list of addresses was sorted incorrectly, which led to letters with protected health information (PHI) being sent to the wrong persons. This project was initiated to improve the reliability of the reporting processes, and to reduce the risk of PHI being inappropriately exposed.

Methods: To understand the process and its failure modes, the team mapped the process and the risks inherent in each step. Following this, the team brainstormed possible interventions, prioritized these based on the required effort and the expected benefit, and implemented the interventions.

Conclusion: The team identified 72 failure modes, of which 14 could lead to PHI being exposed. While the proposed interventions are still being implemented, these are projected to eliminate PHI risk by 64 percent and data integrity risk by 60 percent. While it will be difficult to definitively assess the success of these efforts until more time has passed, there have not been any PHI exposures since the project concluded.

Rapid Adaptation of Quality Tools in a Multi-State Health System

Quality

Christine Feller, MHA

Background: One strategy the nation has turned to for safer care is the widespread use of health information technologies (health IT).¹ While aspects of health IT improve quality and reduce medical errors, health IT can contribute to distraction or miscommunication, raising the possibility of causing harm when poorly designed, implemented or applied.² As the industry strives toward meaningful-use, the intersection of workflow processes, role changes and electronic health record (EHR) expansion creates demand for continual process improvement.

In 2011, Mayo Clinic Health System (MCHS) completed implementing a single EHR in over 70 communities. Although all sites migrated to one EHR, the interfaced applications and related workflows were not standardized. Post implementation practice concerns escalated. Some clinicians stated the EHR was negatively impacting care delivery. To gauge severity and scope of the concerns leadership needed an objective assessment across the multi-state system within an aggressive timeframe. This poster focuses on how to adapt existing quality improvement tools effectively for rapid assessment using an iterative improvement cycle (PDSA).

Methods:

- Review of industry standard and organization specific analysis tools from DMAIC methodology
- Evaluation of existing tools for use in a rapid cycle process assessment
- Revision, testing and adaptation of tools using PDSA (Plan-Do-Study-Act) model
- Training on the use of adapted tools
- Online collaboration tools provided real time communication

Conclusion :Quality improvement tools can be readily adapted to meet extremely expedited timeframes. Rapid assessment and iterative revision of existing tools facilitated a critical assessment of the MCHS EHR processes within an urgent timeframe.

Standardizing Development of an Outpatient Appointment Scheduling System

Quality

Emily Hamilton

Given today's electronic environment, system improvement is an important task. Proper gathering of business requirements for technical design pays off in system usability. We have implemented a process for improvements to the patient appointment scheduling system at Mayo Clinic that ensures development is consistent and guarantees changes to system functionality meet the user needs.

System improvements are in two categories: a bug or an enhancement. Bugs are issues wherein functionality is not working as designed. Enhancements are identified as requests to provide new capabilities to the system. We standardized the process for the bugs and enhancements to include stakeholders, method of collection, and prioritization.

For creating system enhancements we include documenting system functionality in a Functional Requirement Document (FRD). The documents blend the business requirements of the functionality with specific technical information regarding how the user would complete the transaction. The standardized method of system documentation ensures functionality within the scheduling system is applied correctly. The FRD method is a multi-step process where functionality is reviewed by multiple people to ensure that functionality is meeting the end users needs. Prior to implementing this method, target release dates were often missed and functionality included often did not meet expectations. After implementing this method we were able to improve target release date achievement and increase functional success in initial testing attempt from 67% to 74%.

This poster outlines the overall process to ensure our system enhancements meet the needs of the users.

Optimizing the operational effectiveness of the Office of Human Research Protection

Quality

Hattie Hanert, RN, BA, CIP

Problem Statement: Successful organizations can agree that providing services that are valued by the recipients of the services is paramount to their success. Providing services that are valued is a direct result of effectively managing both quality (outcomes, safety and service) and cost. Achieving high levels of quality requires an organization to accept a set of fundamental quality principles, set quality management standards and provide the means for achieving the standards set. Failure to provide the means from which the quality standards can be achieved, results in the inability to optimize the operational effectiveness and the value of services provided by the organization.

Description of Program: Mayo Clinics Office of Human Research Protection has adopted quality principles, set quality management standards and implemented a system for managing the quality of the work its personnel perform and the services they provide. This Quality Management System is based on the principles and standards put forth by the International Organization for Standardization commonly referred to as the ISO 9000 standards. Through the discipline of managing operations using the ISO 9000 principles and standards for quality management as a basis, Mayos Office of Human Research Protection has been able to significantly improve its operational effectiveness and the value of the services it provides.

A quality management system is a set of policies, processes and procedures required for planning and executing core business functions within an organization. A Quality Management System integrates the various internal processes within an organization to continually improve its core business processes, with the ultimate goal of improved business performance and the ability to meet or exceed customer requirements.

The eight elements of the Quality Management System are as follows:

- Management Commitment
- Culture
- Administration
- Documentation System
- Competence Awareness and Training
- Measurement and Analysis
- Customer Service and Satisfaction
- Continuous Improvement

Mayo Clinics Office of Human Research Protection maintains that to bring about the cultural changes necessary to achieve world class quality and service excellence, the people providing the services must be empowered. They must be given the building blocks from which they can build the foundation for

sustainable quality and service excellence. The cornerstone of that foundation is the knowledge and acceptance of the fundamental quality principles, adoption of quality management standards and the effective implementation of a system for managing quality and ultimately the value of services provided.

An Innovative Solution to Biospecimen Tracking for Multicenter Clinical Trials

Quality

Richard Hinds, MS, RRT, CCRP

BACKGROUND: Most traditional Electronic Data Capture (EDC) systems do not track biospecimens from the time of processing to receiving at the biorepository. There is an imminent need to develop a system that could use an existing EDC system, which can track biospecimens from processing at study sites to arrival at various biospecimen processing centers.

METHOD: The Mayo Clinic Clinical Trials Management System (CTMS) met with study team and biorepository representatives to determine the tracking needs of the study team. They developed a work flow for the biospecimens incorporating processing, shipping and receiving time-points. The team programmer mapped out all possible combinations of processing, shipping and receiving. CTMS then tested the initial processing step by rolling out the system to actual study sites around the country using the User Acceptance Testing environment.

RESULTS: CTMS team developed a real time, specimen tracking plan that is integrated into the EDC system. Samples were scanned in at the time of processing, scanned out at the time of shipping, and were scanned in on arrival at the biorepositories. Manifest reconciliation were preformed by the system automatically, and reports of discrepancies were generated. The system was capable of providing complete inventory of specimens at any given time and was able to track the current consent status of specimens as well.

DISCUSSION: Biospecimen collection is a complex and time sensitive process, with multiple steps for error. CTMS was able to develop a novel solution to these challenges that allows for cost effective and sophisticated tracking of biospecimens that may help reduce errors, improve on-time shipments, and improve human research subject protection. The system is undergoing testing and refinement during a multicenter drug trial.

CONCLUSION: CTMS has developed a novel solution to multicenter biospecimen tracking.

On the Path to Nurse Phone Call Standardization

Quality

Adam T. Holland, MS, RN, NE-BC

Background: Standardized telephone nursing care was identified as a practice priority at the Ambulatory RN Supervisor Meeting in October of 2009. Ambulatory RN Supervisors were surveyed about nursing care provided over the phone. The results showed that: a) nursing phone practice and documentation is not standardized b) an inconsistent process for documenting phone calls c) free-text documentation with no tools is time consuming d) lack of resources to support electronic tool development in the work area e) and nurses were not familiar with the required documentation elements.

Methods: Using the Define, Measure, Analyze, Improve, and Control (DMAIC) Framework, the team developed and implemented a Clinical Notes in-line form (structured, standardized template) to standardize ambulatory nursing telephone documentation within the electronic medical record (EMR). The form enhances the accuracy and time commitment of documentation by pulling information from the EMR, utilizing check boxes, radio buttons, free text entry fields and accepting other electronic document tools to further increasing efficiency. The inline form prompts users to document needed elements meeting American Association of Ambulatory Care Nursing (AAACN) standards as well as recommendations from The Joint Commission (TJC) and the Minnesota Board of Nursing. The project scope included telephone interactions by RNs (ambulatory and hospital-based outpatient setting) with established patients.

Conclusions: Through a standardized ambulatory nursing telephone documentation tool, AAACN standards are met, care is documented in a standardized method, and viewing documentation is standardized leading to patient needs being met and nursing care is trusted and safe over the phone.

Research Finance Event Management System

Quality

Denise Jans

Goal: The goal of the Event Management System (EMS) project is to create an automated system to track, investigate, monitor and report upon events and system-related issues that would benefit from formal and informal process and system improvements across the Research Finance.

Scope: In an effort to expand our self-monitoring process, while increasing our customer service focus, Research Finance developed an EMS.

Methods: An Access database was used to develop the EMS database. The team used the DMAIC (Define, Measure, Analyze, Improve, Control) approach to process improvement. Staff were surveyed to identify critical to quality factors and ensure those factors were built into the database, escalation process and metric reporting. A pilot approach was utilized to implement the database to allow for process and database modifications prior to full implementation across Research Finance.

Outcomes/Results: A standardized approach was developed that incorporates Research Finance staff involvement via a defined event escalation process. Events entered into the database are investigated and evaluated for root cause and, if deemed necessary, counteractive/preventive action is initiated. Event data is subsequently evaluated by Leadership via pre-established reports and Research Finance Scorecard metrics to ensure the EMS is functioning as designed.

Conclusions/Replication Potential: The Mayo Effect has influenced Research Finance throughout the development of the EMS. The EMS has enabled us to link the analysis of events to process improvements that help increase employee and customer satisfaction. The tool can be used by any team/group or division to support Mayo Clinics Operating Plan and Mayo Clinic Values.

The Importance of Analytical Instrument and System Software Validation for Clinical Testing of Bone Specimens

Quality

Donna Jewison

Our laboratory, which performs histomorphometric analyses of mineralized bone, has an ongoing quality program to evaluate and monitor the quality of laboratory performance and ensure reliability of test data. We use an OsteoMeasure system, a computer-based software program, for the quantification of bone biopsies. This software program serves as a diagnostic tool for physicians, to help determine if the patient suffers from metabolic bone disease. In keeping up with modern day technology, software systems will periodically need to be upgraded. In order to ensure the highest quality standards of performance, the original DOS based program had been updated to Windows XP. We performed a validation comparing the original DOS and the more recent XP programs, to ensure there was no change in data integrity.

