



UC Health

Center For Health Quality And Innovation

UNIVERSITY OF CALIFORNIA OFFICE OF THE PRESIDENT



UC CENTER FOR HEALTH QUALITY AND INNOVATION

Grant Abstracts and Outcomes 2010-2016

February 2017

GRANT ABSTRACTS and OUTCOMES

2011 CHQI PI's

LOCATION

UCSF

PRINCIPAL INVESTIGATOR

Jeff Belkora, PhD

PROJECT TITLE

The Patient Support Corps: A Service Learning Program for Improved Care and Education

ABSTRACT

We seek to establish a service-learning partnership, the Patient Support Corps (PSC), between UC Berkeley (UCB) and the UCSF Medical Center. UCSF patients will benefit from supportive services provided by UCB students, thereby enhancing the patient-centeredness of care at UCSF, while pre-health students at UCB will be oriented to professional and humanistic attitudes, advanced communication skills, and enhanced knowledge of patient-centered care concepts. Funding for the PSC will enable UCSF to design a program to maximize the benefits for UCSF patients and UCB students and to hire pre-health students from UCB to act as paid patient support staff. This proposal expands on an innovative form of patient support pioneered by the UCSF Breast Care Center in its Decision Services unit (www.decisionservices.ucsf.edu). This unit uses ten paid, part-time premedical interns to support patients. Patients want to be informed and involved in their own care, but report that they get “conflicting information” before their visits and then “forget to ask questions” and that “information goes in one ear and out the other” during their visits. The premedical interns address these patient needs by connecting patients with appropriate information, such as DVDs, booklets, or websites, typing up patient questions for physicians to review before the appointment, and accompanying patients to their visits, which the interns document by audio-recording and taking notes on a laptop. We intend to serve more UCSF patients by hiring more UCB students to act as patient support staff. As such, we aim for the following: (1) To design a Patient Support Corps (PSC) program to deploy UCB students in patient support roles at the UCSF medical center; (2) To pilot test the PSC at the UCSF Medical Center by implementing and evaluating the PSC in the Breast Care and Joint Replacement Centers; and (3) To plan the dissemination of the PSC to other UC Medical Centers.

Outcomes:

1. Patient Support Corps replicated at Dartmouth and in local hospital in southern California.
2. Feasibility study demonstrated that our adapted training materials and program practices were sufficient for deploying student interns alongside the existing staff interns in our Breast Care Center program. The student interns successfully accompanied patients and produced high quality question lists, notes, and recordings.

LOCATION

UCLA

PRINCIPAL INVESTIGATOR

Bruce Dobkin, MD

PROJECT TITLE

Wearable Sensors with Activity-Pattern Recognition Algorithms Detect the Type, Quantity and Quality of Daily Activities and Exercise in the Community: A Wireless Health Strategy to Improve Chronic Care at Low Cost

ABSTRACT

Stroke is the most common cause of neurological disability in adults; 7 million Americans live with its complications.

The Ronald Reagan UCLA Medical Center admits 400 patients per year with acute stroke, 240 of whom are eventually transferred to the inpatient rehabilitation unit after prolonged ICU stays. These patients have marked deconditioning and muscle weakness from disuse and a catabolic state, in addition to neurological deficits. If patients with stroke recover

the ability to walk without physical assistance, their walking speed usually falls well below functional levels of >0.6m/s. Long hospital stays only serve to worsen the problem of regaining the ability to walk for stroke victims, in that bed rest alone contributes to muscle decline. This study seeks to shorten the length of inpatient stroke victim hospital stays while improving stroke victims' abilities to better muscle strength and ultimately regain the ability to walk. We will achieve these ends by implementing a wireless system by which clinicians can monitor patient progress in muscular improvement and exercise remotely, enabling patients to leave the hospital sooner while still staying under their physicians' care. We will employ wireless health innovations developed by UCLA's Wireless Health Institute (WHI) to monitor patients' fitness at home. To do accomplish this goal, participants will be trained to use the UCFit, a portable pedaling device for resistance and conditioning exercise of the arms and legs. We, in turn, will use our recently validated Medical Daily Activity Wireless Network (MDAWN) of sensors, such as triaxial accelerometers and microgyroscopes, and novel movement pattern- recognition algorithms to monitor home exercise, provide feedback, and obtain real-world, clinically meaningful outcome measures of activity. In sum, we aim to: (1) Improve the coordination of care to lessen acquired disability of inpatients and improve the transition from hospital to community care; (2) Improve the quality, patient safety, and satisfaction by reducing complications of immobility, walking-related disability, and falls, and by enabling more functional activities of daily living; (3) To engage patients and families in patient-centered decision-making about progressing activity and exercise which may increase self-efficacy and reduce caregiver stress; (4) Improve access to activity monitoring and post-hospital exercise to reduce risk factors for chronic diseases and hospital readmission; and (5) Spread MDAWN methods and infrastructure throughout the UC system.

Outcomes

1. Through Wireless Health Institute at UCLA, four clinical research groups have adopted activity-recognition sensors and algorithms.
2. Clinical trial demonstrated the feasibility of gathering reliable data from wearable sensors and from the exercise pedaling device, the UCFit.
3. Found a gradually progressive increase in daily use of the UCFit and in walking speed and distance in 11 participants.
4. Ankle sensor system accurately revealed the daily activities of 110 inpatients during stroke rehabilitation in a multicenter study that parallels the inpatient portion of the CHQI study.
5. UCFit was adopted for resistance pedaling in bed by the 24-bed Medical ICU at the Reagan UCLA Medical Center.

LOCATION

UCSD

PRINCIPAL INVESTIGATOR

Gregory Maynard, MD, MSc - 2013 QERM

PROJECT TITLE

CHQI Project (M-5): UC Collaborative to Reduce Hospital Acquired Venous Thromboembolism (HA VTE); Stop the Clot (5-CAMPUS)

ABSTRACT

Pulmonary embolism (PE) and deep vein thrombosis (DVT), collectively referred to as venous thromboembolism (VTE), represent a major public health problem, affecting hundreds of thousands of Americans each year. VTE is primarily a problem of hospitalized or recently hospitalized adults and PE is among the most common preventable causes of hospital death. Each year, over 1,000 patients suffer from hospital acquired VTE (HA VTE) in the five UC hospitals. Pharmacologic methods that can prevent VTE are available, cost-effective, and endorsed by prominent guidelines. However, these methods are underutilized, with only 30-50% of eligible patients receiving prophylaxis. Most UC hospitals do not even know the percentage of their patients receiving appropriate VTE prophylaxis (VTEP). Even when clinicians order VTEP, there is frequently a failure in the administration of VTEP. Public reporting and reimbursement changes are being put into place to reflect the magnitude of this issue as a public health issue (e.g., CMS has designated VTE a “never event” after total joint replacement, withholding higher payment for the incremental expense of a VTE complication). We propose a UC-wide effort to address and overcome barriers to VTEP implementation, with the goal of achieving optimal VTEP in our adult medical/surgical inpatients and securing a reduction in HA VTE at UC hospitals by at least 20%. We aim for the following:

- (1) To build a UC-wide VTI QI collaborative that will focus initially on HA VTEP, but provide a longer term collaborative structure useful for a wide range of QI/research projects; (2) To measure the quality of VTEP throughout the hospital by assessing the adequacy of the ordered VTEP, measuring the actual delivery of the ordered VTEP, and ascertaining the incidence of HA VTE; (3) To intervene to improve the quality of VTEP, using a variety of methods and a QI framework proven successful in prior national collaborative efforts, such as the implementation of measure-vention techniques. Real-time measurement identifies potential non-adherents to VTEP guidelines and spurs concurrent intervention; and (4) To cooperatively collect data that will better define risk factors for HA VTE and post-discharge VTE, and serve as a focal point for related research and QI efforts.

Outcomes:

1. **Overall hospital associated PE / leg DVT are reduced 24% between 2011 and 2014.**
2. Built a hospitalist-led quality improvement collaborative which addressed HA VTE, and provided a longer term collaborative structure useful for a wide range of quality improvement projects.
3. Established common measures and data collection, implemented order set in Epic and revised other order sets.
4. Measured the quality of VTEP (prophylaxis) throughout the hospital, assessing the adequacy and reliability of ordered VTEP, and HA VTE incidence, automated measurement of VTEP and daily identification of patients on inadequate prophylaxis
5. **Prevented VTE occurrences result in annual estimated savings of \$1.9 million in short term cost savings, likely more with avoidance of recurrent VTE, post-thrombotic syndrome, long-term anticoagulation costs/complications.**
6. Adoption of CHQI intervention at Dignity and Sutter systems with similar success
7. Recognized as one of eight 2015 HA-VTE Prevention Challenge Champions by the US Centers for Disease Control and Prevention

LOCATION

UCSD

PRINCIPAL INVESTIGATOR

William Perry, PhD - 2014 Fellow

PROJECT TITLE

UCSD Patient-Centered Recovery Program: Reducing E.R. Recidivism and Length of Stay Among Patients with Co-occurring Psychiatric and Substance Abuse Disorders

ABSTRACT

Patients with co-occurring substance abuse and other mental disorders (COD) have a significantly higher mean number of emergency room visits. These patients tend to be more symptomatic, have multiple health and social problems, and require more costly care. Further, according to the Center for Health Care, addiction and schizophrenia are among the top predictive factors for hospital readmissions within 30 days among fee-for-service Medicaid beneficiaries. Patients who are repeat users of emergency services tend to be individuals who are unemployed, disorganized, and/or homeless and have difficulty following through with recommended discharge plans, especially when they are placed on long waiting lists or required to make repeated phone calls to obtain services. These factors underscore the need for an innovative and fully integrated approach to ensure that patients with COD are assisted in discharge planning and not lost to follow up care. To address this growing crisis in health care delivery to patients with COD, UCSD proposes an innovative program called the Patient-Centered Recovery Program (UCSD-PCR). The UCSD-PCR will expand the continuum of care by filling an important service gap. The UCSD-PCR is designed to reduce visits to emergency rooms and readmissions to inpatient hospitals by providing Screening, Brief Intervention, and Referral to Treatment (SBIRT) services and a patient-centered recovery and case management program which include community outreach. SBIRT and the case management team will help patients arrange outpatient treatment options. Currently, patients with COD have to navigate a complicated and fragmented system that includes outpatient mental health treatment, substance abuse treatment, primary medical care treatment, and social services agencies—none of which are available at the time of the Emergency Room visit. The UCSD-PCR will extend the SBIRT model to patients evaluated for COD in the UCSD Emergency Room or evaluated as medical inpatients at UCSD Medical Center through the UCSD Psychiatry Consultation Service. We aim: (1) To train clinicians and community health representatives to work alongside psychiatry faculty in conducting initial substance use screenings to determine level of risk; (2) To develop a comprehensive discharge plan process which will identify level of treatment needed post discharge, determine medical co-morbidity, and make referrals to the patient's medical home where their medical needs can be best managed; (3) To utilize the tools embedded within the electronic health record to assist in both identification of post-discharge needs as well as ensuring the secure transmission of core discharge information to the next provider of care, either in the medical or social service domain; (4) To train UCSD-PCR staff in motivational interviewing approaches in order to educate patients on the risks and benefits of current substance use; and (5) To identify patients who cannot be linked immediately to services post-discharge and enroll them in a 90 day intensive case management at the COD Integrated Treatment and Recovery Program at the nearby UCSD Outpatient Psychiatric Clinic (UCSD-OPC).

2011 Outcomes:

1. **80% of PCR patients placed in crisis houses did not return to ED for six months**
2. **Generated \$300,000 in savings and achieved an overall ROI of 3.8.**
3. **The UCSD-PCR has reduced the average ED LOS of psychiatric patients 9.1 % and reduced 30-day psychiatric patient recidivism by 15.3% all within the context of a 50% increase in new psychiatric patients coming to the ED for care.**

LOCATION

UCSF

PRINCIPAL INVESTIGATOR

Robert Rodriguez, MD

PROJECT TITLE

Decision Support for Chest CT in Blunt Trauma in the Emergency Department (5-CAMPUS)

ABSTRACT

A desire to avoid missed injuries and the advent of widely available, rapid computed tomography (CT) scanning have contributed to a multi-fold increase in CT use and led to the adoption at many trauma centers of complete head to pelvis CT “pan-scan” protocols for blunt trauma evaluation. This is a low-yield practice; few injuries detected are clinically significant and most of these injuries do not change patient management. The incremental use of CT in trauma has led to: 1) exposure of potentially harmful ionizing radiation to a disproportionately young patient population, 2) increased costs, and 3) greater time in the emergency department (ED), exacerbating ED over-crowding. The financial costs of “pan- scan” protocols are significant. The charge for the performance and interpretation of trauma chest CT at San Francisco General Hospital is \$2,875 and expenditures for CT imaging exceed \$2 billion annually. We seek to limit the financial and medical costs of excessive CT imaging by developing a decision instrument (DI) that reliably identifies those blunt trauma patients who are (and conversely those who are not) likely to benefit diagnostically from chest CT. The long-term goal of this research is to reduce unnecessary chest CT in blunt trauma patients, thereby conserving resources and decreasing unnecessary radiation to patients. To achieve this goal, we will construct and validate a DI for selective chest CT scanning in blunt trauma. This DI will use clinical criteria to identify patients who have “virtually no likelihood” of management changing chest injury (MCCI) on chest CT. The DI will reduce CT utilization in the following manner: When evaluating a blunt trauma patient, the clinician will look for clinical criteria A, B, C, and D (the criteria comprising the DI). If the patient meets these criteria, he has virtually no risk of having MCCI and the clinician may forego chest CT.

Outcomes:

1. Derived and validated the NEXUS Chest decision instrument, which may safely reduce the need for chest imaging in blunt trauma patients older than 14 years.
2. NEXUS Chest had a sensitivity of 98.8%, a negative predictive value of 98.5%, and a specificity of 13.3% for TICl. The sensitivity and negative predictive value for thoracic injury seen on chest imaging (TICl) with clinically major injury were 99.7% and 99.9%, respectively.
3. Decision instruments designed to reduce use of CT imaging now being incorporated into trauma imaging protocols

LOCATION

UCD

PRINCIPAL INVESTIGATOR

Ulfat Shaikh, MD, MPH, MS

PROJECT TITLE

Integrating Patient Care and Health Professions Education to Improve Care Transitions: The UC Healthcare Quality Improvement Network (5-CAMPUS)

ABSTRACT

This proposal seeks to create a learning network that brings together teams from all University of California medical centers to work together on improving processes, practices, or systems in focused topic areas, to learn from their collective experiences, successes, and challenges. Quality improvement networks (QIN) improve patient care processes, as well as clinical outcomes, and can enhance the delivery of care during transitions of care at discharge. The proposed UC QIN will integrate significant trainee involvement, as trainees are at the frontlines of patient care. We seek to devote our attentions to the transition of care at hospital discharge because of the frequency of fragmentation of care following discharge, which leads to poorer patient outcomes and readmissions. We intend to improve the transition of care through the use of the BOOST (Better Outcomes for Older adults through Safe Transitions) toolkit. The UC Health QIN is an innovative collaboration that will focus on integrating educational excellence with adult and pediatric care delivery improvement in a five-campus QI learning network. The UC Health QIN's first project will be to implement the BOOST toolkit and better practices for transition of care. This initiative addresses the urgent need to improve patient safety at hospital discharge and to reduce preventable readmissions, integrated with the current emphasis on incorporating quality and safety principles in the education of trainees who will be expected to lead care in the future. We aim: (1) To demonstrate the feasibility and effectiveness of the UC Health QIN in improving transitions of care for adults and children during hospital discharge. The objective of the QIN interventions is implementation of the BOOST toolkit combined with team training and trainee and faculty development to improve hospital discharge processes and patient outcomes; (2) To evaluate trainee education and experiences in the UC Health QIN; and (3) To adapt the BOOST toolkit to children and adolescents. An expert panel of pediatricians, nurses, and patient advisors will adapt the BOOST toolkit to increase its applicability to children and adolescents who are medically complex, hospitalized outside their local community, lacking a medical home, and experiencing socioeconomic or cultural barriers to care.

Outcomes:

1. All 5 UC sites in the project implemented projects involving faculty, trainees and front-line staff to improve transitions of care at hospital discharge.
2. Approximately 1000 learners at the 5 UC medical centers were enrolled three one of three courses, Introduction to Healthcare Quality, Patient Safety, and Transitions of Care.
3. The Pedi-BOOST toolkit was developed and peer-reviewed by the Society for Hospital Medicine.
4. Parts of program used in new certification program in health system improvement at UCD and UCLA, program sustained at UCI and spread to multiple residency programs, helped lead to creation of chief medical resident for quality at UCSD.

LOCATION

UCSF

PRINCIPAL INVESTIGATOR

Rebecca Smith-Bindman, MD

PROJECT TITLE

Standardization and Optimization of Computed Tomography Patient Radiation Dose Across The University of California Medical Centers (5-CAMPUS)

ABSTRACT

The number of computed tomography (CT) examinations quadrupled between 1994 and 2007, rising to 186 exams per 1,000 people in 2007. Despite this dramatic increase, there are no standards for dose protocols. CT delivers substantially higher radiation doses than conventional X-ray imaging. As a result, patients have been medically exposed to significantly higher amounts of ionizing radiation. In addition to the general rise in dose exposure, CT doses are also highly variable. Radiation doses received for the same type of procedure can vary by 20 times or more, both within and across institutions.

There are few published studies describing current radiation doses associated with CT; there are no clear standards for appropriate or acceptable clinical imaging protocols. All of these factors suggest that standardizing and optimizing CT protocols will improve safety by reducing patient radiation dose. Consensus is growing both within academia and the broader lay community that efforts are needed to ensure that patients receive the lowest radiation dose possible to produce the necessary medical benefit. However, the safety of CT cannot be achieved without more information quantifying current exposures and describing how this varies by indication. The goal of this project is to standardize and optimize CT protocols by filling in key gaps in our understanding of radiation associated with CT in order to inform the creation of quality standards and guidelines across all University of California (UC) Medical Campuses. We aim: (1) To create a collaborative working group across the UC Medical Centers, including physicists and radiologists from each campus. This group will meet regularly and frequently to carry out the aims of the project; (2) To optimize, standardize, and audit CT imaging protocols across UC campuses, with the goal of standardizing and optimizing doses used across manufacturers, platforms, and institutions and reducing the number of different protocols and the dose within each protocol; (3) To educate UC Medical Center physicians, physicists, and technologists on radiation dose optimization through the creation of a series of continuing medical education courses; (4) To assess the impact of strategies of lowering radiation dose by assessing the dose delivered to consecutive patients who underwent CT by age, anatomic area, and indication at baseline (2011) and following efforts described above (2013). This will include the creation of audit reports by technologist, physician, and institution to help guide future efforts at auditing and assessing radiation dose; and (5) To develop a strategy of reporting CT radiation dose information in the medical record in an efficient manner that will enable the UC Medical Centers to respond to and comply with SB 1237, which requires health care providers to collect and record all radiation dose information beginning in 2012.

Outcomes:

1. Radiation doses used for CT show an overall improvement and lowering of doses used for CT.
2. **Measured 33% reduction in Head CT (measured in Effective Dose), a 26% reduction in Chest CT dose, and a 23% reduction in Abdomen/Pelvis CT dose across sites since January 2012.**
3. Creation of ongoing Radiation Safety Quality Assurance workgroups at UCSF.
4. Collaborators are now interested in looking at dose optimization for other modalities and are considering shared strategies for clinical decision support for the ordering of tests.

LOCATION

UCI

PRINCIPAL INVESTIGATOR

Elizabeth Turner, MD - 2013 QERM

PROJECT TITLE

CHQI & QERM Project: Implementation of Bedside Ultrasound Training (2-CAMPUS)

ABSTRACT

In recent years, there has been an exponential increase in the literature in support of the use of bedside ultrasound to improve patient safety, particularly for procedures such as central venous access (CVC), thoracentesis, and paracentesis. Bedside ultrasound involves portable ultrasound examinations performed and interpreted by the physician at the point-of-care in real time. Studies demonstrate significant improvement in iatrogenic complications, infection rates, and ultimately better patient outcomes with the use of bedside ultrasound. Currently, however, there is no standardized training in point-of-care ultrasonography for residents or attending physicians. The demand for training is high, and inadequate training programs are in place, if any at all. As of Fall 2010, UC Irvine medical students have been exposed to a cutting-edge, integrated curriculum that includes specific training on the use and interpretation of bedside ultrasound. The majority of UC Irvine house-staff, fellows, and attending physicians who will be direct supervisors of these students have not been exposed to formal, organized training in point-of-care ultrasound. Until a hospital-wide ultrasound curriculum is instituted in a longitudinal fashion, the medical students will not have clinical mentors or adequate guidance to continue their education in the proper use of this powerful diagnostic tool. More importantly, the patients at the UCI Medical Center are not currently receiving the highest level of evidence-based care with the underutilization of bedside ultrasound technology. This project seeks to create a formal curriculum for bedside ultrasound training in order to best serve UC Irvine patients and students.

Outcomes:

1. Created nurse-developed metric to assess patient perception and satisfaction regarding ultrasound.
2. Trained 14 pulmonary and critical care fellows and cardiology fellows.
3. Simulation equipment from the grant is being used by multiple departments to help train house staff and attending physicians. Infrastructure to support bedside ultrasound is being enhanced to enable proper archiving and quality assurance of images.

LOCATION

UCLA

PRINCIPAL INVESTIGATOR

Catherine Walsh, GNP & Teryl Nuckols, MD, MSHS

PROJECT TITLE

Individualizing Assessments of Risk to Reduce Falls in UC Hospitals (2-CAMPUS)

ABSTRACT

Falls during hospitalization can lead to serious injuries and death. Approximately 30% of falls cause injuries, including bruises, lacerations, fractures, intracranial bleeding, and even death. In addition to the physical suffering of the patients, these injuries can have a substantial impact on hospitals. Serious injuries increase the length of stay, for which hospitals may not even receive payment. The California Department of Public Health can also fine hospitals for deaths related to falls. We propose a project to develop educational programs to train nurses, physicians, and physical therapists about the 5P method, implement the 5P Method at Santa Monica UCLA Medical Center (SMMC) and UCSF's Moffitt-Long Hospital Complex (MLHC), assess its effectiveness at those hospitals, and examine the cost implications for the hospitals. Finally, the project will disseminate the educational program and results to the other three UC hospitals and nationwide. In sum, we aim: (1) To develop education programs for nursing staff, physicians, and physical therapists that will facilitate the implementation of the 5P Fall Prevention Method to hospitals that have not used it before; (2) To implement the 5P Method for the first time at SMMC and MLHC, using the newly developed education program; (3) To evaluate the 5P Method's effectiveness at reducing falls at SMMC and MLHC; (4) To estimate the cost implications of implementing the 5P Method at SMMC and MLHC; and (5) To disseminate the 5P Method to the remaining UC hospitals and nationwide.