The assessment of consistency or reliability of quantitative measurements was determined by either the intraclass or the interclass correlation coefficient (ICC). On both systems, a reader performed a given set of tasks and measurements on slides from a group of ten normal control subjects. This data corresponds to the intraclass correlation coefficient for each system and comparing measurements between systems, corresponds to the interclass correlation coefficient. An ICC has a range from -1 to 1, with an excellent value of $ICC > 0.75$ and a good value of $0.4 < ICC < 0.75$. All parameters tested were within the good to excellent range, meeting the acceptance criteria.

With methods presented here, we have demonstrated that laboratory validation is essential for clinical testing.

Cardiovascular Value Creation Scorecard

Quality

Carmen Kane

Background: Mayo Clinic has been successful because of its commitment to meet the needs of each patient and provide the best in patient care. There is no tradeoff between improving quality and decreasing cost. Increased productivity and decreased cost structure are intended and rationally expected consequences of higher quality. We must be able to objectively measure value and accordingly our aim is to pioneer meaningful and relevant value metrics.

Per Mayo's Value definition, we need the ability to identify and monitor Value Metrics at division and CV Area levels, providing a mechanism to identify improvement opportunities.

Method: Identify relevant metrics for each CV area:

Tier 1 - Volumes & scope of services

Tier 2 - Publicly reported measures of quality and safety

Tier 3 - Performance measures, Mayo-consensus measures, national registries

Tier 4 - Appropriate Use

Other - Service, Satisfaction, Financial, Compliance

Rationale for selecting measures:

1. Most important aspects of care related to patient outcomes
2. Strength of evidence
3. Use for public reporting and benchmarking
4. Use for quality improvement face validity, measurable, interpretable, and actionable

Populate, implement and operationalize Scorecard

Conclusion: Utilizing the Value Scorecard and knowing what that means specifically at the CV division and lab/specialty area is imperative.

National trends towards transparency in health care are helping us define the standards by which we can benchmark with national health care organizations externally and each other across divisions, departments and sites, providing opportunities for continuous improvement and innovation in the care we deliver each day.

The Research Finance Event Management System

Quality

Nicole Lies, CPA, MBA

Goal: The goal of the Event Management System (EMS) is to create an automated system to track, investigate, monitor and report events that would benefit from process and system improvements across Research Finance.

Scope: Research Finance continues to mature its Quality Management System (QMS). Current year Quality objectives include enhancing self-monitoring and improving customer service. EMS was designed to help meet these objectives.

Methods: The team used the DMAIC (Define, Measure, Analyze, Improve, Control) approach. Access was used to develop the EMS database. Research Finance staff were surveyed to identify critical to quality factors, and those factors were built into the database, escalation process and metric reporting. A pilot approach was utilized prior to full implementation to allow for process and database modifications.

Outcomes/Results: A standardized approach was developed that incorporates Research Finance staff involvement via a defined event escalation process. Events entered into the database are investigated and evaluated for root cause and, if deemed necessary, counteractive/preventive action is initiated. Event data is subsequently evaluated by Leadership through pre-established reports and Research Finance Scorecard metrics to ensure the EMS is functioning as designed.

Conclusions/Replication Potential: The EMS has enabled the ability to link the analysis of events to process improvements and increase employee and customer satisfaction. The tool can be used by any team/group or division to support Mayo Clinics Operating Plan and Mayo Clinic Values. EMS supports QMS initiatives and helps to define Research Finances role in the Mayo Effect.

Assessment of prophylactic antibiotic use in patients developing surgical site infections

Quality

Jenna Lovely, PharmD, BCPS

Background: Surgical site infections (SSIs) are the leading cause of nosocomial infections and are associated with substantial healthcare costs and morbidity. The Surgical Care Improvement Project (SCIP) includes standards that are nationally reported with the aim of improving patient outcomes after surgery. This institutions standards for antimicrobial prophylaxis in the perioperative period are more stringent than these measures and may be considered beyond SCIP. The four elements of appropriate antimicrobial prophylaxis are timing, selection, dosing and intraoperative redosing. The purpose of this medication use evaluation was to quantify antimicrobial SSI prophylaxis compliance according to institutional standards and identify potential opportunities for improvement.

Methods: Patients 18 years or older were included if they developed a SSI between January 1, 2009 and June 30, 2010 according the prospectively maintained database by the Department of Infection Prevention and Control. Adherence to the institutions practice standards were assessed by analyzing antibiotics administered: timing in relation to the incision, closure, and tourniquet inflation times for the procedure, selection, dose and redosing.

Results: Overall adherence to all four elements of antimicrobial prophylaxis was 24.4%. The element with the greatest noncompliance was repeat dosing of antibiotics (44.9%). Antibiotic selection had the lowest incidence of noncompliance (10.8%).

Conclusion: Noncompliance exists in each of the four elements of antimicrobial SSI prophylaxis: timing, selection, dosing, and redosing. Opportunities to improve with institutional standards were identified through this review and will assist with future decisions regarding surgical prophylaxis in this institution.

Capacity Planning: Doing more without sacrificing quality.

Quality

Aaron Maixner

The Division of Clinical Biochemistry and Immunology (CBI) is comprised of 7 laboratories, 357 FTE, over 48 testing platforms, and performs over 1,000 unique laboratory tests. In 2009, 2010, and 2011, CBI performed over 6 million laboratory tests. Nearly 85% of CBI's annual volume is generated from the extramural market, serviced by Mayo Medical Laboratories (MML).

CBI developed a standard method for determining available capacity. Each lab built a model based on that method that would allow them to understand how many more tests could be performed in their lab without an additional step function (Equipment, FTE, Space, Schedule) or compromising the quality of the assay. The step function that yielded the highest constraint determined the overall available capacity for each platform.

The model indicated the overall available capacity for CBI at 22% of total volume or equal to an additional 1.5 million tests. Available capacity by lab ranged dramatically, as low as 6% for Immunology Lab, to as high as 575% for Nucleotide Polymorphism Lab.

Manage staffing to workload and cross-training across platforms are two ways laboratory management can utilize available capacity data. Going forward, each lab is required to maintain their model, based on the step-functions and changing factors. By doing so, each lab is able to maintain the same level of quality even as testing volumes increase.

Our poster will share the proposed capacity model with conference attendees.

Ready for Takeoff: Improving Handoffs from ICU to General or Progressive Care Units

Quality

Pamela M. Maxson, PhD, RN, CNS

Background: Communication errors have been linked to 70% of sentinel events nationwide. Transitions in care require effective communication to ensure continuity of patient care and safety. Traditionally, when patients transition out of the Intensive Care Unit (ICU) handoffs have been done by telephone without patient and family involvement. To improve patient safety and staff satisfaction with ICU transfers, a quality improvement project was initiated.

Methods: All RN staff on one surgical ICU and on four surgical floors were invited to complete a survey (Likert scale; 1 = Always; 4 = Never) before and after practice changes were implemented. Practice changes included a transfer checklist and face-to-face handoffs.

Results/Conclusions: Performing two person intravenous medication reconciliation improved significantly (mean pre 3.4 + 0.65; post 1.8 + 0.66; $p = 0.001$). There was a statistically significant improvement in having an updated medication profile (mean pre 2.5 + 0.68; post 1.8 + 0.59; $p = 0.005$). Receiving RNs also reported face-to-face handoffs improved overall patient safety (pre mean 2.1 + 0.60; post 1.6 + 0.50; $p = 0.029$). Eventhough, we did not find statistical improvements in areas of adequate communication and overall teamwork, there was a trend towards clinical significance. Most nurses articulated satisfaction with face-to-face communication. It gave them the ability to visualize and clarify questions just in time regarding patient care needs. This quality improvement project has resulted in improved safety, quality and satisfaction when patients transition from the ICU.

Standardized sign out improves communication skills

Quality

Brian D Moseley, MD

Background: As residency programs adjust to new duty hour restrictions, the usage of cross-coverage systems requiring handoffs will rise. Handoffs are vulnerable to communication failures when unstructured. Accordingly, we implemented a standardized sign-out process and assessed its effect on the completeness and perceived accuracy of handoffs on inpatient Neurology services.

Methods: Junior residents on our General Neurology, Stroke, and Neurologic Intensive Care Unit services spent the first half of their rotations utilizing unstructured sign-out. They transitioned to a structured sign-out system using the Situation-Background-Assessment-Recommendation (SBAR) format during the second half of their rotations. We analyzed survey responses before and after implementation to evaluate for an effect.

Results: Residents utilizing structured sign-out were significantly more likely to share test results with patients/family prior to shift changes (22/32, 1 non-responder, 69% versus 18/19, 1 non-responder, 95%, $p=0.037$), update our electronic service list (13/29, 4 non-responders, 45% versus 15/20, 75%, $p=0.045$), and feel all important data was being transmitted (16/33, 49% versus 16/20, 80%, $p=0.041$). Overall satisfaction (scale 1-10) increased from 6.2 ± 1.6 to 7.4 ± 1.3 ($p=0.002$).

Conclusions: Our results demonstrate that standardized sign-out improves the completeness and perceived accuracy of handoffs. Neurology residents utilizing an SBAR-style sign out system were significantly more likely to share test results with patients/families prior to shift changes, update electronic service lists, and deem that all important data was being transmitted. Such improvement may have the potential to improve patient safety and quality of care.

Protecting Patient Privacy in the Critical Care Unit

Quality

Marguerite Paradis, RN BSN

Nurses in the Critical Care Unit (CCU) care for the sickest patients who require some of the highest skilled care. Families and loved-ones of these patients are often anxious and in crisis. The telephone rings and anxious callers seek information from sources closest to the bedside. Family members and loved-ones have a need for accurate and up-to-date information; the importance of which is easily underestimated. HIPAA limits the release of Personal Health Information (PHI) to the minimum necessary and nurses feel the need to guard patient information. The inability to identify multiple callers and sometimes visitors is a constant struggle for the nurse. Transforming Care at the Bedside (TCAB) initiatives seeks to enhance processes and increase the value of the time the nurse spends with the patient. Through TCAB and utilizing the Mayo Clinic Evidence-Based Decision Making Model, the CCU successfully implemented a process of identifying a support person designated by the patient and/or family in the CCU. The support person receives updated information and is the spokesperson for all other family members and loved-ones. The nurse provides the support person a code to use when calling for information. This support person process increases compliance with hospital and federal guidelines for PHI and limits the number of calls to the nurse at the bedside. Nurses were surveyed pre and post implementation. Patient complaints and patient satisfaction were monitored for changes. Nurses successfully maintain compliance with patient privacy regulation and policies and reduce interruptions at the bedside while maintaining a high level of patient and family satisfaction.