Outcomes:

1. **Created annual savings to UC of approximately \$6.8 million.**
2. **Implementing the 5P Method was significantly associated with declines in fall rates at UCLA-SM from 4.13 to 1.95 falls per 1,000 patient days, and associated (not significantly) with declines in fall rates at UCSF-P from 2.54 to 2.10 falls per 1,000 patient days.**
3. Time that nurses spent on fall-related activities declined from about 13% to about 9% from pre-intervention to post-intervention.
4. Intervention toolkit is available at the national Partnership for Patients website hosted by Premier/Quest and available for 500 hospitals working on quality of care issues

LOCATION

UCSF

FELLOW

Wendy Anderson, MD, MS - 2013 QERM

PROJECT TITLE

Palliative Care Workforce Expansion: Nurse-Initiated Multidisciplinary Patient and Family-Centered Communication in the ICU (5-CAMPUS)

ABSTRACT

One fifth of Americans die after receiving ICU-care, with terminal ICU stays accounting for significant costs to the health care system. These treatments are often not in accord with patients' wishes, and result in uncontrolled pain and other symptoms. Two interventions - routine multidisciplinary provider-family communication and palliative care consultation - have proven ability to achieve the aims of reducing unwanted ICU treatments and as a result improving patient and family physical and mental symptoms and experience, while at the same time reducing costs. Unfortunately, these processes do not occur routinely for many patients. A key step in translating these proven interventions into practice is multidisciplinary collaboration. Involvement of nurses - patients' primary bedside providers - is a key aspect of ICU quality improvement, yet nurses are frequently not involved in these efforts. This project will refine and implement the UC bedside nurse communication training program, and complement it with implementation of a bundle of combination quality metrics.

Outcomes:

1. Developed and implemented a train-the-trainer program and 2-year-long mentored professional development for nurse leaders across UC Health.
2. Completed 8-hour long palliative care communication courses for a total of 68 ICU bedside nurses across five centers.
3. Conducted 42 eight-hour palliative-care communication workshops across the five centers, with 527 nurses trained as of January 2015.
4. **45 palliative care consults in the ICU resulted in \$167,000 in annual savings from reduced ICU bed-days at UCSF.**

LOCATION

UCSF

FELLOW

Kevin Bozic, MD, MBA - 2014 Fellow

PROJECT TITLE

Episode of Care “Bundled” Payments for Joint Replacement Patients

ABSTRACT

UCSF has been awarded grants from the California Healthcare Foundation and the UC Center for Health Quality and Innovation to develop and pilot an innovative model of delivering and paying for health care – bundled payments – based on a patient-centered integrated care pathway (PCICP). The current fee-for-service reimbursement system rewards volume of care rather than quality of care, resulting in low levels of integration and fragmented care across the various providers and organizations patients touch during their episode of care. This project aims to coordinate the care that lower extremity joint arthroplasty patients receive throughout their episode of care by integrating the care plans of each clinical provider both within and outside the hospital. This integration will enable the calculation of a price for the entire care episode and provide a mechanism for determining the distribution of the bundled payment to providers based upon performance.

This project involves (i) designing (including mapping and re-engineering, where appropriate, existing care pathways), (ii) costing, (iii) pricing, (iv) implementing, and (v) auditing the effect of a patient-centered integrated care pathway that is anchored in primary care before and after hospitalization for patients undergoing total joint arthroplasty of the hip or knee.

The last segment of the project involves the development of an “episode of care” or “bundled payment,” with the goal of creating ‘shared savings’ that will be distributed among the participants (hospital, physicians) based on evidence and consensus-based performance measures.

Outcomes:

1. **Readmission rate declined from 4.3% in June-December 2013 to 0.7% in January-October 2014.**
2. **Patients discharged to home increased from 39% to 45% and discharged to SNF decreased from 53% to 41%.**
3. **Direct costs declined by 4-5% per case.**
4. **Blood transfusion rate declined from 22.8% for hip arthroplasties and from 11.2 to 5% for total-knee arthroplasties.**

LOCATION

UCSD

FELLOW

Robert El- Kareh, MD, MPH, MS

PROJECT TITLE

Rapid Feedback and Certification to Improve the Accuracy of Discharge Medication Instructions

ABSTRACT

Readmissions to the hospital are common, expensive, and often preventable. Inaccurate medication reconciliation and unclear medication-related instructions are contributors to the problem. At UCSD, our recently launched Epic electronic health record (EHR) has the potential to eliminate problems with illegible handwriting and streamline medication reconciliation and prescribing. However, improving the reliability of transitions of care has proven difficult. The promise of the EHR to improve the quality of discharge information remains largely unfulfilled, and the implementation of Epic has introduced some new types of errors. Physicians frequently start out reconciling the medication list incorrectly and receive little or no feedback about their errors. These errors result in inaccurate discharge medication lists and confusing instructions—potentially leading to patient harm, readmissions and dissatisfaction. The objective of this proposal is to improve the quality of the medication-related discharge information for our hospitalized patients, leading to reduced preventable readmissions and improved satisfaction of our patients. This project will achieve its objective by evaluating the use of EHR and developing an educational curriculum to certify competency in medication reconciliation and the creation of accurate medication instructions.

Outcomes:

1. Within two months, the majority of hospital medicine physicians were trained to become their teams' trainers.
2. Trained nurses employed a teach-back approach to reinforce discharge instructions for high-risk patients.
3. Four main categories of errors were found: (1) obsolete medications (on the list, but shouldn't be); (2) missing medications (not on the list, but should be); (3) wrong dose; and (4) duplicates.

LOCATION

UCI

FELLOW

Lisa Gibbs, MD

PROJECT TITLE

Transformation of the Primary Care Practice to the PCMH Model

ABSTRACT

Planning and implementing our response to the Patient Protection and Affordable Care Act will require UC Irvine Senior Health Services to increase both efficiencies and capacity to address the healthcare needs of the currently uninsured, and patients with multiple chronic conditions who will have an increased need for services at our site. Our SeniorHealth Center has been chosen to become a NCQA designated Patient Centered Medical Home (PCMH). The site has a foundation of interdisciplinary care and transitions of care which includes several nursing homes and assisted living facilities. The value of this project to the healthcare system includes overall cost reduction through coordinated care, elimination of adverse events, and planned and safe transitions between care settings.

Outcomes:

1. **Reduced readmission rate by 27%**
2. Using tools and resources available at NCQA's website, a gap analysis of current processes of care was performed.
3. SeniorHealth Center's scheduling template was modified to accommodate patients who call for next day or same day appointments, reducing clinic impaction.
4. The clinical team has identified three preventative care services, including immunizations, mammography and colonoscopy, and three chronic care diagnoses, including diabetes, heart failure and depression, for population management.

LOCATION

UCD

FELLOW

John Grubbs, MS, MBA, RPH

PROJECT TITLE

Development of a UC Medical Center Specialty Pharmacy Program

ABSTRACT

This proposal is to initially expand UC Davis Medical Center's specialty pharmacy program to one or more additional payers at UCDMC. Based on the experiences and lessons learned, this program will then be expanded to include other UC Medical Centers, culminating in the development of a UC system-wide specialty pharmacy program. The system-wide program may be a centralized or decentralized model, depending on a number of factors. Using the financial performance of the specialty pharmacy program at UCDMC, we can conservatively estimate that each enrolled patient would generate an average of \$4 per member per month in net margin for the UC Medical Centers. For an enrolled base of just 100,000 patients, this equates to an annual net margin of \$4.8 million. The other positive impact will be improved care coordination and overall quality of care.

Outcomes:

1. Implemented a specialty pharmacy program at UC Davis.
2. **Annual revenue of approximately \$71,000 at UCD and \$2.03 million at UCSF.**
3. **Entered into a contractual relationship with Avella which allowed UCD to benefit financially whenever an eligible UCD patient receives services from their pharmacy.**
4. Documented instances in which patients experienced delays lasting from days to weeks receiving their medications from external specialty pharmacies.
5. **As of FY2016, providing services to 9 specialty populations with an annual net margin of \$24.5 million with 40 FTE, and three contracts with outside specialty pharmacies.**

LOCATION

UCSD

FELLOW

Elisabeth McLemore, MD, FACS

PROJECT TITLE

Neurosurgery Perioperative Care Pathway

ABSTRACT

MIRAS is a trans-disciplinary, multimodal, enhanced post-operative recovery program which aims to reduce patient morbidity and hospital length of stay during the post-operative period by promoting immediate post-operative patient ambulation, early resumption of oral nutrition, and the utilization of post-operative ileus (POI) prevention protocols. Over 500,000 patients in the United States underwent gastrointestinal surgery with bowel resection in 2010. Gastrointestinal recovery is a critical endpoint that frequently prolongs hospitalization and length of stay. Post-operative ileus (prolonged gastrointestinal recovery) is a poorly understood but frequently encountered phenomenon after gastrointestinal surgery. Contributing factors to developing post-operative ileus include inflammation, exogenous opiates for pain relief, anesthesia, hormones and neuropeptides, enteric nervous system substance P and nitric oxide release, and surgical trauma. Hospital length of stay (LOS) is frequently used as a surrogate measure of post-operative ileus as the return of gastrointestinal function is generally the rate limiting step in post-operative recovery after gastrointestinal surgery with bowel resection. The University of California Health System is an ideal setting for the implementation of a universal enhanced recovery program after gastrointestinal surgery. Four of the five medical centers utilize the same electronic medical records and ordering. This will allow for standardized protocol development and implementation of enhanced recovery programs. The University of California Colorectal Surgery Colloquium has recently been established and will serve as the advisory board for the development of standardized post-operative enhanced recovery protocols for use in electronic ordering systems.

This project seeks to minimize hospital LOS and post-operative complications after gastrointestinal surgery by promoting early ambulation and other physical activities after surgery, where not otherwise contra-indicated. Moreover, this project aims to implement and utilize post-operative enhanced gastrointestinal recovery protocols including the early resumption of oral nutrition, post-operative ileus preventative medical therapy, and opioid alternatives for peri-operative pain management through the collaboration and education of surgeons, anesthesiologists, nurses, physical therapists, allied medical staff, patients, and family members.

Outcomes:

1. Full Implementation of the MIRAS Pilot Segmental Colectomy Enhanced Recovery Program at UC San Diego and underway at other UC Medical Centers.
2. **Reduced length of stay by 4.5 days for high-risk patients and 0.9 days for moderate-risk patients, resulting in projected annual savings of \$553,000.**
3. **Reduced % Intensive Care Unit (ICU) Cases and ICU Days (DRG 329, 330)**
4. No Mortality differences observed.

LOCATION

UCSD

FELLOW

Adrian Han-Miu, MBA, MSN

PROJECT TITLE

Improving Emergency Department Throughput

ABSTRACT

The Emergency Department (ED) at the University of California San Diego Health System (UCSDHS) struggles with patient flow management. The time in the ED for admitted patients is over 9 hours on average; patients leaving without being seen runs ~6-8% at our Hillcrest site and ~4% at our La Jolla site. This project will test and develop Lean and Six Sigma Principles using a patient centered approach to eliminate waste identified by our customers and patients, removing unnecessary processes and redirecting efforts towards value-added business operations. The project will use a data-driven and statistical approach to process improvement aimed at the near-elimination of defects from every product, process, and transaction. In so doing, we expect to increase patient satisfaction, and therefore their likelihood to recommend UCSDHS, and to improve ED throughput.

Outcomes:

1. **Reduced the total number of patient who left ED without being seen by nearly 800, generating estimated annual revenue of \$674,000.**
2. **Hillcrest and La Jolla Patient Satisfaction baseline March, 2012, were 78% and 80% respectively; after DC Lounge implementation Patient Satisfaction December, 2012, is 73% Hillcrest and 84% La Jolla.**
3. **Hillcrest and La Jolla ED throughput (Arrival to Transfer to Unit) baseline March, 2012, were 10:44 and 8:25 respectively; after DC Lounge implementation ED throughput December, 2012, is 9:06 Hillcrest and 6:50 La Jolla.**
4. **EDIP nurses were reduced by half from 16.8 hours per day to 7.8 hours per day equating to a cost savings of \$225K per year**

LOCATION

UCLA

FELLOW

Jim Morrison

PROJECT TITLE

Modeling and Projecting the Impact of Patient Safety Related Changes in Medicare Reimbursement at the Hospital Unit Level Within the UCLA Health System over the next 5 to 7 years

ABSTRACT

Medicare currently has 3 “carrot and stick” programs aimed at leveraging reimbursement rates to improve Patient Safety within hospitals in order to promote higher quality and more coordinated care. These are 1) Hospital Acquired Conditions, 2) Value Based Purchasing and 3) Hospital Readmission Reduction Program. The financial impact of these programs is set to increase incrementally over the next 5-7 years and political uncertainty over Medicare funding make it quite possible that additional programs may be added or the penalties of the existing programs may be increased. The aims of this project are as follows: a) Design and build a model to illustrate current and future reductions in Medicare reimbursement to the UCLA Health System as a result of these 3 programs, b) Identify at the Hospital Unit Level each event (e.g. AHRQPSI, Readmission, HAC, etc.) that may result in lost reimbursement, c) Assign a specific dollar amount to each event representing the revenue that will be lost to the Health System should the rates of the events maintain or increase over the next 5-7 years, d) Provide a detailed, specific “Dollar Dashboard” to Health System Leadership identifying specific areas that will lead to greatest revenue loss, e) Set the state for management to target interventions to simultaneously improve Patient Safety and retain revenue, f) Model will be flexible to incorporate future changes in Medicare reimbursement policy.

Outcomes:

1. Aggregated information and data from a wide variety of sources and to “connect the dots” to fully understand the variables that contribute to the Health System’s performance on these measures.
2. Identified a relatively small number of events that may have led to potential lost reimbursement (PLR) to the UCLA Health System.
3. CMS scale-back of the value-based purchasing agreement led to insufficient measures where potential loss reimbursement would prove to be meaningful and actionable.
4. **Calculated potential loss reimbursement for each readmission as ~\$15K per case at Ronald Reagan Medical Center and ~\$10K at Santa Monica.**

LOCATION

UCD

FELLOW

JoAnne Natale, MD, PhD

PROJECT TITLE

Collaborative Incident Response Team

ABSTRACT

Unanticipated incidents and clinical errors are common, expensive, adversely affect patients and their families, create a chronically recurring source of liability, increase stress and job dissatisfaction in hospital staff, and erode the trust of the public in our medical institutions. Our communication with patients and their families about such incidents is typically far from timely, transparent, and apologetic, increasing dissatisfaction and vulnerability to litigation. Further these adverse events are largely “invisible”, even as they adversely impact staff, patients, and budgets. Building an institutional “culture of safety”, absolutely requires overcoming such invisibility. The overall objective is to evaluate the potential benefits of an interprofessional collaborative incident response team (I-CIRT). This team will provide assistance and support in: 1) disclosing unanticipated incidents/clinical errors, and 2) collecting and reporting timely information required to rapidly recognize and ameliorate potentially preventable precipitating factors.

Outcomes:

1. An inter-professional team composed of nurses, physician, and psychologists completed the 12-hour course “Disclosing Adverse Events and Medical Errors.
2. Trained I-CIRT members are available 24/7 to respond immediately to assist front-line staff on all acute/intensive care units.
3. 212 individuals completed surveys (131 RNs, 44 MDs, and 37 RT's) assessing disclosure culture and self-efficacy for communicating errors.
4. 550 UCD medical center staff participated in training
5. Response team successfully responded to all activations during the three-month pilot.

LOCATION

UCR

FELLOW

Nasser Salomon, MBA

PROJECT TITLE

Development of a Telemedicine Strategy for the UC Riverside School of Medicine

ABSTRACT

The UCR School of Medicine has a mission to address the region’s physician shortfall and to improve access to healthcare and health outcomes of people living in the region. The UCR medical school recognizes the great potential of telemedicine to serve patients in its far-flung catchment area by expanding healthcare access, improving quality of medical care and reducing costs. Access to healthcare remains a principle impediment for a significant portion of the region’s 4.2 million people, forecast to grow to nearly 6.5 million by 2030. While a significant portion of the population lacks health coverage – an estimated 1 million according to a recent study by the UCLA Center for Health Policy Research – provisions currently in the Patient Protection and Affordable Care Act will enable an estimated 350,000 residents of the Inland Empire to become eligible for health coverage through the Medicaid expansion and over 530,000 residents of both San Bernardino and Riverside Counties to become eligible for coverage through the Health Exchange. This is expected to worsen access to healthcare, as greater demand on an already overwhelmed physician workforce will reduce the number of physicians willing and able to take on new patients and make routine and preventive care visits less available. The UCR School of Medicine believes that delivering selected healthcare services to this population via telemedicine could maximize its effectiveness, expand healthcare access, introduce an important new healthcare innovation to this underserved region, and have long- term benefits to the broader UC Health network. While recognizing these benefits, the developing UCR medical school has yet to formulate its long-term telehealth strategy. As the clinical enterprise of the medical school is just being initiated, this is an opportune time to create a business plan that will allow telemedicine to become a meaningful and financially viable model for the UCR School of Medicine.

Outcomes:

1. Developed several models of telemedicine delivery at UCR, depending on site and clinic characteristics

LOCATION

UCSF

FELLOW

Ning Tang, MD

PROJECT TITLE

Building a Primary Care Program to Reduce 30-day Hospital Readmissions at UCSF

ABSTRACT

One in five Medicare patients is rehospitalized within 30 days of discharge. An estimated three-quarters of these readmissions may be preventable, costing the US healthcare system \$12 billion annually. In 2013, the Centers for Medicare and Medicaid Services will enact financial penalties on hospitals with higher than average risk-adjusted readmissions for Medicare patients with heart failure, acute myocardial infarction, and pneumonia. A recent systematic review of interventions to reduce hospital readmissions showed that our understanding of effective solutions is still limited. In terms of outpatient-based interventions, timely follow-up for patients with congestive heart failure has been associated with lower readmission rates, and a similar effect has been found in one small study of general internal medicine patients. This project aims to: a) reduce all-cause 30-day readmissions among UCSF primary care patients by 10%, b) engage primary care leaders in a program to reduce hospital readmissions, c) develop tools in EPIC (electronic medical record) to monitor and manage hospitalized patients at the population level and an infrastructure to investigate how to reduce preventable readmissions, d) collaborate with other UC medical campuses to benchmark readmission rates for primary care practices and share best practices.

Outcomes:

1. Nearly all newborns are seen by their pediatrician within two weeks of hospital discharge.
2. **The adult clinics have also improved follow-up appointment rates from 50% at discharge to 70-80%.**
3. "Freezing" appointment slots for follow-up visits has eliminated access problems for recently discharged patients.
4. Tools developed for PCPs to monitor track and manage their hospitalized patients: Direct EHR notification upon admission and discharge; daily reports to quality analysts of recently discharged patients, notification to complex case manager when "high risk" patients are admitted to ED or hospital.

LOCATION

UCLA

FELLOW

Daniel Uslan, MD, MS

PROJECT TITLE

Development of a UC-Wide Antimicrobial Stewardship Program: Benchmarking and Beyond; A business Plan and Gap Analysis

ABSTRACT

The emergence of bacteria for which no effective antibiotics exist, coupled with an antibiotic development pipeline which has dried up, have heightened critical concerns about inappropriate use of antimicrobials. Inappropriate antimicrobial use occurs in 30-50% of hospitalized inpatients. Abuse of antimicrobials leads to increased length of stay, nosocomial infections including C. diff, and increased pharmacy costs. Antimicrobial stewardship programs are multidisciplinary initiatives whose primary aim is to optimize clinical outcomes of antimicrobial use. Antimicrobial stewardship is broadly defined as a practice that ensures the optimal selection, dose and duration of antimicrobials that leads to the best clinical outcome for the treatment or prevention of infection while producing the fewest possible side effects and the lowest risk for subsequent resistance. Antimicrobial stewardship programs may contain a variety of interventions that are complementary to effective infection prevention and control programs. Each UC Campus has independently developed internal programs for oversight of antimicrobial use. These may or may not have been developed with evidence-based principles of stewardship in mind, and likely have not been developed with a goal of comparative benchmarking or compliance with California Senate Bill 739. This project aims to evaluate stewardship activities and infrastructure presently available at each UC site, resulting in a written gap assessment and action plan for each site; to standardize reporting and surveillance of antimicrobial utilization and data collection across all UC sites, facilitating future reporting to CDPH and allowing benchmarking and analysis by the clinical service line and ultimately developing target observed/expected ratios for antimicrobial use; and to develop a written business case for a UC system-wide antimicrobial stewardship program.

Outcomes:

1. Based on responses to the structured interview, a gap analysis was produced using the SWOT framework. UC Davis has already used the assessment to obtain funding to expand their Pediatric ASP.
2. **Identified discrepancies in ASP across all five campuses.**

LOCATION

UCLA

FELLOW

Michael Yeh, MD

PROJECT TITLE

Improve Discharge Times after Elective Surgery

ABSTRACT

Market forces within health care are exerting downward pressure on cost and resource utilization nationally. The flagship hospital of the UCLA Health System is the 520-bed Ronald Reagan Hospital (RRH), which currently operates at an average noon occupancy of 100.6%. The high occupancy rate reflects a critical bed shortage that carries several adverse effects. This project seeks to improve discharge times after elective surgery, with specific attention to increasing the percentage of patients discharged by noon (%DBN) from the current figure of 24% to a target of 40%. Our specific aims are as follows:

1) To develop, implement, and maintain global (non-service-specific) measures to streamline the discharge process. These include interdisciplinary rounds (IDRs), electronic clinical pathways, and discharge pharmacy interventions; and 2) To develop and implement service-specific measures to streamline the discharge process. These include improving service-specific diagnostics, such as chest radiography for cardiothoracic patients, and deployment of new service-specific personnel, such as nurse practitioners or physician assistants.

Outcomes:

1. Initial efforts led to improvements in %DBN which peaked in May of 2012 (20% to 55%, the latter a historic high for general surgery).
2. **The discharge pharmacy program has seen rapid adoption, especially by transplant and surgical services. In July 2013, 257 discharge prescriptions were filled, yielding net revenue of \$107,278 for the hospital.**
3. **Increased net revenues projected \$1.29 million annually.**

LOCATION

UCI

FELLOW

Maxime Cannesson, MD, PhD - 2013 QERM

PROJECT TITLE**Dissemination of Enhanced Recovery After Surgery (ERAS) Toolbox for High Risk Surgery Patients****ABSTRACT**

Every year about 240 million surgical procedures are performed globally. While high-risk surgery procedures represent only about 12.5% of this surgical volume, they account for about 80% of overall patient mortality related to surgery. In addition, the incidence of postoperative complications in patients undergoing high-risk surgical procedures is about 30%. As such, there is urgent need to develop and adopt interventions that are directed at improving outcomes of high-risk surgical procedures. Enhanced Recovery After Surgery (ERAS) is a bundle of best evidence-based practices that are aimed at enhancing patient postoperative recovery and outcomes following high-risk surgery. This innovative program includes management of perioperative pain, nausea and vomiting, transfusion, and goal directed fluid administration and hemodynamic optimization. Where ERAS is embedded, participating sites report improved patient experience, clinical outcomes, and multi-disciplinary team collaboration and reduction in length of stay and risk of hospital acquired infections. In the past, my research expertise have focused mainly on goal directed fluid administration, which is an essential part of the ERAS approach. My goal is to champion and implement this innovative ERAS program within UC Irvine Health. The program will initially concentrate on elective major surgeries in two specialties: Orthopedics and Gynecology. We plan to develop a three phase quality improvement process including 1) baseline evaluation of perioperative management and outcome of patients undergoing high-risk orthopedic and gynecology surgeries, 2) implementation of the intervention program, and 3) evaluation of the intervention using multi-dimensional valid and relevant outcomes. This fellowship will allow me to develop a toolbox that will help to disseminate this program system-wide within the UC system once this one year program has been successfully completed.