Department of Comparative Medicine - Atypical Vendor Process Improvement Project

Quality

Tom Partridge, BS, MBA

Goal: Reduce Defective Atypical Mouse Vendor Shipments

Scope: In Scope: ATV Mice, which represent over 99% of all ATV orders.

Out of Scope: All other species, which will be considered to be special ATV orders; and handled via a Mayo veterinarian.

Methods: DCM (MCR and MCF) and the Office of Research Quality Management Services (ORQMS) worked together to improve the Atypical Vendor Process. This process was re-designed using the DMAIC improvement methodology, including the following specific tools: Hi-Level Process Mapping, Check Sheet (data collection), Detailed Process Mapping (SIPOC+R), Pareto Analysis, Failure Modes and Effects Analysis (FMEA), Control Plan, Standard Operating Procedures (SOPs).

Outcomes:

1. Identified/quantified risks in the current process, determined actions to reduce/eliminate the risks and estimated the risks in the re-designed ATV process.
2. A Future-State Process with process map and process documentation.
3. Operational Metrics in-place, supporting both control and improvement.

Results: Defective Animal Shipments reduced from 83% to 14%.

Conclusions/Replication Potential: The re-designed ATV process consolidated many disparate functions, reduced manual efforts, and enhanced communication/coordination activities associated with ATV orders. These improvements resulted in a simplified process with improved quality and efficiency. The process now requires the PI to simply complete one electronic form that is forwarded to the (newly created) Rodent Coordinator. The Coordinator assumes responsibility for requesting health information and coordinating all activities necessary to order, ship and receive ATV mice.

Implementation of project management principles and tools to streamline and accelerate discovery science research

Quality

Mindy Rice, MBA, CSSBB

Background: Despite the human and financial capital dedicated to medical research, it takes an average of 15 years for a research discovery to reach the patient. Fundamental science research is based on the building of knowledge from careful experimentation and observation. The inherent imprecise nature of the outcomes of these research projects makes it difficult to manage them using traditional project management strategies. However, to improve productivity and increase deliverables, i.e. scientific manuscripts, this research project implemented the use of traditional project management strategies and the project management software, Basecamp, in our discovery science research.

Methods: During the planning phase of the project, a research project description document was carefully crafted to outline questions to be addressed and hypotheses to be tested, pertinent background information, significance of the work and milestones to be completed throughout the projects execution. Throughout implementation of the project, the online project management software, Basecamp, served to track day-to-day progress, coordinate collaboration between investigators (i.e. project managers) and maximize data sharing to expedite further experiments. Formal, monthly progress reports monitored the success and evolution of the project. These reports allowed for assessment of potential problematic areas within the research project and planning of strategies to circumvent these issues.

Conclusion: Completion of the project resulted in a scientific manuscript, drafted and completed using Basecamp for communication and data exchange. The application of tradition project management strategies to our research project has allowed us to meet timeline milestones and increase our productivity in basic science research.

Agile rapid application development for engineering functionality in research laboratory software

Quality

Mindy Rice, MBA, CSSBB

Background: The cell culture function in the Program for Hypoplastic Left Heart Syndrome experienced significant usability issues with the Mayo Clinics standard vended sample creation and tracking application. The purpose of this project was to develop a process and system for tracking cells and specimens throughout the cell culture process from tissue to fibroblast to stem cells to differentiated cardiac tissue. Due to heavy-weight web based user interface, scientists in the process did not have a practical solution for rapidly accessioning samples in a laboratory setting, where speed is paramount. The solution for this team was to create a focused, user-friendly system that would be used in real-time within the laboratory environment.

Methods: Agile rapid application development process, in conjunction with functional development sprints, was used to develop a mobile solution that would be feasible for the user and the technical support systems. The teams project charter documented the agreed-upon goals, objectives, and approach. User observations were conducted and the technical solution developed from the users perspective.

Conclusion: This methodology resulted in high velocity (functional throughput) development cycles, ending in a production-ready product within two months. Results of the implementation were as follows: 90% reduction in cycle time (30 to three minutes) and 90% reduction of system button clicks (50 to five). The new system also resulted in fewer errors and rework, as data is captured in real-time and in the location of the process (cell laboratory). Collectively, rapid application development can accelerate rate-limiting steps in specific laboratory environments by focused project management strategies.

Using systems engineering to accelerate knowledge to delivery for Hypoplastic Left Heart Syndrome (HLHS)

Quality

Mindy Rice, MBA, CSSBB

Background: The Todd and Karen Wanek Family Program for Hypoplastic Left Heart Syndrome is an integrated, multi-disciplinary, and comprehensive program that combines discovery science and clinical/translational research to develop innovative therapeutic strategies for children with Hypoplastic Left Heart Syndrome (HLHS). Affecting approximately 2,000 newborns per year in the US, HLHS requires aggressive early surgical intervention, and is responsible for 20 to 25% mortality in infants born with congenital heart disease. The Program will ultimately design novel, personalized diagnostics and regenerative therapeutic application for HLHS patients whom are currently limited to palliative surgery and heart transplant.

Methods: The Program is built in a robust, milestone-driven, and goal-based roadmap to ensure all work can be defined, tracked, and linked to the Programs mission. The Program leverages internal institutional structure and intra-institutional partnerships to design a platform necessary to significantly reduce the amount of time to first-in-man delivery (currently estimated across all of biomedical research to take 15 years from discovery to delivery). A sustainable, replicable and reproducible platform validated according to performance-oriented metrics hastens the clinical implementation of innovative strategies that can be applicable to a broader spectrum of children affected by debilitating forms of congenital heart disease.

Conclusion: The Programs autonomous management structure and in-house expertise, along with institutional core support, provides the unique programmatic combination to enable the agility necessary to stay relevant in the rapidly evolving environment of biomedical research and the momentum required to provide for the unique needs of patients with HLHS.

Quality Management Services Administrative Support Team Sharing Teamwork Project 2011

Quality

Lisa Rogich

Quality Management Services Administrative Support

Team Sharing Teamwork Project 2011

Background/Rationale: The Administrative Assistant team supports seven work units within Quality Management Services.

Objectives/Aims: Create a seamless process to increase service for internal/external customers.

Methods/Strategies: To improve cross-training processes/techniques by creating Standard Operating Procedures (SOPs) for job tasks/responsibilities by 25% by February 28, 2012, 50% by July 31, 2012, and 100% by December 31, 2012

Results: The Administrative Support team used a variety of methods/strategies which included the following: Email Communication, Informal Huddles, One on One Meetings, creating of a Standard Office Procedure Tracking Tool, regular team meetings, and celebrations after each goal met by the team.

Standardization of Medication Management to Reduce Errors through Improved Interdisciplinary Communication and Handoffs at a Skilled Nursing Facility

Quality

Archana S. Shinde, MHA

Background: The project was conducted in a skilled nursing unit of an extended care facility located in the Upper Midwest. The sub-acute care and skilled nursing rehabilitation services provided on the unit extends inpatient-hospital care involving an Interdisciplinary Team approach which includes health care providers, therapy, nursing, social services, spiritual care, dietician and therapeutic recreation, through an individualized resident focused plan of care.

Objective: Develop a standardized process for ordering, collection, administration and documentation of medications by improving information gathering, communication and handoffs among various care team providers.

Methods: The team used the Define Measure Analyze Improve Control (DMAIC) methodology and value stream mapping to understand current state information flow from resident admission to discharge and from physician order to resident consumption. Change management and Plan Do Study Act (PDSA) methodology was used during the implementation stage.

Findings and Conclusions: Medication errors and order problems were divided into two categories: (1) workflow, and (2) communication. Medication management was laborious, inefficient, and a source of frequent interruptions. Unclear lines of communication among team members caused confusion and misunderstanding. Procedures delineating role expectations were not always clear and in some cases, not followed.

Recommendations/Action Items: The following changes were introduced:

- Interdisciplinary team huddles.
- Physician/nurse collaboration upon resident admission.
- Medication reconciliation
- Five Rights during medication administration.
- Bedside reporting with resident involvement.
- SBAR communication methodology.
- Clarification of role expectations.
- Creation of new and revision of existing orders, forms, and templates.

Health Systems Engineering at University of Wisconsin Health: Partnering to Redesign Ambulatory Care

Quality

Elizabeth K Strutz, MSIE

University of Wisconsin Health, an academic medical center employing 1,200 primary and specialty care physicians, recognizes the importance of encompassing industrial engineering concepts and tools to improve quality within the health system. The Quality, Safety and Innovation department at UW Health currently employs nine industrial engineers whose work is focused on redesigning care. These industrial engineers are responsible for system-wide project management, process improvement, facilitation, change management, and training. This poster will describe the role of IEs at UW Health and two specific programs that focus on the involvement of industrial engineers.

The first example is the Industrial Engineering Student Semester Program which provides UW Madison industrial engineering students real world experience in healthcare and resources to various UW Health departments for improvement work. UW Medical Foundation established an affiliation agreement with UW Madison in 2008. Since then, 229 students have participated in 63 projects.

The second example is the Ambulatory Care Innovation Grant (ACIG) Program which provides funding to UW Health employees for improvement projects. Data has shown that the year-long ACIG projects are more successful when supported by an industrial engineer. Therefore, each project is assigned IE support to help with data collection and teaching process improvement tools. Learn to create similar programs at your organization.

Cutting Through The Haze: One Intensive Care Units Effort to Promote Assessment for Delirium

Quality

Paul D. Trewartha Weiner, BSN, RN

This quality improvement session explains how an education program and multidisciplinary collaboration during daily rounds improved delirium assessment compliance.