Outcomes:

1. **Implemented ERAS for high-risk colo-rectal, hepato-biliary, pancreatic, urological, spine, and neurosurgery.**
2. **In the 1-year pre- and post-implementation periods, 128 and 202 patients were included.**
3. **The average volume of fluid administered during the case was decreased from 9.9 (7.1–13.0) ml/kg/hour to 6.6 (4.7–9.5) ml/kg/hour ($p < 0.01$).**
4. **Length of stay decreased from 10 (6–16) days to 7 (5–11) days ($p = 0.0001$).**
5. **Intervention reduced LOS by 18 % (95 % confidence interval 9–27 %). The incidence of NSQIP complications decreased from 39% to 25% ($p = 0.04$).**
6. **Intervention has spread to burn unit at UCI, and to UCSF and UCLA.**
7. **Created projected annual savings of \$816,000**

LOCATION

UCLA

FELLOW

Robin Clarke, MD

PROJECT TITLE

Engaging Faculty: A Forum for Value-based Improvement

ABSTRACT

The mandate of healthcare reform is that health systems deliver higher-value care. This entails improving the quality and service of care extended to the patient population while reducing costs. Achieving this goal requires a system that integrates the providers - across the clinical specialties - around providing comprehensive care to patients. This proposal outlines a deliberate, methodical approach for building the personnel and data infrastructure within the faculty departments to conduct value-based improvement programs. Over the course of 2013, we will create quality teams within all departments, specialty-specific value-of-care dashboards, and a cross-departmental working group. During 2013, this program will reduce the use of low-value interventions through a "Choosing Wisely" campaign, as well as potentially target other suggested topics including appropriate utilization of services, coordination of care and/or maximizing resources. We anticipate that CHQI support for this program will lay the foundation for sustainable and continuous value-based improvement at UCLA. This program will also develop a best practices model for integrating the group practice that can be used by other University of California campuses.

Outcomes:

1. 35 of the 38 clinical departments and divisions have an engaged Quality Officer and a quality committee that meets at least quarterly.
2. We have developed customized reports that cover 24 of the divisions and departments and 110 specific patient populations/procedures.
3. The Quality Measurement & Improvement Committee (QMIC) is now an accepted and increasingly strong part of the UCLA Health's infrastructure. This Committee is written into the bylaws of the Faculty Practice Group. This forum is a monthly meeting of all the Quality Officers from each department/division.

LOCATION

UCSF

FELLOW

Nathaniel Gleason, MD - 2014 Fellow

PROJECT TITLE

Expansion of e-Consults to Multiple Specialty Services

ABSTRACT

Background: The referral process in ambulatory care is an important source of inefficient care that is not patient-centered. E-Consults are information-only exchanges that allow primary care providers (PCP) to obtain guidance from specialists via electronic consultation in appropriate cases and can improve utilization of specialists within a care delivery system. This innovation has the potential to improve timely access to care over cost of specialty care, and improve patient-centeredness across the spectrum of ambulatory care. A UCSF pilot e-Consult program shows early promise in meeting these objectives. Launched in September, 2012, the pilot program involves seven internal Medicine Subspecialties. **Intent:** To expand the UCSF e-Consult program to UCSF specialties outside the internal medicine subspecialty practices, to conduct a robust program evaluation, and to develop a scalable implementation and dissemination program. **Methods:** The e-Consult program will be implemented in Neurology, Dermatology, Orthopedics, and at least one surgical subspecialty practice, leveraging experience with the pilot program and further defining key elements for successful implementation. A multi-dimensional evaluation of the e-Consult will inform a comprehensive implementation strategy to allow efficient future dissemination. **Evaluation:** The primary outcome measure is the number of new patient referrals per clinical FTE managed in target specialty practices per month, and the proportion of these managed via the e-Consult system. Additional process and outcome measures will assess patient experience; PCP experience and workload; specialist experience and workload; breadth of adoption by primary care providers; barriers to adoption; perceptions of e-Consult appropriateness; and documentation elements associated with high-quality e-Consults.

2013 Outcomes:

Findings:

1. Five specialties were added, with 3 additional specialties nearing the launch date-based upon groundwork laid during the grant period. The specialties launched differ from the specialties proposed initially.
2. Launch of orthopedics as a specialty is being conducted with a more formal development process to explore the utility of this approach.
3. **eConsults were used for 8.2% of total referrals, and the referral rate for standard office visits decreased by 20%.**
4. **Mean pro-fees during the 120-day period fell from \$557 to \$517 per referral, a decrease of 7.2%. The proportion of these referrals with an ED visit within 120-days decreased from 9.8 to 8.6%, and hospital admissions among these patients decreased from 6.6 to 5.9%.**
5. During the first eight months of the program, over two-thirds of PCPs placed at least one eConsult and 91% strongly agreed that the response was helpful. Feedback from providers has been overwhelmingly positive.

LOCATION

UCSF

FELLOW

Toby Maurer, MD

PROJECT TITLE

Can a teledermatology training service succeed in an insured system?

ABSTRACT

Store and forward teledermatology when implemented as a triage consult service has potential to open access to care for patients, decrease wait times and help with the coordination of care between primary care providers and dermatologists. This study attempts to examine financial costs and benefits when such a system is implemented in the insured medical structure of University of California, San Francisco. Working within a closed primary care clinic that has a dermatologist on the premise, the study will track billing and collections and compare this to the traditional practice that did not include teledermatology. The innovation technologic pieces of the teledermatology service will be implemented at Lakeshore and tested for ease of use and reliability. In addition, primary care providers and the dermatologist will be surveyed prior to the study and after to better understand patient and provider satisfaction.

Outcomes:

1. Installed the software on all the computers at the satellite clinic.
2. **Successfully completed 20 consults with triage back to primary care physicians. Of those patients, 85% were triaged back to the primary physician and only 15% were triaged to my live dermatology clinic.**

LOCATION

UCLA

FELLOW

Anne Lin, MD

PROJECT TITLE

Implementation of an Organized Process of Care Program for Facilitating Discharge Transition for Colorectal Surgery Patients

ABSTRACT

Patients undergoing abdominal operations for colorectal diseases, such as colorectal cancer, diverticulitis, and inflammatory bowel disease, account for a significant number of postoperative complications. Currently, 30% of healthcare dollars are spent in the six months subsequent to an operation, and these costs are projected to rise. With implementation of fast-track protocols, the trend over the past years has been to focus on reduction in hospital length-of-stay and earlier discharge following colorectal operations. Thirty-day readmission rates after colorectal operations have increased to include 11-12% of Medicare patients. Readmission rates are already being used as a hospital performance metric and may eventually be used to determine Medicare reimbursement. Discharge adverse events after colorectal surgery resulting in emergency department visits or readmissions continue to be a problem, and a preliminary pilot survey of patients undergoing colorectal operations at UCLA (University of California, Los Angeles) highlighted potential areas for improvement. We hypothesize that implementation of organized processes of care program for facilitating discharge transition will reduce 30-day post-discharge adverse events leading to emergency department visits and readmissions in patients undergoing colorectal operations at UCLA-affiliated hospitals (Westwood and Santa Monica). The project has the following specific aims: 1: Develop the protocol for three discharge planning processes of care that will allow each hospital to provide feasible, cost-efficient, and sustainable care for patients undergoing colorectal operations using a multidisciplinary team. 2: Implement a process of care protocol for patients undergoing colorectal operations at the UCLA-affiliated hospitals. 3: Assess patient function before and after colorectal operations, using elderly function surveys. Studies targeting readmissions and transition in patient status have focused primarily on patients with medical conditions such as heart failure and not on patients following abdominal operations. Thus, this project will provide insights on improving the discharge transition in patients after colorectal operations. This is an important area of study given that processes have not been standardized in most hospitals despite the high rates of post-discharge adverse events often resulting in emergency department visits and readmissions. This project is timely given the expected increase in the number of patients undergoing abdominal operations as the population ages and given that colorectal cancer and diverticulitis are diseases associated with aging. An established process of care program will guide future development of similar programs for patients undergoing a wide variety of abdominal operations.

Outcomes:

1. A colorectal care pathway was developed to address our two goals—reducing surgical site infections and improving discharge transitions.
2. Patient care pathways were established to improve patient knowledge of Perioperative expectations.
3. Compliance assessments have been incorporated into the electronic health records.
4. Readmission rates did not drop appreciably during the study period.

LOCATION

UCD

FELLOW

James Marcin, MD, MPH

PROJECT TITLE

Telemedicine Program in Pediatrics

ABSTRACT

As a pediatric critical care physician and the director of the Pediatric Telemedicine Program, my passion has been to help our clinicians use telehealth technologies to better treat patients living in underserved and rural Northern California. The goal of my proposal and CHQI Fellowship application is to work with the UC Davis Health System's Center for Health and Technology, the Department of Pediatrics, and the Children's Hospital to better integrate telehealth technologies into our practice of outpatient and inpatient medicine with the ultimate goal of improving the timeliness, efficiency, quality and cost effectiveness of our pediatric clinical services. I will work with several pediatric sub-specialists to effectively leverage telehealth technologies in our outpatient and inpatient clinical practice to result in more appropriate utilization of services (including a reduction in inappropriate outpatient referrals as well as emergency department and inpatient transfer), more efficient clinical workflow (including an increase in appropriate in-person outpatient referrals), more cost effective care (including a reduction in outpatient clinic overhead costs), and a stronger relationship with partnering health systems from improved patient and referring provider satisfaction.

Outcomes:

1. **Expanded the number of subspecialists available for telemedicine consultations to 17 subspecialties.**
2. **In 2012, there were 166 telemedicine consultations done; as previously reported, during the fellowship in calendar year 2013, this number increased to 267. In 2014, 341 outpatient consultations were provided, and, and as of November 2015, 332 consultations were provided.**
3. After the addition of hospitals in local health systems, there are a total of 26 hospitals using telemedicine in their EDs, making the UC Davis Pediatric Tele-Emergency Network the largest of its kind in the United States.
4. During the period of this project, our team was able to expand the number of inpatient telemedicine units from two, Mercy Redding ICU and Mercy San Juan Pediatric Ward, to eight hospitals.
5. The dedicated outpatient telemedicine specialty clinic within the Center for Health and Technology has decreased the cost of care. This dedicated service has also streamlined the efficiency of care, raising quality.
6. **Expanded subspecialists available for tele-medicine consultation from 3 to 7.**

LOCATION

UCD

FELLOW

Christopher Polage, MD & Joo Song, MD

PROJECT TITLE

Expand the UC Davis Pathology Consortium to Southern California Medical Centers

ABSTRACT

The pathology departments of the five University of California (UC) Medical Centers offer an extensive menu of clinical tests and pathology services. Many of the individual facilities offer esoteric and high complexity testing within their particular medical campus. Problem Statement: Although the five UC medical campuses are considered a single entity under the University of California, the large majority of the esoteric testing is not shared between each other. This results in sending out tests to outside reference laboratories that is both costly and results in a loss of potential revenue. Over nearly a decade the annual aggregate cost for the five medical centers has doubled from \$6-7 million to \$15-18 million and is rising. To address this issue, the beginning of a UC Consortium was established several years ago, led by Dr. Ralph Green, then pathology chair at UC Davis. Hypothesis: With improvement in communication, relationship, and connectivity between the individual pathology departments of the UC Health system, these esoteric tests as well as novel tests, can be shared among all campuses, which will result in greater efficiency, reduction in cost, and increased revenue. Methods: Expand the current UC consortium by recruiting increased participation of the other UC medical campuses located in the southern California area (UCSD, UCLA) that would be interested in participating. Identify current testing performed and implement sharing of novel and esoteric testing that would otherwise be sent to an outside reference laboratory. Create connectivity between campuses in the Southern and Northern hub and ultimately between the two hubs. Expected Result: Testing performed within the UC Health system will increase and will result in a significant reduction in send-out testing. Novel tests will be developed at participating UC campuses that can be utilized by others. Increased efficiency and revenue is expected for each campus and for the UC as a whole. Conclusion: The expansion of the UC consortium to expand additional Southern hub participation and improved connectivity will ultimately be one step toward anticipating the impact of healthcare reforms by reducing costs, improving efficiency, and increasing profitability. These results will ultimately make the UC system a role model for other state university systems.

Outcomes

1. Laboratory tests available at each UC medical center were also obtained and matched with the 'Top 10' send out list to identify 17 current high-volume tests that could be redirected for testing to another UC medical
2. **An estimated ~\$1.8 million savings were identified. Inappropriate sending out of testing for Vitamin D 1,25 at an annual cost of ~\$5 million was identified at UCLA as part of this process and recommended for discontinuation.**

LOCATION

UCSD

FELLOW

Vaishal Tolia, MD

PROJECT TITLE

ED-TITRATE -- Emergency Department Telemedicine Initiative to Rapidly Accommodate In Times of Emergency

ABSTRACT

This application for the 2013 UC Health CHQI (Center for Health Quality and Innovation) Fellowship will focus on the development, implementation, and evaluation of the recent IRB approved study ED-TITRATE (Emergency Department Telemedicine Initiative To Rapidly Accommodate In Times of Emergency). This is a prospective study which will serve to utilize emergency department evaluation of patients by a remote EM physician via a telemedicine module during times of ED overcrowding and resource limitation. These patients would otherwise be awaiting placement in an examination room without any physician interaction and guided care initiation. The goal of the study is to evaluate the efficacy, safety, as well as patient and provider acceptance of a detailed telemedicine physician evaluation and care initiation process in the emergency department.

Outcomes:

1. Median throughput times for EDTITRATE to non-telemedicine ED patients sorted by triage category during the time of day EDTITRATE showed a significant reduction for telemedicine encounters. For triage category 3-5 the mean throughput time was 175.3 minutes (s.d. 94.3, interquartile range 116.5-206). Mean throughput for triage class 3-5 non-telemedicine patients during the same time period was 331.4 minutes (s.d. 207, interquartile range 199-408).
2. Demonstrated the safety of emergency physician telepresence in the ED along with very favorable ratings by patients and providers
3. Patients gained opportunity to see what the telemedicine physician sees during the examination.
4. Intervention is now embedded in QI process within the UCSD departments of emergency medicine and is in the process of expanding to our second clinical site in La Jolla.

LOCATION

UCD

FELLOW

Elisa Tong, MD - 2014 Fellow

PROJECT TITLE

Tobacco Cessation Incentive Program using EMRs

ABSTRACT

Background: Tobacco cessation is among the most beneficial and cost-effective interventions that providers can offer patients. Tobacco use is the leading preventable cause of morbidity and mortality, and is also a major contributor to health care expenditures with a smoker's annual health care cost costing \$1830 more than a nonsmoker. Health systems have an important role in changing the status quo and improving how they integrate and effectively promote tobacco cessation. Technology, through the electronic medical record (EMR), has an important role in facilitating tobacco cessation for UC Health, especially with the federal incentives demonstrating "Meaningful Use" of EMRs. Technology facilitating tobacco cessation is strengthened with the guidance of the new Joint Commission tobacco measure. Coordination of care at discharge is the most novel component of the new Joint Commission tobacco measure, but the UCSD-based California Smokers' Helpline can assist. UC Health would benefit greatly from improving addressing tobacco cessation more effectively for patient outcomes, from primary to secondary prevention, and also its own employee wellness, since UC plans to self-insure soon. Objectives: This proposal reflects a cross-campus, interdisciplinary collaboration that will transform how UC Health can use technology to facilitate tobacco cessation, with the intent for adoption by all campuses. The Fellowship will provide the opportunity to lead and strengthen a UC-wide tobacco cessation network. Specific Aim 1: To implement and refine EMR modification prototypes to promote tobacco cessation, including an EMR interface with the California Smokers' Helpline. Specific Aim 2: To evaluate the impact of the EMR modifications on provider action and patient cessation, and begin assessment of cost savings from cessation. Specific Aim 3: To disseminate the EMR modifications, workflow processes, and technical reports to the other UC medical campuses. Methods: In Aim 1, two key EMR modifications will be implemented and revised: a Tobacco Order Set and an EMR Interface with the Helpline. A Tobacco User Registry will be created using REDCAP database to capture EMR data and track quit outcomes. In Aim 2, the EMR modifications will be evaluated for their effect on provider action and patient tobacco cessation, using the Tobacco User Registry. Cost savings will be estimated from the quit rates during the evaluation period, which can be later confirmed with UC Health utilization data. In Aim 3, Dr. Tong will make two visits to each sister UC Health campus to build a UC Health tobacco cessation network and disseminate the findings from the UCD project. Anticipated Impact/Value Statement: This proposal is anticipated to both reduce cost and enhance revenue for UC Health, by improving the health of its patients, particularly its employees when UC self-insures. It will demonstrate how health systems may effectively use technology to improve health outcomes through provider action, utilize interfaces to coordinate care, and establish a UC Health resource (Tobacco User Registry) and network to monitor and improve quality performance and develop future research initiatives. Dr. Tong will lead and develop a UC Health tobacco cessation network based on the foundation of this proposal.

Outcomes:

1. **Generated 441 referrals, resulting in \$11,000 in savings from reduced healthcare utilization.**
2. 50.6% of patients were reached after an average attempt of 4.9 calls.
3. Created the first two-way referral system between an electronic health record system and the California Smokers' Helpline.
4. Referrals from diverse departments with low-intensity outreach reached 50.6% of patients after an average attempt of 4.9 calls, higher than the 33% reported by the University of Wisconsin for e-referrals in the outpatient clinics.

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5. Of those contacted, the majority (72.6%, n=162) agreed to complete the intake questionnaire and were mailed self-help educational materials, with most (82.1%, n=133) receiving counseling. Thus, 36.7% of those referred accepted and received a tobacco cessation intervention, which is higher than the 5% reported in Wisconsin.
 6. UCD has disseminated the technical build documentation of the two-way e-referral build to the other 4 UC medical campuses.

LOCATION

UCI

FELLOW

Shermeen Vakharia, MD

PROJECT TITLE

Urology Surgical Home: A Transformative Model of Perioperative Care

ABSTRACT

Lack of coordination and standardization of care across the perioperative continuum leads to costly inefficiencies, and increase in postoperative complications, re-admissions and mortality, creating an undue burden on the health care system. The Surgical Home represents an innovative model that leverages the unique training, skills, and perspectives of the perioperative personnel and anesthesiologists allowing them to coordinate and manage the perioperative care of patients by assisting surgeons and proceduralists, as well as hospital administrators and ancillary personnel, in achieving the shared vision of coordinated care with reduced complications and expenses. The fellowship will enable me to implement the 'Urology Surgical Home' At University of California, Irvine, Health Standardized evidence based protocols, patient centric care, elimination of non-value added tests and consults, and decrease in practice variability form the core of the surgical home. The implementation will involve a 4 phase process in which multidisciplinary teams will work together to create an evidence based care pathway with defined and measurable metrics for quality improvement and benchmarking. Once implemented successfully, the model can be extended to other surgical services as well as other University of California (UC) Hospitals.

Outcomes:

1. Practice changed to create four integrated, coordinated care pathways.
2. **Length of stay decreased between 5-7 days.**
3. **Created cost savings of between \$10,000 and \$20,000 per case.**

LOCATION

UCI

PRINCIPAL INVESTIGATORMaxime Cannesson, MD, PhD - *2013 Fellow***PROJECT TITLE****Dissemination of Enhanced Recovery After Surgery (ERAS) Toolbox for High Risk Surgery Patients****ABSTRACT**

Every year about 240 million surgical procedures are performed globally. For the UC system alone, 110,000 patients undergo surgery each year. While high-risk surgery procedures represent only about 12.5 % of this surgical volume, they account for about 80% of overall patient mortality related to surgery. In addition, the incidence of postoperative complications in patients undergoing high-risk surgical procedures is about 30%. As such, there is urgent need to develop and adopt interventions that are direct at improving the outcomes of high-risk surgical procedures. Enhanced Recovery After Surgery (ERAS) is a bundle of best evidence based practices aimed at enhancing patient postoperative recovery and outcomes following high-risk surgery. This innovative program includes management of perioperative pain, nausea and vomiting, transfusion, and goal directed fluid administration and hemodynamic optimization. Where ERAS is embedded, participating sites report improved patient experience, clinical outcomes, and multi-disciplinary team collaboration and reduction in length of stay and risk of hospital acquired infections. The overall goal of this application is to implement UC wide an innovative Enhanced Recovery After Surgery (ERAS) program for patients undergoing high-risk abdominal, gynecologic, urological, and orthopedic surgeries. This application is a follow-up to the 2013 CHQI Fellowship Year that was awarded to develop this program at UC Irvine. We have already developed a "Toolbox" for the dissemination of this program systemwide. This Toolbox includes online pre-tests and post-tests, online training, written protocols, handouts for Goal Directed Therapy application at the bedside, and documents explaining the key factors for success and the barriers to implementation and how to overcome them. Our goal is to disseminate this approach using our Toolbox to all UC Medical Centers for patients undergoing high-risk abdominal, gynecologic, urological, and orthopedic surgeries.

Outcomes:

1. **Implemented ERAS for high-risk colo-rectal, hepato-biliary, pancreatic, urological, spine, and neurosurgery.**
2. **In the 1-year pre- and post-implementation periods, 128 and 202 patients were included.**
3. **The average volume of fluid administered during the case was decreased from 9.9 (7.1–13.0) ml/kg/hour to 6.6 (4.7–9.5) ml/kg/hour ($p < 0.01$).**
4. **Length of stay decreased from 10 (6–16) days to 7 (5–11) days ($p = 0.0001$).**
5. **Intervention reduced LOS by 18 % (95 % confidence interval 9–27 %). The incidence of NSQIP complications decreased from 39% to 25% ($p = 0.04$).**
6. **Intervention has spread to burn unit at UCI, and to UCSF and UCLA.**
7. **Created projected annual savings of \$816,000**

LOCATION

UCLA

PRINCIPAL INVESTIGATOR

Anahat Dhillon, MD

PROJECT TITLE

Development and Implementation of Comprehensive Peri-procedural Handover Processes

ABSTRACT

The goal of quality improvement projects is to mitigate the risk of an adverse event resulting from exposure to the health care system. Patients are at risk in a myriad of scenarios but none so much as when there is a transition of care during the perioperative time of increased physiologic perturbation. Simple interventions in the perioperative period focusing on effective communication and education could potentially decrease adverse events. The Joint commission requires hospitals to “improve the effectiveness of communication among caregiver... accurately and completely reconcile medications across the continuum of care”, and “have a standardized handoff”¹. We plan to develop and implement a comprehensive program of handover processes in the peri-procedural setting across all team members and clinical ranks. As patients transition from one care phase to another (i.e. emergency room to operating room), technology and experiential knowledge of care team members must be transferred to new care providers. The transition of care for all peri-procedural encounters will be evaluated. A systematic patient centered handover process promoting open bidirectional communication aided by a checklist tool will be developed. To nurture clear communication patterns across the teams, we will conduct longitudinal education using multimodal tools including simulation, self-awareness practice, group feedback and professional supervision. These processes will be evaluated with qualitative and quantitative measures and continuous improvement will be performed.