Background: Delirium identification is a complex problem in the hospital environment, particularly in critical care. Delirium is found in up to 80% of ventilated patients and is an independent predictor of increased length of stay, cost, morbidity, and death. Without use of a validated assessment tool and a standardized documentation process, delirium often goes unrecognized. Our facility uses the Confusion Assessment Method for Intensive Care Units (CAM-ICU) tool to identify delirium. Staff use of the tool has been inconsistent. A recent quality improvement project found CAM-ICU assessment compliance to be 20%.

Methods: Unit based quality coaches developed an individualized education program for nursing staff, including a slide presentation and individual instruction for nurses. Post-education audits continued to show poor CAM-ICU assessment compliance (25%).

A team focused delirium assessment program emphasizing a discussion of the Richmond Agitation and Sedation Scale (RASS) and CAM-ICU scores on every patient during multidisciplinary rounds was implemented. Staff used CAM-ICU and RASS cards and a daily rounding checklist as reminders to focus on delirium discussion during rounds.

Conclusion: Audits of CAM-ICU assessment documentation after implementation of the team intervention revealed CAM-ICU assessment compliance at 75%. Although this shows substantial progress, quality coaches recognize the need for continual improvement in CAM-ICU documentation. Chart audits and coaching of noncompliant staff continues. Coaching emphasizes the importance of early identification of delirium using the CAM-ICU, and adverse outcomes associated with delirium.

ENT Nursing (Excellent Teamwork through Nursing)

Quality

Jeanette Ward-Newkirk, RN, BSN

Background/Rational: Our culture of safety survey results revealed that nurses often feel there is a lack of teamwork and spirit of cooperation, and not enough staff to handle the workload. Nurses are performing tasks they have not been trained for and are performing tasks not within their scope of practice. We strive to change our practice to improve our work environment through, awareness, desire, knowledge, ability, and reinforcement. Our plan is to create a Skills Matrix, create sub-specialty guideline manuals, perform a pre and post staffing satisfaction survey, and to evaluate existing data to improve scheduling.

Methods/Strategies: We have benchmarked with the Department of Nursing Staffing and Scheduling, Human Resources, Systems and Procedures, and the Center for Innovation. We attended the Staffing to Workload Collaborative. We have reviewed our Workload Measurement and Reporting System (WMRS) data. We have reviewed our Patient Access Management Analytics (PAMA) data for 2010 and 2011.

Conclusions/Results: Each nurse has completed a pre-scheduling survey and their Skills Matrix. We continue to look in depth at our WRMS data to evaluate how we are spending our time. Out of these metrics, we were approved to hire two new technicians to assist with performing non-nursing tasks. We have adjusted nursing days off to accommodate surgeon coverage and will continue to monitor and adjust as needed. We will start to cross train staff in all sub-specialty areas. We will continue to work on development of the sub-specialty guideline manuals.

Improving Sterilization Documentation Errors

Quality

Amy White, MS, RN

Ensuring sterilization documentation is accurately completed is essential to the delivery and maintenance of quality sterilized instrumentation. We noticed an increase in the number of sterilization documentation errors throughout the surgical practice. Baseline data was collected to identify the type and frequency of sterilization documentation errors occurring in all of the surgical cores across all surgical specialties. A process change was implemented. At the change of shift, two staff simultaneously review the sterilization documentation completed on that shift and initial the record when the review has been completed. We decreased the number of sterilization documentation errors by over 10%. Communication has increased between staff. We hope that the peer-review process will help to continue decreasing the number of documentation errors.

Money In

Quality

Jon Zurn, BA

The Strategic Funding Office (SFO), made up of three core staff, supports mission-advancing financial performance for the College of Medicine, providing expertise and resources to secure extramural funding. SFO works with a wide array of education stakeholders throughout the Mayo Clinic system (e.g. investigators, administrators and students). The Office is responsible for several pre-award solicitation and post-award accounting and stewardship processes. Mistakes can result in lost revenue. While holding to an existing 42% success rate and maintaining customer satisfaction, we sought to improve our post-award process total lead time by 15% (number of days). Project success would allow for the Strategic Funding Office to potentially increase the number of solicitations, the size of proposals, and realize additional extramural revenue.

The project goal was to improve award processing by standardizing procedural steps and reducing total lead time.

We used a variety of quality improvement tactics to analyze problems, plan solutions, and test outcomes. Our team learned a number of valuable lessons that will enable us to integrate quality throughout our continuing work.

MAXIMIZING PATIENT SAFETY THROUGH STANDARDIZATION: MICROTOMY ERROR REDUCTION INITIATIVE (MERI)

Quality

Jami R. Zwiefelhofer, MS

To align with Mayo Clinics initiative to create a higher level of quality, improve patient care, and establish a culture of safety within the institution, the Histology Laboratory at Mayo Clinic Rochester created the Microtomy Error Reduction Initiative (MERI). Histology event data trends indicated a need to evaluate the circumstances surrounding patient identification errors occurring within the microtomy process. The teams initial focus was to review the process flow of microtomy work in the laboratory and identify the areas of variability.

Using Lean and Six Sigma tools (George, 2005); the MERI team defined the current practice, measured processes, analyzed data, implemented improvements and utilized a control plan for sustaining progress. A thorough analysis of data collected during this initiative led the team to center project improvements on the standardization of laboratory processes. Implemented improvements included process and workbench standardization, creation of Best Practice methods and workstation zoning through color mapping. Standard operating procedures were also revised to eliminate microtomy methods that were considered risky or dangerous. Challenges were faced by the team when implementing these improvements. Change management tools, such as the ADKAR model (Hiatt, 2006) were utilized to guide stakeholders through the implementation process.

The results of this project reduced the microtomy patient identification error rate in the Mayo Clinic Rochester Histology laboratory by over one-third. The team will continue to monitor error reduction progress. Future improvements include implementing technology to further reduce patient identification errors.

STOP, COLLABORATE AND LISTEN: Transforming Quality Patient Care Is Our Mission

Quality of Care and Health Outcomes

Laura Axley, RN

Background: Mayo Clinic defines quality as the best outcomes, safety and service we can provide. Understanding quality terminology and how quality impacts nurses at the bedside was seen as a challenge. Accepting the challenge, members of two staff development committees collaborated on quality education.

Objectives:

1. Explain quality concepts and the vital role nurses have in impacting the patient experience.
2. Apply quality principles using evidence based practice on initiatives to increase patient satisfaction and safety.

Methods: Monthly, the staff development committees would discuss one quality concept and create an educational tip sheet to display on the units. Discussion among colleagues promoted further discovery of quality. Additionally, nurses worked on quality initiatives to improve the patient experience. One unit performed Plan, Do, Study, Act (PDSA) cycles to implement intentional rounding while the other unit used Define, Measure, Analyze, Improve, Control (DMAIC) to examine patient interruptions at night. Strategies were developed to increase patient satisfaction and safety in both projects.

Results: A foundational understanding of quality concepts for nursing and the impact on patient satisfaction and safety was achieved through Mayo Quality Academy bronze and silver certification as well as through patient care unit quality improvement projects.

Conclusion: As transformational leaders, nurses initiate change through quality improvement to enhance patient care. A collective professional voice between two nursing units can transform the overall patient experience.

Utility of Technician ECG Overread in Improving in After Hour Cardiovascular Care

Quality of Care and Health Outcomes

Peter A. Brady, MBCh.B, M.D., FRCP, FACC, FHRS

Background: The 12-lead electrocardiograph (ECG) is an essential tool in the management of patients with cardiovascular disease, yet accuracy and timeliness of ECG interpretation can vary widely. We hypothesized that use of specially trained ECG interpretation technicians to overread all after-hour ECGs and to alert the responsible medical provider of life-threatening change could improve quality outcomes by reducing adverse cardiac events in a hospital setting.

Methods: Prior to clinical implementation of the study, experienced ECG interpretation technicians were selected to undergo pre- and post-ECG interpretation testing and education using a standardized tool. Only technicians who exceeded a predetermined competency in ECG interpretation were included. All ECGs were interpreted using standard diagnostic coding and the responsible provider alerted if changes were present that met predetermined alert values (see table 1). The accuracy of ECG interpretation was confirmed by a second over-read and agreement reached.

Results: Between February 1 and 29, 2012, a total of 3567 ECGs were performed and interpreted outside of the normal clinic hours of which 115 (3.2%) met alert criterion that resulted in urgent contact being made with the appropriate provider. Of the 115 ECG alerts, 102 were because of newly diagnosed ST elevation or depression (88.7%) and 13 (11.3%) were because of a newly diagnosed arrhythmia. In two patients, the ECG alert system had a significant impact on patient management.

Conclusion: Use of experienced technician-led ECG overreads after-hours is feasible and accurate and may improve diagnostic and therapeutic outcomes in selected patients presenting with cardiac disease.

Educating fellows in Practice-Based Learning & Improvement and Systems-Based Practice: the value of Quality Improvement in clinical practice

Quality of Care and Health Outcomes

William Carey, MD

Introduction: In 1999, the Accreditation Council for Graduate Medical Education identified six general competencies in which residents must receive training. In the decade since these requirements went into effect, Practice-Based Learning & Improvement (PBLI) and Systems-Based Practice (SBP) have proven to be the most challenging competencies to teach and assess. Because PBLI and SBP both are related to quality improvement (QI) principles and processes, we developed a QI-based curriculum to teach these competencies to our fellows.

Methods: Our fellows participated in our divisions program of continuous quality improvement. Using the Plan-Do-Study-Act change model, fellows partnered with faculty to develop and implement QI projects designed to reduce common morbidities in our patient population. To assess fellow competence in PBLI and SBP, the program directors maintained portfolios for each fellow, including written self-reflections, evaluations and documentation of any related academic achievement.

Results: Our fellows developed and implemented practice changes that reduced the incidence of bronchopulmonary dysplasia and central line-associated blood stream infections in our NICU. Program directors documented evidence of fellow competence in portfolios that included: semi-annual self-reflections; competency-based evaluations of fellows quarterly QI presentations; and a compendium of our fellows academic achievements related to QI, such as presentations at academic meetings, receipt of Performance in Practice credit toward maintenance of certification by the American Board of Pediatrics).

Discussion: Given the clinical and educational structures common to most ICU-based training programs, we believe that a QI-based curriculum such as ours could be adapted by others to teach and assess PBLI and SBP.