Outcomes:

1. Successfully rolled out and implement handoff processes across all our ICUs and the operating rooms as well as our catheterization laboratory.
2. Tools have been integrated and improved based on clinical staff feedback.
3. Incorporating information into EHR is in progress

LOCATION

UCSF

PRINCIPAL INVESTIGATOR

Margaret Fang, MD, MPH

PROJECT TITLE

Management of Perioperative Anticoagulant Care and Transitions for the Perioperative Patient (The UC IMPACT Project)

ABSTRACT

Anticoagulants are widely acknowledged to be high risk medications and are especially prone to errors due to inappropriate use, incorrect dosing, and failure of monitoring. The management and coordination of anticoagulants around the time of invasive procedures is a period where the risks and error rates are particularly magnified. Unfortunately, periprocedural anticoagulant management varies widely and we currently lack system-wide guidelines to encourage the optimal management of these patients. Inadequate communication between clinical providers and with patients can exacerbate the possibility of errors, particularly during care transitions. To address this problem, we have assembled a collaborative group of experts at each of the five UC Medical Centers that will initiate a system-wide effort to improve the safety of surgical patients who must take anticoagulants. In contrast to efforts to reduce hospital-acquired venous thromboembolism (e.g., “prophylactic anticoagulation”), the focus of this project is to identify patients on anticoagulants prior to surgery, evaluate their need for “bridging” therapy (defined as transient pre-operative discontinuation and then post-operative reinstatement of anticoagulant therapy, using substitution of parenteral anticoagulants when necessary) and ensure that the plan is instituted and accomplished. The specific aims of the project are to (1) develop and disseminate UC system-wide guidelines and standards for the appropriate periprocedural management of anticoagulation in patients on chronic anticoagulant therapy who undergo an operation or procedure, (2) establish local mechanisms to identify at-risk patients preoperatively so that an evidence-based, patient-centered, perioperative anticoagulation management plan can be instituted, and (3) standardize documentation, processes, and communication related to the perioperative anticoagulation management plan through creation and implementation of checklists and patient worksheets. We anticipate that our efforts will serve as a platform to support the systematization of other high-impact areas to accomplish our goal of providing safe, high-quality care for our patients.

Outcomes:

1. Developed several UCSF guidelines addressing the Perioperative management of anticoagulants
2. Developed an automated “Best Practice Alert” in the electronic medical record system at UCSF that requires individuals scheduling patients for surgery to indicate whether or not they are on an antiplatelet or anticoagulant pre-operatively.
3. Developed an e-Consult program to assist clinicians at UCSF with Perioperative anticoagulation management.

LOCATION

UCSD

PRINCIPAL INVESTIGATOR

Rebecca Sell, MD (original PI Daniel Davis, MD)

PROJECT TITLE

Advanced Resuscitation Training (ART) (5-CAMPUS)

ABSTRACT

The Advanced Resuscitation Training (ART) program was developed at UC San Diego as a strategy to reduce preventable arrests by decreasing the incidence of cardiopulmonary arrest and improving survival-to-discharge for arrest victims.

The ART program provides a continuous feedback loop between performance improvement data (“ART Afferents”) and training/interventions (“ART Efferents”). The proposal requests funds to develop an ART leadership team at each campus, provide guidance for the development of an ART program at each site, establish an ART database for resuscitation CQI, and create a repository of ART training materials and best practices. Anticipated benefits include a decrease in arrest frequency, improvement in arrest survival-to-discharge, and creation of a resuscitation infrastructure at each campus to help develop a “culture of resuscitation.”

Outcomes:

1. Achieved integration between nursing and physician groups, ICU and non-ICU personnel, and clinical and administration.
2. MDs/managers, as well as large numbers of senior clinical staff (MDs, RNs, supervisors) have been trained in ART – including recognition of patient deterioration, prevention of arrest, rapid response, cardiopulmonary resuscitation, post-arrest care, categorization of arrest type per ART matrix, interpretation of ART matrix information, and how to implement specific large-scale training based on those results.
3. Baseline data from the first year of the grant has been collected, with ongoing analyses of mortality and improvement in patient safety with the institution of many of ART’s QI and patient safety efforts.

LOCATION

UCSF

PRINCIPAL INVESTIGATOR

Catherine Lau, MD

PROJECT TITLE

UC Care Check: A Standardized Multi-Disciplinary Approach to Improve Neurosurgical Patient Safety and Quality (5-CAMPUS)

ABSTRACT

Adverse events are common in the high-risk work of neurosurgery. Causes of surgical errors include failures in effective team communication, handoffs, and lack of standardization in clinical protocols. Currently, neurosurgical care across UC Medical Centers is highly variable and results in a range of patient outcomes. The objective of this proposal is to develop and implement a multi-disciplinary clinical care pathway “UC Care Check” to improve outcomes and the patient experience for those undergoing neurosurgery across all UC sites. UC Care Check is a bundled toolkit comprising of three distinct components that will: 1) Standardize the use of EMMI patient education materials preadmission to improve the neurosurgical patient and family experience; 2) Improve multi-disciplinary communication and safety awareness through standardizing expectations and practices around the ‘Postoperative Operating Room Debrief’; and 3) Pilot a ‘Postoperative Clinical Care Checklist’ to reduce postoperative surgical mortality and complications. The rationale for UC Care Check is based on strong evidence that surgical checklists and operating room debriefs can standardize work practices, improve patient outcomes, and enhance provider communication and safety culture. This initiative will be developed, implemented and evaluated over four distinct phases across all UC Medical Centers over the three-year funding period. It is envisaged that UC Care Check will not only raise the quality of care for the UC system and improve patient outcomes, but it will also break down existing clinical silos by promoting greater collaboration between sites and leveraging benefits of synergizing resources and expertise. UC Care Check has engaged multi-disciplinary stakeholders from all UC sites to ensure maximal buy-in and commitment to facilitate successful implementation and sustainability.

Outcomes:

1. Standardized use of preadmission patient education materials in the EMMI program to over 16,000 neurosurgery patients across five campuses.
2. Improved multidisciplinary communication and safety awareness after implementing a standardized postoperative operating room debrief. All five campuses averaged over 90% compliance in the last two months of 2015. Postoperative debriefing has spread to all surgical services at UCSF and UCD (UCI did prior to project) and is planned for UCSD in FY17
3. All sites now use an ABC Clinical Care Checklist to reduce perioperative mortality and complications which is completed daily (for eligible items) for all neurosurgical patients during their post-operative period as an inpatient. Checklist includes **A**mbulation, **B**lood Glucose Control, **C**hecks, **D**VT prophylaxis, **E**ducation and **F**oley Catheter.
4. Completed five focus groups, one at each campus, where patients and care-partners described their care experiences related to pre-admission information and expectations, inpatient communication with providers and discharge preparation

LOCATION

UCSF

PRINCIPAL INVESTIGATOR

Jacqueline Leung, MD, MPH

PROJECT TITLE

Delirium Elimination in Post-Operative Critically Ill Patients

ABSTRACT

Delirium is a major challenge facing medical practice due to its prevalence, complex etiology, and potential severe impact on patients. Some have viewed delirium as acute brain failure requiring the same attention paid to heart failure to avoid its occurrence. Postoperative delirium in particular is associated with longer hospital stays, poor functional outcomes, higher healthcare costs, and increased long-term mortality. Delirium may be caused by an underlying medical illness, but often, the exact etiology is not identified. The course of delirium can vary considerably and depends on resolution of the causative factors. The health care costs of patients who develop delirium in one study were 31% higher than those without delirium (\$41,836 versus \$27,105). Post-hospital costs related to rehabilitation, institutionalization, and home care are in excess of \$100 billion annually. Our project will i) reduce the incidence of postoperative delirium in UC Health perioperative patients; ii) reduce or eradicate harm or prevent clinical harm to UC Health perioperative patients resulting from any errors in the provision of care; and iii) reduce the likelihood of a tort claim being filed. Our project specifically targets delirium elimination in postoperative critically ill patients. Although postoperative delirium is typically considered a short-term, reversible syndrome, many patients with postoperative delirium also have further cognitive decline after hospital discharge. For the afflicted patients and their families, they frequently have the perception that it is something that is “done to them” during or after surgery that precipitates the long-term cognitive changes. Our approach will adopt the Six-Sigma methodology, a five-phase disciplined approach to continuous improvement. The five phases of our project will include i) Define –to reduce the incidence of postoperative delirium by 50%; ii) Measure – nurses will be trained to measure and record postoperative delirium, under the supervision of a psychiatrist; iii) Analyze – data analysis will be performed by the PI, Dr. Leung and her Perioperative Medicine Research Group; iv) Improve – we will use a team approach to delirium reduction (details described below); and v) Control – we will disseminate the learned processes and outcomes to the rest of the medical center and possibly to other centers in the UC system in year 2 of the project. We will also implement continuous improvement processes learned from the Lean principles with the ultimate goal to reduce costs but enhancing the quality of care to patients. We believe that our pioneering project will induce a change in culture from the top down, resulting in a system-wide effort to shape the care to these high-risk surgical patients, with the ultimate goal of reducing postoperative delirium and its associated adverse events, and in turn will reduce risk to the institution at large.

Outcomes:

1. **Reported incidence of postoperative delirium in the 591 patients who have been screened for postoperative delirium was 46/591 = 7.8%. This rate was substantially lower than that measured from a historical cohort of patients with similar matching characteristics such as age and undergoing similar type of procedures (approximately 40% of postoperative delirium rate was noted in the historical cohort).**
2. Implemented a preoperative cognitive screen to patients 65 years of age or older awaiting surgery of the spine or joints arthroplasty. The percentage of patients eligible and received the cognitive screen preoperatively was 55%.
3. Trained nurses on 12 Long acute care ward to routinely measure postoperative delirium using the Nu-Desc tool every shift (twice daily). The % of patients at 12 Long who received the Nu-Desc assessment postoperatively was 73%.
4. Developed a nursing charting tool on APEX to record the delirium score.

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5. Disseminated the nursing delirium measurement tool to other nursing units and nurses on these two acute care wards have begun to measure delirium routinely.
 6. Participated in a UC system-wide preoperative evaluation conference in September 2013. As a result of this conference, two of the UC medical centers (UCLA and UC Davis) expressed an interest to adopt the preoperative cognitive screen in their preoperative clinics.

LOCATION

UCSD

PRINCIPAL INVESTIGATOR

Kristen Kulasa, MD (original PI Gregory Maynard, MD, MSc, SFHM - 2011 PI)

PROJECT TITLE

Optimizing Care of the Surgical Patient with Hyperglycemia Across the Continuum of Care

ABSTRACT

Diabetes and stress hyperglycemia are very common inpatient conditions. Uncontrolled hyperglycemia is strongly associated with a host of adverse outcomes in the perioperative setting. Iatrogenic hypoglycemia is also a common (and often preventable) condition, occasionally resulting in catastrophic sequelae, especially in vulnerable patients unable to communicate. UC medical centers have a highly variable process for preoperative evaluation and management of hyperglycemia, and high quality measures, protocols, and EHR tools are not routinely available. We propose a three year collaborative improvement effort across all 5 UC sites to optimize the perioperative diabetes / hyperglycemia management of the adult surgical inpatient across the continuum of care. We will design and implement best practice protocols using overlapping and mutually reinforcing interventions, including standardized order sets, educational materials, audit and feedback, a unique interactive web-based program for preoperative management of diabetes, and real time measurement of glycemic outliers the spurs concurrent intervention (aka measure-vention). Working with all stakeholders, we will work to streamline and standardize preoperative evaluation and management, and insure that our protocol guidance “touches” all hyperglycemic patients on their pathway to the operating room. Standardized high quality measurement of hypo- / hyperglycemic rates from the baseline period (1 year prior to funding) will be compared to rates obtained over the project time period, using a secure web-based “glucometrics” data and reporting engine. Patterns of insulin use, surgical site infections, readmissions, iatrogenic DKA, and other measures will also be tracked by selected manual chart review and retrieval of data from the electronic health record. We are targeting a 25% reduction in hypoglycemia days and recurrent hypoglycemic events, a 20% reduction in uncontrolled hyperglycemia, and a reduction in related adverse outcomes such as readmissions and surgical site infections. We expect to contribute to standardization of preoperative evaluation and management pathways for all UC patients, which will pave the way for a variety of other improvement efforts and reduce UC liability.