Improving pediatric nursing practice: A process for meaningful audit

Quality of Care and Health Outcomes

Patricia Conlon, MS, RN, CNS, CNP

The evolution of nursing practice presents challenges to staff. Changes to established procedures require acquisition and use of new information. Nursing leadership is tasked with ensuring that practice changes are implemented. In many cases, post-implementation auditing of documentation or direct observation of nursing care is required. Unit-based staff nurses are in an excellent position to audit practice and provide direct peer feedback.

Our pediatric nursing practice improvement committee developed a methodology for audit by a group of staff nurses. For the past 7 years, we have conducted audits three times each month on a variety of unit-specific clinical practice changes and on areas of nursing practice which needed improvement. Individual paper tools were created for each area being audited. The tools provide stepwise auditor instructions to promote consistency of methodology. Sixteen aspects of practice are currently being evaluated. The auditor discusses findings directly with the staff nurse and provides education when improvement is needed. Positive reinforcement is provided when the audit shows no areas for improvement.

Discussion of audit summary results and evaluation of trends occurs monthly at the unit practice committee. A summary e-mail is sent to unit nursing staff.

Our audit process has resulted in increased quantity and quality of care process audits on our pediatric general care unit, greater awareness of compliance with practice performance, and ultimately has led to improvement in clinical nursing practice. The methodology has been adopted and replicated by many other units in our institution

Medication Reconciliation: Discrepancies in medication records as potential marker for poor health outcomes after discharge from a medical cardiology service.

Quality of Care and Health Outcomes

Magali Disdier Moulder PharmD, PhD.

Background: On hospital admission and discharge, medication reconciliation is a crucial but error-prone process. Our goal is to evaluate the relationship between errors related to medication reconciliation and outcomes after discharge. Additionally, we hope to determine characteristics to help identify patients who would benefit from closer follow-up in the outpatient setting to improve management of their medications.

We hypothesize that patients with low health literacy, higher co-morbidities and more complex medical regimen are at higher risk of Potential Adverse Drug Events (PADE) and poor health outcomes after discharge.

Methods: We plan to enroll 400 patients from our local community upon admission to a Medical Cardiology service at Saint Marys Hospital. We are assessing PADE scores on admission and discharge, patient characteristics such as number of medications, self-reported health literacy, co-morbidities, loss of vision, degree of medication compliance and a composite of readmission and death at 30 days post discharge.

Conclusions: Our first 133 patients with complete data have a median age of 72 (IQR[58-81]), a median Charlson co-morbidity score of 4 (IQR[2-5]) and take a median number of daily prescription medications of 7.5 (IQR[4-10]). Thus far, we have found an association between the number of prescriptions and the number of errors on admission (Spearman analysis $\rho = 0.40$ $p < 0.001$). We have not found an association between 30-day readmission and PADE (admission or discharge), health literacy or co-morbidity scores. Patients with low visual acuity and suspected non-compliance have high readmission rates in our population and may warrant further study.

Primary Care Pre-Visit Planning

Quality of Care and Health Outcomes

Donna Fenton, CMA (AAMA) CPHQ

The focus of primary care has changed from reactive care to proactive, preventive care. In order to meet the needs of our patients and ensure they receive the best care possible in a timely and efficient manner, we have implemented a standardized pre-visit planning process. An interdisciplinary group, including administration, providers, clinic nursing, IT, quality and registration staff met to analyze current practices and design a new, better process of pre-visit planning. Objectives include ensuring all pertinent patient information is available to providers at time of visit; reduce patient cycle time (registration to checkout) to 45 minutes; and increase provider access.

We are currently piloting this project with two internal medicine and two family practice providers. Feedback from providers and nursing staff has been positive. They feel visits are going more smoothly and efficiently when they are well-prepared. Measurement regarding additional access is pending as this process is still very new.

We have met some struggles along the way, mainly staffing. We have not added staff for the project, instead we redistributed the workload among current staff. We continue to work through challenges by being very transparent about the process and maintaining open communications.

Barriers to Implementing Synchronous Spontaneous Breathing and Awakening Trials in the Intensive Care Unit

Quality of Care and Health Outcomes

Andrew D. Goldberg, MD

Background: For patients requiring mechanical ventilation, daily respiratory therapy (RT) guided spontaneous breathing trials (SBT) effectively liberate patients from the ventilator and reduce mortality. When SBTs are performed simultaneously with daily spontaneous awakening trials (SAT), the success rate is higher.

Objectives: To assess the barriers in the implementation of a nursing and respiratory therapy driven protocol of daily SBT, coupled with daily SAT in the medical intensive care unit.

Methods: Surveys were administered to all medical ICU nursing and respiratory therapy staff. The frequency of perceived SBTs and were measured and most common barriers to communication between services were recorded.

Results: Eighty-seven responses were recorded. Fifty-five percent of the respondents noted that SBT's during sedation vacation occurred between 25%-50% of the time and 12.6% noted a 0% of the time rate. Both nursing and respiratory therapy staff had similar reports. Communication problems (27%) were the most cited barrier. Medical team daily work schedule (24%), unit staffing 21%, and physician availability (21%), encompassed 93% of the total reported barriers.

Conclusions: Daily SBT's during SAT's are infrequently performed in the medical intensive care unit. Communication between nursing and respiratory services is the most frequently cited barrier to this practice. Considering, an intervention focused on improving RN-RT communication may be beneficial to patients.

Depression Care Model

Quality of Care and Health Outcomes

Lisa Hardesty, Ph.D.

Depression affects 10% of all primary care patients. Only about 50% of patients with depression are diagnosed and started on treatment or referred to psychiatry. Additionally, there are limited psychotherapy resources and often treatment that is initiated is ineffective (20-40% improvement over 12 months). Finally, there is a lack of a quantitative measurement system for depression which promotes tracking of effectiveness of our treatments.

Prior to our intervention, there was a lack of standardization across the Mayo Clinic Health System (MCHS) and use of the PHQ-9 was only 14%; some primary care sites were at 0%. Before our project, the less specific diagnosis of Depression NOS (311) was used an average of 47% of the time; some sites were up to 80 to 98%. Project goals include 100% use of the PHQ-9 with Major Depression and at least 89% use of the more accurate Major Depression and Dysthymia codes and at most 11% use of the less precise Depression NOS code.

As a result of this project, an implementation matrix was developed to assist the MCHS with a standardized approach to depression management. Additionally, an algorithm and the PHQ-9 tool were built into the electronic medical record. The PHQ-9 assessment tool was implemented at varying degrees across the MCHS, and metrics for use of the PHQ-9 and depression remission rates were developed and currently reside on the MCHS Dashboard. In January 2012, the MCHS average use of the PHQ-9 tool across Minnesota was 64.61%, and depression remission rates average 12.35%.

Cardiology Hospital Practice Redesign

Quality of Care and Health Outcomes

Carmen Kane

Background: Cardiology cares for nearly 500 patients admitted to St Marys Hospital each month and also supports Mayos education mission. In order to do this well, we need to be proactive; developing an efficient patient care system that allows for resident education, safe patient care, and proper utilization of staff. Regulations for resident work hour restrictions have become more stringent.

Methods: The redesign project focused on the five primary Cardiovascular (CV) inpatient services, addressing daily workflow, admission patterns, individual service census, role definition, and optimal utilization of cardiologists.

Conclusions: The project was ambitious and required significant change management skill and coordination of communication to gain buy-in from multiple stake holders. As a result, we learned that phased implementation was more apt to lead to success than trying to do too much at one time. Efforts to communicate included initial brainstorming sessions with the Nurse Practitioner/Physician Assistant (NP/PA) staff, monthly NP/PA staff meetings, and open invitations for individual conversations with leadership members.

Phase One: All admitting services accept patients in rotation until 6:30 pm, eliminating the previous pattern of all patients being admitted to a single service. The change facilitated better staffing to workload.

Phase Two: New Surge criteria with service caps written, reviewed, and implemented, load leveling steps and. elimination of 24 hour shifts on CV5 .

Are Fresh Red Blood Cells better than Standard Red Blood Cells for Critically-ill Patients?

Quality of Care and Health Outcomes

Rahul Kashyap, MBBS

Background: Alterations that occur to both red blood cells (RBC) and their media during the storage process are believed potentially responsible for many of the adverse effects associated with RBC administration. The objective of this investigation was to evaluate the impact of RBC storage duration on short-term pulmonary function and immunologic status in mechanically ventilated, critically-ill patients receiving RBC transfusion.

Methods: We performed a single-center, double-blind, randomized clinical trial comparing fresh (≤ 5 days storage duration) versus standard issue (median 21 days storage duration) single unit leukoreduced RBC transfusion in mechanically ventilated ICU patients. Outcome measures included markers of pulmonary function and immune status and patient outcomes as mortality, new or worsening acute lung injury (ALI) and change in sequential organ failure assessment (SOFA) scores.

Results: A total of 50 patients were randomized to fresh RBC and 50 to standard issue RBC. Good separation was noted between groups with a median storage age of 4 days (IQR 3-5) in the fresh RBC cohort and 26.5 days (IQR 21-40) in the standard issue group. Patients in the standard issue group had higher baseline heart rates (median 93 versus 86 bpm; $p=0.02$) and respiratory rates (median 26 versus 21.5 breaths per minute; $p=0.04$) when compared to the fresh RBC cohort. Characteristics such as patient comorbidities, pre-study transfusions, severity of illness, PaO₂/FiO₂, inspiratory plateau pressures, and indication for transfusion, had equal distributions.

Conclusions: In this double-blind, randomized clinical trial of fresh versus standard issue single-unit RBC transfusion, no differences were noted in early measures of pulmonary function or immunologic status or patient important outcomes such as mortality or organ failures.

Providing common asthma tools to improve quality of care

Quality of Care and Health Outcomes

Shari Kropp, MA

Background: Improving publicly reported quality scores can be a challenge when trying to deliver the best care possible to our patients. The Mayo Clinic Health System formed the Asthma Expert Team in an effort to streamline best-practice information to care teams across MCHS. This included providing the care teams standardized tools to improve quality scores and, more importantly, to ensure that our patients are receiving consistent, quality care, regardless of the site at which they are seen.

Methods: Research was completed to identify best practices in the healthcare community when caring for asthma patients. Interviews with care team members within MCHS were also completed to understand current tools and work flows along with identifying gaps in providing consistent care.

Results: It was identified that MCHS sites were not consistent in delivering quality care to asthma patients. Variation existed in diagnosis methods, management strategies and tools associated with caring for asthma patients.

Conclusion: Due to variations identified a set of standardized tools were developed and recommended for use in caring for asthma patients within MCHS. Identified tools are currently being incorporated into the EMR to ensure even more consistent care. Some sites have also had the ability to incorporate a pre-visit planning process which has greatly impacted the publicly reported quality scores. The incorporation of standardized tools and processes ensure that our asthma patients will receive consistent, quality care regardless of what MCHS chosen to visit.

MCHS Albert Lea Primary Care POD

Quality of Care and Health Outcomes

Tonia Lauer, MBA

MCHS Albert Lea Department of Family Medicine is testing a primary care POD with 3 family practice providers, assigned nurses, and care manager.

The POD Team includes physician, midlevel, Office nurse, Float nurse, Phone advise nurse, Registration staff, Case Manager/Care Coordinator

Pod team prepares for visit with pre-visit planning and follows the visit with post-visit follow-up care as appropriate. The POD allows staff to work at their highest level of licensure and gives the patient a team that is in tune with the patient's specific needs.

The team is tracking patient outcomes as well as measures related to the # of phone calls per provider in the POD, # of refills requested outside of the patients visits, and # of letters generated to send patients results that could have otherwise been given to the patient during their appointment.

Designing an Effective Intensive Care Unit Discharge Process towards Reducing Unexpected Readmissions; Qualitative Methodologies that Elucidate Quality Gaps

Quality of Care and Health Outcomes

Uchenna R. Ofoma, MD, MS

Background: Readmission to the Intensive Care Unit (ICU) is associated with worse outcomes and increased cost. Discharge processes are often fraught with errors and providers are poor judges of the risk of readmission. The implementation of a previously validated scoring tool [1] for predicting the probability of readmission in our medical ICU had an impact on provider discharge planning but not on the overall readmission rates. This suggests that ICU readmission may be associated with poor discharge and transition processes, factors that are not measurable by quantitative means

Objectives: To design an ideal ICU discharge process that addresses quality gaps identified from qualitative study of ICU readmissions

Methods:

1. Direct observation of the discharge process in two ICUs and general floor, to better understand discharge behavior, processes and workflow.
2. Mapping of current discharge process. (Fig 1)
3. Semi-structured one-on-one interviews of medical and surgical ICU and general medical staff.
4. Design of a working ICU discharge process model using gathered data.

Results: Five ICU discharge processes were observed. Staff interviews are currently in progress. Quality gaps identified include lack of collaborative decision making; lack of communication within and between teams and with patient/family; as well as lack of consideration of readmission as potential fallout of discharge. These factors were utilized in designing a working ICU discharge process model.

All Aboard: A Process For Increasing Activation Of A Sepsis Response Team In The Medical Intensive Care Unit

Quality of Care and Health Outcomes

Uchenna R. Ofoma, MD, MS

BACKGROUND: Sepsis Response Team (SRT) activation is associated with significantly increased compliance with the sepsis resuscitation bundle and decreased hospital mortality in patients with severe sepsis/septic shock.

GAP: SRT activation and compliance with the sepsis resuscitation bundle for patients with severe sepsis/septic shock has fallen dramatically below the previously established target in our Medical Intensive Care Unit (MICU).

GOAL: Increase SRT activation from the current baseline to >40% in patients admitted to the MICU with severe sepsis/septic shock by May 1st, 2012.

SCOPE: All adults with suspected infection and with systolic blood pressure <90 mm Hg, despite fluid challenge with 20 mL/kg body weight of crystalloid, and/or lactate level >4 mmol/L admitted to our MICU.

METHODS & RESULTS: Baseline compliance with SRT activation was 19%. Barriers to SRT activation were identified by a survey of relevant stake holders using the REDCap[®] instrument. Recurrently identified barriers were grouped as common themes using a Pareto chart. Specific interventions were undertaken to overcome identified barriers including: 1) Designation of charge nurse as lead person for SRT activation, 2) Stakeholder education directed at MICU residents and registered nurses, 3) SRT activation criteria pocket cards given to residents, 4) Targeted regular reminder emails to MICU fellows and residents, 5) Biweekly feedback on SRT activation, 6) Flyers about SRT & activation in MICU pods and break areas. Preliminary data suggests that the compliance in activating the SRT improved from baseline to more than 50%.

CONCLUSION: Ongoing project. Post-intervention data will be available by May 1, 2012.

Provider Nurse Rooming Model

Quality of Care and Health Outcomes

Ashley Proulx, MSN

After 20 years in practice the time to change became known as our patient satisfaction scores fell. After much foundational work to understand where are deficits were our number one focus was wait time. After creating a group and focus we began the strenuous activity of finding the starting point. The logical place to start was analysis of our process. Through value stream mapping, observational studies, time studies and creative thinking a new process of patient rooming emerged. Our process pairs a provider and a nurse together to provide optimum care to the patient during the visit.

Blood pressure improvement in the diabetic patient - A critical access hospitals approach

Quality of Care and Health Outcomes

Christopher Tourney, Industrial Engineer

In early 2011 Mayo Clinic Health System in Lake City designated a Quality Resources staff member to facilitate a diabetes care initiative. The facilitator works with a diabetes team. Their primary goal is to improve patient care by increasing Lake City's all or none diabetes Top 5 measures score. After assessing data, it was found that 46 percent of patients did not receive a second blood pressure reading if their initial blood pressure was equal to or greater than 140/90. Performing blood pressure re-checks after the patient relaxes and is accustomed to the appointment environment, often results in a lower reading.

Re-checks were only being completed less than 54 percent of the time, in spite of the chronic disease protocols requirement that a second blood pressure reading be performed with elevations of this nature. To improve compliance with the chronic disease protocol, the diabetes team implemented an educational program and established scheduled rounding with provider/nurse teams to share results from data collection. These performance reports detailed individual team compliance rates and were circulated to all department staff to ensure transparency.

As a result of the efforts by the diabetes team, three significant changes occurred. The percentage of blood pressure re-checks went from less than 54 percent to over 80 percent. Performing blood pressure re-checks resulted in lower readings 56.3 percent of the time. By improving compliance with blood pressure re-checks Lake City improved their diabetes Top 5 measures score from 22.1 percent in January 2011 to 42 percent in October 2011 which exceeded the MCHS goal of 39%.

Educating Future Physicians to Change Medical Culture- Patient Safety and Medical Quality Curriculum for Undergraduate Medical Students

Safety

Kariline Bringe, BA

Background: Undergraduate medical schools are lacking curriculum to educate students about patient safety and quality improvement. Major improvements in safety will be difficult to achieve without inclusion of these topics in the early stages of medical training. These topics can be effectively taught to medical students starting in their first year. An 18 hour introductory safety and quality curriculum was implemented which included didactics, readings, facilitated discussions, small group exercises, and simulation activities. Didactics included safety and quality improvement sciences, human factors, systems engineering, effective communication, teamwork, effects of error on the caregiver, role of quality in healthcare reform, and quality research.

Methods: Baseline quality and safety knowledge and attitudes were assessed by a pre-curriculum survey of all students. Basic knowledge scores significantly ($p < 0.0001$) increased post-curriculum. All students took the Mayo Clinic Quality Academy Bronze Exam, 85% passed. A Likert scale was used to assess student attitudes on 26 statements. Statement examples include: Sentinel event reporting systems do little to reduce future errors, After an error occurs, an effective strategy is to work harder to be more careful, and Disciplinary actions for staff are effective in preventing error. There was a significant change in student attitude post-curriculum.

Conclusions: Development of appropriate quality and safety curriculum for medical students is challenging. Effective curriculum must incorporate several learning modalities including didactics, simulation, small group sessions, and hands on learning. Inclusion of these topics in medical school curriculum will help foster the medical culture change needed to provide safe, high quality care.

Using a National Risk Adjusted Surgical Quality Database to Reduce Colorectal Surgical Site Infections: A Multi-disciplinary Approach

Safety

Gene Dankbar, MS

Surgical site infections (SSI) are a major cause of morbidity and contributor to mortality in the surgical patient. Also, they represent a major a significant driver of increased healthcare costs.

Colorectal surgery (CRS) is consistently associated in the literature with the highest SSI rates. The rate ranges between 3%-45%. No single intervention has been demonstrated to effectively reduce SSI.

The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) is a nationally validated risk-adjusted data collection mechanism that collects and analyzes clinical outcomes data for individual institutions.

The ACS-NSQIP collects data on nearly 140 clinical variables, including preoperative risk factors, intra-operative variables, and 30-day postoperative mortality and morbidity outcomes for patients undergoing major surgical procedures in both the inpatient and outpatient setting.

Risk adjustment occurs at a national level and performance is reported back to individual institutions to drive quality improvement.

A multi-disciplinary approach was formed to address the issue at Rochester Methodist Hospital. Interventions were implemented across the entire continuum of care: pre, intra, post-operative and post-hospital discharge. The SSI Reduction Bundle has helped reduce SSIs by over 60% and the improvements have remained steady for six months.

Improving Patient Safety in the First Hour Following Total Joint Replacement Surgery

Safety

Susan Heitman, RN, MS

Preventing complications in the immediate post-operative period is critical. The purpose of this project was to evaluate the current practice of having total joint replacement patients receiving spinal anesthesia with or without sedation bypass the Post Anesthesia Recovery Unit (PACU) or Phase 1 recovery in a Critical Access Hospital (CAH).

A retrospective chart review of 168 patients was conducted over a 6 month period. Data collected included age, body mass index (BMI), ASA score, Aldrete scores, vital signs, mean arterial pressure (MAP), type and length of surgery, estimated blood loss, oxygen supplementation, and incidence of nausea, vomiting, pain, and itching. Over 39% of the sample had an Aldrete score of less than or equal to 7 in the first post-operative hour. 19% had an MAP of less than or equal to 63 and 12.5% had an MAP less than or equal to 60. Patients with total hip arthroplasty and bilateral total knee arthroplasty had higher incidence of lower Aldrete scores and MAP than unilateral total knee arthroplasty patients. Most PACUs require a minimum Aldrete score of 8 for discharge. Because nearly 40% of the sample had Aldrete scores less than or equal to 7 within the first postoperative hour, patients having total joint replacement arthroplasty in a CAH need a higher level of nursing.

Modeling, Analysis, and Continuous Improvement of Rapid Response Operations in Acute Care: A systems Approach

Safety

Jingshan Li, PhD

Background: The number of potentially preventable hospital deaths in the US is astonishingly high. To improve patient safety and reduce hospital mortality, rapid response teams have been developed and implemented to provide a quick evaluation and treatment to patients with clinical signs of deterioration.

Method: We present a preliminary study on modeling, analysis, and continuous improvement of the rapid response operations in acute care delivery. Specifically, such a process is modeled as a complex network with split, merge and parallel structures. An analytical model is developed to evaluate the mean and variability of the decision time in the system, as well as the response-time performance, i.e., the probability that such a decision is made within a desired time interval. In addition, system-theoretic properties are investigated to provide directions for performance improvement. Continuous improvement methods have been developed to identify the bottleneck responses in rapid response operations, where the bottleneck response is referred to as the process impeding system performance in the strongest manner. In other words, the improvement of bottleneck response will lead to the largest improvement in system performance comparing with improving all other processes. Bottleneck indicators have been introduced based on the data collected from hospital information system.

Results: A case study at University of Kentucky Chandler Hospital is presented to illustrate the applicability of the method. Such a method provides a quantitative tool for healthcare professionals to analyze and improve rapid response operations in acute care delivery.

Looking in the Mirror: Provider Approachability

Safety

Karl Palmer, RN, MS

Background: Approachability feedback is a crucial component of medical staff professional development, yet often not adequately addressed by physician leaders. Teamwork, effective communication, and trust have been correlated with better patient outcomes and safer patient care. A 2010 Culture of Safety survey administered at Mayo Clinic Health System-Red Cedar (MCHS-RC), a twenty-five bed Critical Access Hospital and clinic, identified opportunities for improvement in regards to communication openness and staff's ability to speak up when an issue (including patient safety) was identified.

Methods: At the request of the MCHS-RC Patient Safety Committee, senior leadership and oversight committees endorsed an innovative method of providing medical staff with a safe mirror in which to view perceptions of their behaviors. All employees of the organization (including medical providers) were surveyed regarding the perceived approachability of each medical provider. Each provider received their results in comparison to blinded peer data, free-text comments and a list of opportunities for approachability self-improvement. A resurvey will be performed in late March, 2012.

Conclusions: According to our Medical Director, I am going to come away from this exercise believing this did more to facilitate communication between me and our staff than any other thing I have done in 6 years.

Learnings:

1. The majority of providers were perceived as very approachable
2. Outliers did exist
3. Comments must be filtered to provide emotional safety
4. Staff appreciated this exercise
5. Provider ratings of providers were congruent with ratings by non-providers
6. Most providers felt results were reasonable representations

A staff-driven fall prevention initiative on a cardiovascular unit at Mayo Clinic in Florida

Safety

Shin Park, MSN

A staff-driven fall prevention initiative on a cardiovascular unit at Mayo Clinic in Florida

Background: Falls are a global epidemic, increasing both serious injury and death (CDC, 2006). A major safety measure of the National Database of Nursing Quality Indicators (2010) is reducing the risk of patient harm which result from falls and to implement fall reduction initiatives, such as purposeful patient rounding, arms reach toileting, activating bed alarms and increasing staff awareness.

Mayo Clinic in Florida has implemented safety measures hospital wide. Despite consistent initiatives, the cardiovascular unit (CV) has one of the highest fall percentages in comparison to other inpatient units.

Methods: In addition to the above fall reduction plans, the CV unit implemented three unique staff-driven initiatives in their efforts to provide a fall free environment. The following three-part plan was implemented: setting realistic fall free days in 30 day increments, celebrating upon reaching each goal with incentives, such as food items and writing pens, and purchasing chair alarms specifically for the unit. Team leaders monitored for falls and recorded daily results on the Quality Board.

Conclusion: Findings show that chair alarms and celebratory incentives are effective and measurable. The fall rate data of Mayo Hospital (2012) revealed that falls on the CV unit have decreased from 3.8 per 1000 patient days in 2008 to 1.9 in 2011. These results have added support to nursing leaderships decision to place chair alarms in every patients room. This year-long project has lead to a culture change resulting in highly motivated staff members responding quickly to all bed and chair alarms.

Establishing a Clinical Research Indicator in the Electronic Medical Record: Enhancing Patient Safety

Safety

Alexa Richie, MPH

Background: Historically, there has not been an easy way to identify clinical trial patients who present to Mayo Clinic hospital or out-patient clinic for care. This introduced the safety concern that patients may receive contra-indicated care, resulting in harmful outcomes. In addition to the patient safety concerns, the absence of a standardized alert process raised a secondary concern that trial staff may be unaware of the patient visit. This could compromise the integrity of the trial protocol, or introduce potential reporting violations to the trial sponsor and/or the Food and Drug Administration.

Methods: In the fall of 2010, a lean team was established among Mayo Clinic Florida, and later Arizona staff, to create an indicator flag in the banner of the electronic medical record (EMR) to easily identify clinical trial patients. The team met with various end-users such as physicians, nursing staff, information technology, medical records and research staff to gather input on best practice of where to display the information and in what format. From these meetings it was determined that a stand-alone research folder and summary note would be created to provide a succinct overview of critical study-related information as well as study contact information to facilitate collaborative care.

Conclusion: The Research flag has been established in the EMR. From the indicator, a specific research folder and summary note were created to provide basic instructions for the treating physician as to the nature of the study, and whom to contact for collaborative care.

Upfront Review of the Patient Appointment Guide (PAG) Pre-procedural Instructions Quality Improvement Project

Safety

Rebecca (Becky) Smith, RN

Background: In May 2007, Mayo Clinic Systems & Procedures (S&P) leadership went to the Mayo Clinic Outpatient Practice Subcommittee (OPS) as a result of Sentinel Events, which prompted requests to revise inaccurate and outdated Patient Appointment Guide (PAG) instructions. Six Sentinel Events had occurred from 2002-2008 related to diabetes medication instructions.

In August 2007, OPS charged the Section of Patient Education (SPE) to develop a strategy to transition content oversight of PAG Section A instructions from S&P to SPE. A strategy was developed and endorsed by OPS on January 24, 2008.

A PAG Operational Oversight Workgroup, including representatives from Clinical Operations, SPE, IT, Nursing, Media Support Services and S&P, provided governance to overall PAG operations. The SPE team provided oversight and governance to content creation and revisions.

The specific aim of the project was to improve patient safety. The performance target was 0 Sentinel Events related to diabetes medication instructions.

Methods: The project team used Lean process mapping, standard problem solving frameworks (5 whys, brainstorming, and PDSA cycles), standard Six Sigma method, timelines, and reports showing staff time and progress.

Conclusions: SPE completed >11,000 reviews of existing PAG instructions. Reviews were conducted through clinical practice meetings involving hundreds of providers, clinical operations, legal, and S&P staff. A mapped process with standard operating procedures (SOP) was developed. Physician sign-off on PAG content was secured. Version control was established. A new 2-year content review cycle was launched in first quarter 2012. The project goal was achieved. No Sentinel Events associated with diabetes medication instructions have been reported since implementation of new provider and patient education materials, and new PAG instructions on March 13, 2009 (MC6346 and MC6346-02).

Uncovering Patient Safety Issues with a Web-based Safety Event Reporting Tool: Improving Post-Sedation Assessment for MRI Patients

Safety

Stacy Schultz, BA

BACKGROUND: A significant safety liability exists when a sedated patient leaves a facility without being properly assessed as they could pose a danger to themselves or others. This study describes improvements made to our practice that have ensured sedated MRI patients are properly assessed prior to dismissal.

METHOD AND MATERIALS: Several events involving sedated patients leaving a specific MRI location without completing their post-sedation assessment were reported to our web-based Radiology-specific event reporting system. A workgroup of frontline staff performed a Failure Modes and Effects Analysis (FMEA) to identify the root causes of these events. Plan-Do-Study-Act (PDSA) cycles ensued, generating processes that led to a significant decrease in non-assessed patients leaving the department.

RESULTS: The initial FMEA identified a process change in nurse electronic charting at this MRI location that led to unreliable routing of patients for post-sedation assessment. This charting change was to be spread to the entire department. Also, there was no procedure in place to independently identify sedated patients.

The initial PDSA cycle concentrated on an attempted process flow in which the patients MRI Safety Form would be labeled indicating the sedation. This form was to be placed in the patients personal bin and checked after the MRI. During the first week 100% compliance was achieved. Over the following 3 weeks success declined to 86.5%, with decreased performance found to be related to the MRI safety form not being reliably retrieved at the completion of the exam.

The workgroup reconvened and a second PDSA was started. This approach involved a visible identifier of sedated patients with an armband of the same color as the sedation label placed on the patients MRI Safety Form. After 1 week 100% compliance was again achieved. This process has been well accepted by staff and over an 8-week period, there was a 98% success rate. Improved labels and matching armbands were subsequently designed that state "Needs Radiology Nurse Dismissal" and these are now available at all MRI imaging locations. Follow-up data analysis continues to show an improved success rate.

CONCLUSION: Utilizing patient safety event data and involving frontline staff using quality improvement tools can significantly improve patient safety. This process led to improved frequency of post MRI sedation assessment.

Medication bar-scanning - a Critical Access Hospitals approach to increasing compliance.

Safety

Adrian White RN, MBA

Mayo Clinic Health System (MCHS) introduced an Electronic Medical Record in March 2010, a component of which was a hand-held barcode scanner (Caremobile) for use in medication administration. Six months after implementation, the compliance rate for scanning medications dropped from 66% to 19% at MCHS - Lake City. To address this, a multidisciplinary team composed of nursing, pharmacy, information management, surgical services, process improvement and quality was formed in Lake City. A detailed review identified the multiple problems that allowed users to circumvent safety stops. This process hampered safe medication administration, led to high numbers of manual medication overrides, and near-miss events from incorrect medication dosing. Barriers to appropriate barcode scanning included: equipment malfunctions, slow wireless network speeds, delays in pharmacy profiling medications and a perception that scanning medications was optional. Equipment, technology, process, accountability and educational solutions were identified and implemented throughout the facility using a Fair and Just Culture approach. Monthly performance reports detailing individual compliance rates for all staff were posted in the work units. Information management installed additional devices and pharmacy reduced the time for profiling medications. Overall compliance with barcode medication administration rose from 59% in December 2010 to 88% in January 2012.

The Power of Collaboration & Team Communication

Service

Kim Andre, LPN

The Orthopedic Center wanted to improve the overall patient satisfaction without decreasing the care providers scores utilizing the use of Press Ganey.

Hence, we developed some Plan-Do-Study-Act(PDSA) to be able to acheive this goal. First of all, we wanted to understand our patients "true" wait times and understand the specific delays causing these wait times. Secondary, we dramatically increased our good will gestures when there was the unfortunate service breakdown. Also, Acknowledge,Introduce,Duration,Explanation,Thank you(AIDET) was "hardwired" with patient care staff, schedulers, and providers within the department. A resource was found that could provide the comments written by patients in the Press Ganey surveys for everybody in the department to read. Amazing what people have to say about their care and experience in the Orthopedic Center.

Finally, we looked at our PDSA results to find out that the Press Ganey scores had improved making all the challenges and hurdles throughout the months worth all the hard work.

Using Simulation to Optimize Just-in-Time Blood Delivery

Service

Erin Brach, BS

As part of Mayo Clinics initiative for blood processing in surgery, a sub-group called ReBARS was formed to implement a just-in-time blood delivery system: controlled access refrigerators located within the surgical suites and medical floors. These refrigerators, called HemoSafes, provide quicker access to blood than the current method of getting blood from the blood bank. As part of this project, locations for the HemoSafes were assessed for “best placement” based on predicted usage and associated time savings.

A travel study was performed to determine the amount of time spent traveling to get to the blood, have it issued and get the blood to the patient. A simulation model was created using the Process Model software application to simulate the current state. Requests for blood by floor locations were assigned in the model based on the historical distribution for blood products issued. From the data collected in the travel study, process steps were assigned timings in the model using a triangular distribution. Potential future states were evaluated by creating a second simulation model which placed the HemoSafes at potential locations in the model as alternate locations to the blood bank. The time savings between current state and future state were compared.

Comparing the time savings enabled the team to select the best locations for the HemoSafes. The locations selected as a result of this analysis are in close proximity to the highest usage areas and will provide the biggest time savings for staff as they administer blood products to the patients.

Business Consulting and Systems Engineering Tools, Methods and Constructs to Support Patient-Centric Health Care

Service

Amy Donahoe-Anshus, BA, MS

The vision of the Systems & Procedures (S&P) Division is to be Mayo Clinics premier business consulting and systems engineering team. S&P aligns its consulting services with the strategic direction and priorities of Mayo Clinic. To ensure consistent, excellent consulting services, S&P staff must have a spectrum of tools, methodologies and constructs to support local and system-wide efforts. These also must support narrow to broad initiatives and qualitative to advanced analytic methods. S&P has developed a robust process and structure to proactively research, procure, develop, implement, integrate and sustain various tools, methodologies and constructs to support and leverage its diverse staff. This poster will demonstrate the value of this approach and will highlight how S&P proactively builds and sustains a robust platform to help run, grow and transform the organization to deliver high-quality, cost-effective and consumer-focused health care.

Orientation to the ICU Increases Family Satisfaction

Service

Jean M. Holubar, BSN, RN

Background: Critical illness can stress the coping mechanisms of the family unit. Lack of knowledge increases stress levels and anxiety. The literature supports that providing education to family members of patients who are in the ICU can decrease anxiety, psychological distress, and promote trust and confidence in the care team. We recognized a standardized orientation program for families educating them to the ICU environment was not available. The purpose of this quality improvement project was to establish a standardized ICU orientation program for families.

Methods/Strategies: Using available educational tools, a standardized family orientation program was developed. Included in the education was the Introduction to the ICU video, unit tour and an individualized time with an ICU RN to address questions. A family satisfaction survey was given to each family after the orientation.

Conclusion: Survey results showed 86% of families were very satisfied with the education provided. Sixty seven percent of the families strongly agreed with the statement that the orientation made them more comfortable with the ICU environment. Preparing families for what to expect in the ICU reduces their fear and anxiety. Providing knowledge through a standardized orientation program for families enhances the ICU experience, contributes to the development of trusting and supportive relationships with the ICU staff and promotes patient-centered care.

MCHS Albert Lea Pharmacy Service Collaborative

Service

Tonia Lauer, MBA

MCHS Albert Lea's Department of Pharmacy made significant changes to work flow in order to improve both patient and staff satisfaction.

A Pharmacy team consisting of frontline staff participated in the 2011 Service Collaborative: The team's AIM was to improve the patient's perception of service outcomes from staff in the Outpatient Pharmacy Department by improving the patient satisfaction related to friendliness/courtesy of staff. Their countermeasure was wait times

The team was able to introduce and imbed improvements that resulted in a almost 6 points of improvement from the baseline survey through the end of the collaborative. Wait times were not impacted by improving the patient's satisfaction with the friendliness and courtesy of staff.

Collaborative practice agreements between pharmacists and surgical teams: optimizing medication management in hospitalized surgical patients

Service

Jenna K Lovely, PharmD, BCPS

Background: Pharmacist interventions to improve medication safety and efficacy normally occur. This review evaluated the outcomes associated with Collaborative Practice Agreements (CPA) between pharmacists and surgeons. CPA assigns decision rights to pharmacists to fully utilize the extent of their education, experience, and insight to provide optimal patient care to hospitalized surgical patients.

Methods: Initiation of CPA involved implementation of a new organizational design via a phase-in approach. Outcomes assessed include pharmacist interventions, time to decision making and admission medication reconciliation. Data was obtained from a prospectively maintained database, the electronic medical record and compared between CPA and non-CPA groups. Rule-based interventions, computerized prompts that alert the pharmacist and non rule-based interventions, those which require cognitive application of patient-centered care, were compared. Stakeholder feedback was obtained informally and via survey.

Results: For the 135 patients eligible of CPA, 417 pharmacist interventions for medication optimization (3.1 per patient episode) occurred. This compares to 537 pharmacist interventions for 305 patients (1.8 per patient episode) without CPA. Rule-based interventions were 5 % (21/417) in CPA versus 41.2% (221/537) non-CPA. Stakeholder feedback showed > 90% found the additional service valuable and would recommend to other teams. Admission medication reconciliation was completed for 100% (135/135) of patients under CPA versus 72% (220/305) in non-CPA.

Conclusion: Establishing CPA as a new organizational design represents one model to improve medication management in hospitalized surgical patients. CPA allows expansion of value added pharmacist services and may be readily implemented in other high functioning teams.

A Picture is Worth a Thousand Words

Service

Pamela M. Maxson, PhD, RN, ACNS-BC

Background: Transitions of care from acute care to long-term care are critical, especially for patients with complex wounds. Evidence shows system factors including inadequate or incorrect handoff information, staff knowledge deficits regarding the patients care needs, and inadequate time for discharge teaching can negatively impact a patients care transition. Receiving facilities depend on complete and accurate information to adequately follow through with the patients plan of care. Complex wound care is particularly difficult due to the need for elaborate description of the wound and its cares. When information is fragmented, incomplete or misunderstood, there may be adverse outcomes. Improving coordination and handoff of care has received national attention.

Methods/Strategies: Using a clinical camera and medical photography resources, we developed a wound care album for staff to ensure an accurate and complete transition to meet the patients wound care needs. The album included supplies, a picture and instructions of every step in the dressing change process and a business card of the clinical nurse specialist managing her wound.

Conclusion: The photo album gave the patient and discharging RN reassurance the wound care would be clearly communicated. The receiving staff were extremely satisfied with both the written and visual handoff communication. It prevented inconsistencies in caring for this patients complex wound and serves as a point of reference for resolution or progression of the wound. Photos, combined with written instructions, enhances communication for managing complex wounds. It improves care transitions and positively impacts patient safety, patient and staff satisfaction.

Frontline Solutions: Four Service Improvements Identified and Implemented by Scheduling and Registration Staff

Service

Karl B. Palmer, MS, RN

Background: MCHS-Red Cedar has been utilizing a staff-driven, lean-based method of process improvement called Frontline Solutions for the past three years. This poster will describe four improvements identified and implemented by frontline scheduling and registration staff, all of which affected staff and patient satisfaction.

Methods: Frontline staff received 8 hours of training and ongoing coaching in direct observation problem identification and A3 problem solving. During direct observation of their departments work, they identified opportunities for improvement, worked with peers to identify root causes and solutions, and implemented new processes.

Conclusions: Through empowerment, resourcing, and support, scheduling and registration staff:

- reduced obstetric patient waiting for armbands and paperwork (which reduced time before medications could be administered and admission processes completed)
- eliminated cases of confusion regarding who (patient, family, other) should pick up paper prescriptions
- eliminated the practice of pediatric patients being moved from clinic exam rooms to have blood drawn in a lab area where their crying was disruptive to the child and other patients
- improved wayfinding signage for clinic patients

Frontline Solutions staff report high satisfaction with their work and feel like they have more influence over their work environment.

A patient-centered approach to improving care in the Pediatric Aerodigestive Practice

Service

George Then, MBA

The pediatric aerodigestive project team is committed to developing a patient-centered practice to improve the care of children with complicated feeding, swallowing and breathing disorders. Establishing a Patient Family Advisory Council (PFAC) and incorporating meaningful customer involvement at strategic points of its Define, Measure, Analyze, Improve and Control (DMAIC) improvement journey has enabled the team to:

1. Prioritize improvements that matter to the patients
2. Facilitate stakeholders' acceptance of required changes
3. Obtain leadership support for proposed improvements

During the Define phase, the PFAC augmented the team's own evaluation of current state by providing uninhibited customer perspectives on what worked well and didn't at the Mayo Clinic and other facilities where they had received care. They provided new ideas that the team had not previously considered and helped the team understand patient and family priorities which may be different from those of the providers. In doing so, the PFAC helped define improvements needed to make the Mayo Clinic aerodigestive practice best-in-class.

During the Improve phase, the PFAC performed the œacid test when they returned to review the team's proposed future state process design. Again, family members quickly identified potential shortcomings in the plan and helped drive changes which would improve customer satisfaction.

Empowering the patient and family, through the PFAC, to participate actively in developing the future care model, ensured that the voice of the customer was truly heard and acted upon in this CPC-sponsored project. In an Institution where the interests of the patient come first, taking this approach just seems natural.