Outcomes:

1. Collected detailed baseline information on glycemic control, hypoglycemia rates, and recurrent hypoglycemia for surgical patients over the course of their stay.
2. Established protocols for evaluating patients in the preoperative clinic, and have **doubled the rate of preoperative A1c testing from 28% to 56% in the outpatient setting and increased the rate from 67% to 79% in the inpatient setting**
3. Provided educational materials and instructions for patients.
4. Defined the process for checking glucose values at check in on the day of surgery, established protocols for defining who gets infusion insulin vs SC insulin, and revised order sets in the PACU to reflect the standardized approach.
5. **Preoperative rates of hyperglycemia (>180 mg/dL) and severe hyperglycemia (>299 mg/dL) were significantly reduced with no significant change in rates of hypoglycemia**
6. **Post-operative rates of hyperglycemia (>180 mg/dL) and severe hyperglycemia (>299 mg/dL) and hypoglycemia were significantly reduced**

LOCATION

UCLA

PRINCIPAL INVESTIGATOR

Nancy McLaughlin, MD, PhD

PROJECT TITLE

Neurosurgery Perioperative Care Pathway

ABSTRACT

Despite significant improvements over the past three decades in surgical technique, supporting technology, and translational science, neurosurgery remains a high-risk specialty. At UCLA, from 2008 to 2012, neurosurgery was the specialty with the highest number of claims and cost incurred, reaching \$4,949,867. Technical skills, clinical judgment, and communication were the three most frequent contributory factors in neurosurgical claims at UCLA and at the UC system level. In 2009, The Department of Neurosurgery at UCLA launched a comprehensive Clinical Quality Program, aiming to improve quality and safety, patient satisfaction, and efficiency and utilization. With experience in implementing improvement interventions and monitoring progress, the department has a proven track record of leading quality and safety initiatives. In a baseline study assessing delivery of value-based care for patients undergoing a microvascular decompression (MVD), we documented improved clinical outcomes and reduced total costs for the entire episode of surgical care following the implementation of numerous processes involving clinical care and patient communication. Review of this data initiated multidisciplinary efforts to develop an evidence-based optimized clinical protocol that conforms to local and national standard of care, while providing efficient care, rapid recovery, optimized clinical outcomes, maximal safety, all at the lowest cost: The Neurosurgery Enhanced Recovery, Value, and Safety (NERVS) protocol. In addition, it was clear that comprehensive risk management also required a professional communication protocol that engaged the patient with (1) pre-operative understanding of the condition, treatment options, procedural risks, and realistic treatment expectations as well as (2) post-operative understanding of treatment results, plan for follow-up monitoring and/or adjuvant treatment, details of recovery process and expected time frame. Both protocols are complementary and propose a strategy to comprehensively target the most frequent contributory factors involved in claims. They will be data-driven, cost sensitive, patient safety-conscious, and risk management mindful. It will include recommendations/interventions for all elements of care and patient education in the pre-, intra-, and post-operative settings, stressing the importance of continuity of multidisciplinary teamwork and communication throughout the care episode. This proposal will enhance clinical care and risk management by four key steps: 1) Establish evidence-based/best practice, local and national standard of care protocols for clinical care and patient communication, initially for 4 cranial neurosurgical procedures; 2) Employ a multidisciplinary team to “hardwire” the care protocols into everyday workflow, 3) Implement the clinical and communication protocols with real-time data collection, individual and group feedback, and corrective action/modification to achieve the highest level of reliability; and 4) Develop an educational program regarding risk management, with review of past claims but also new cases. As the data supports the success of this approach, we will welcome the collaboration of the other Neurosurgery departments to expand this protocol to all cranial procedures across the UC system. We also intend to extend these protocols to spinal neurosurgery. We will assure dissemination to other departments within the UC system and nationwide.

Outcomes:

1. Developed five care items in pathway, including post-operative nausea and vomiting.
2. Process measure monitoring revealed elements of education that had not been integrated at bedside, and various education methods were implemented to correct.
3. NERVS training has been expanded to PACU at UCLA.
4. NERVS RN on floor three mornings and evenings per week has had significant impact in the ICU and also in the PACU, where they extend their auditing and continuous education.
5. 1000 patients enrolled in the NERVS protocol

LOCATION

UCI

PRINCIPAL INVESTIGATOR

Christine Kim, MD (Original PI Karen Noblett, MD)

PROJECT TITLE

Improving Communication and Perinatal Outcomes with the Use of Standardized Handoffs for Nurses, Residents and Staff Physicians

ABSTRACT

Transfer of patient care between providers is vulnerable to communication failures and the Joint Commission has recommended an emphasis on developing standardized handoff tools to improve patient safety. The perinatal period presents unique challenges in that two or more patients are being cared for concurrently. Developing an effective handoff tool will improve communication among healthcare providers, improve patient safety and quality of care, and reduce malpractice claims.

Outcomes:

1. Created and implemented handoff tool and incorporated it into EMR.
2. Determined baseline satisfaction measures.
3. Handoff tool pilot completed, revisions made based on feedback, ongoing use in clinical practice.
4. Other services also have rolled out similar specialty driven communication tools.

LOCATION

UCI

PRINCIPAL INVESTIGATOR

Michael Stamos, MD, FACS, FASCR

PROJECT TITLE

High Risk Colon & Rectal Surgery Intervention Program (5-CAMPUS)

ABSTRACT

Colon and rectal surgery carries high risks of surgical site infections (SSI), readmissions and other morbidities. Due to these inherent risks there are ample potential opportunities to improve quality of care within this specialty. The UC Colon & Rectal Surgery Collaborative comprises the colorectal surgery services of the five UC medical campuses, which gives us distinct advantages and improves the likelihood of success of our proposal. By using this unique alliance, we propose a multi-aim project that will improve the quality of health care delivered to high-risk colorectal surgery patients by addressing deficiencies in risk assessment and communication, surgical site infections, and hospital readmissions.

Methods. This project will involve a close collaboration between surgery, anesthesia, nursing and administrative departments to target delivery of care at the preoperative, intraoperative and postoperative level by adopting new colorectal care bundles. In order to maximize benefit, we will focus initially on procedures that have high rates of SSI and readmission, pelvic anastomoses and ostomies. Beyond standardized practices widely accepted in the surgical community, UC Colon & Rectal Surgery Collaborative members have also reached consensus on several promising and innovative interventions. **Conclusions.** The UC High-Risk Colon and Rectal Surgery Intervention Program will institute specific care bundles to improve the overall quality of colorectal surgery care at UC hospitals. These initiatives will improve surgical outcomes, generate new areas of investigation, reduce costs and risks, and establish new benchmark quality measures for patients across the country.

Outcomes:

1. Created a colorectal NSQIP collaborative that collects NSQIP variables and CAHPS surgical care surveys from each site quarterly, data are reviewed as a group to help guide “best practices”.
2. Created an integrated Colorectal Enhanced Recovery Program
3. Post-operative educational video has been produced and is being distributed in the clinic and to inpatients prior to discharge. Two additional educational videos have been produced, for patients with and without stoma.
4. The preoperative NSQIP risk calculator is being utilized for all patients undergoing high-risk (pelvic anastomosis or creation of an ostomy) colon and rectal surgery procedures, is being discussed with the patient and documented in the patient’s medical record.
5. Standardized postoperative colorectal patient care implemented at all five campuses, including order sets, pain control, ostomy care pathways with integrated nursing education, nutrition, and surgical site infection prevention patient discharge instructions (in collaboration with another CHQI project).

LOCATION

UCLA

PRINCIPAL INVESTIGATOR

Igor Barjaktarevic, MD (Original PI Elizabeth Turner, MD, MS - 2011 PI)

PROJECT TITLE

Implementation and Assessment of a Formal Curriculum for Training on bedside ultrasound at UC Hospitals

ABSTRACT

This study, funded by the University of California Center for Health Quality and Innovation Quality Enterprise Risk Management (CHQIQERM) will assess the impact on health quality and safety outcomes after implementation of a bedside ultrasound training program proven effective in a 2011 CHQI grant. UCLA critical care physicians will be trained to provide focused ultrasound assessment of patients in shock. After training, a protocol (RUSH: Rapid Ultrasound in Shock) will be implemented within 24 hours on shock patients admitted to the medical or liver ICU. After intervention, outcomes from the patients who received a RUSH evaluation will be compared to a sample of shock patients from 2011 when bedside ultrasound was not used. Outcomes include length of stay (primary outcome), cost, utilization of resources, incidence of iatrogenic errors, mortality, ventilator days, acute kidney injury, and impact on satisfaction. In addition, the confidence, knowledge, and competence of the trainees will be assessed as was done in the initial grant.

Outcomes:

1. Trained 11 Pulmonary Critical Care Fellows in bedside ultrasound.
2. Patients enrolled in RCT and follow-up is under way.

LOCATION

UCSD

PRINCIPAL INVESTIGATOR

Francesca Torriani MD

PROJECT TITLE

Developing Standardized Bundles to Decrease Surgical Site Infections in Ortho, Spine Cases and Colo-Rectal Cases (5-CAMPUS)

ABSTRACT

Surgical site infections are associated with significant morbidity and mortality, increased length of stay, costs of surgery, and have been identified as high risk for litigation. Facility-wide standardized bundles have been shown to improve overall compliance with infection prevention standards and decrease complications. Five UC health systems have come together to propose a UC-wide implementation of peri-operative bundles that include patient education, skin decontamination, and wound care to help reduce surgical site infection (SSI) rates in orthopedic and neurosurgical patients undergoing knee and hip replacements, laminectomies, and spinal fusions. At those five sites, in collaboration with surgical services, infection prevention, inpatient services, the following measures will be implemented during the first year of the grant: a pre-operative, peri-operative, and a post-operative bundle. In the pre-operative bundle, each patient undergoing a targeted surgery will receive a standardized education module on showering with chlorhexidine gluconate 3 times prior to the surgery. In the peri-operative module, vancomycin will be added to cefazolin if colonization with MRSA/MRSE is suspected based on known history, epidemiology, or screening tests. Operative room (OR) electronic people monitors will measure traffic during orthopedic and neurosurgical surgeries. In the post-operative bundle, patients will undergo CHG bathing for five days post-operatively, patients and their care providers will receive a standardized patient education module regarding wound care. Lastly, for patients transferring to skilled nursing facilities, standardized recommended order sets on appropriate bathing and wound care will be provided upon transfer of care. During year two, progress will be assessed and shared among UC sites. Outcomes measured for success will be compliance with bundles and surgical site rates. Process improvement changes will be implemented and successes may be extended in other surgical areas and outcomes measured during year three.

Outcomes:

1. **At all the five participating UCs, the overall standardized infection ratio for all surgical procedures from 2013 to 2014 decreased from 0.857 to 0.6572.**
2. **In 2014, of 10697 surgical procedures performed at the 5 UCs, 136 surgical site infections were recorded. The SIR complex decreased from 0.857 in 2013 to 0.672 in 2014.**
3. **Pre-operative bundle developed and implemented at each site.**
4. **In 2014, SIR decreased in each of the procedures studied in this grant, except for colorectal surgeries where SIR slightly but not significantly increased from 1.165 to 1.283 in 2014.**
5. Chlorhexidine gluconate (CHG) bathing for pre-op skin decolonization; each site has a minimum of 3 pre-op baths planned for each patient.
6. Each site has completed implementation of standardized antibiotic prophylaxis adherence and process measures reside in flow sheets with EHR at each institution
7. Standardized one page CHG bathing education sheet developed and implemented. Translations in Spanish, Hmong, Vietnamese, Russian, and Mandarin were also done and shared among all sites.
8. Wound care transition of care order set for preferred skilled nursing facilities implemented at UCSD and UCSF

LOCATION

UCD

PRINCIPAL INVESTIGATOR

Philip Wolinsky, MD

PROJECT TITLE

Co-Managed Care Model for Geriatric Hip Fracture

ABSTRACT

Approximately 330,000 hip fractures occur every year in the United States, and this number is expected to increase to 550,000 in the year 2040. The mortality rate for this population is between 20% and 24% within one year of the hip fracture. The Co-managed Geriatric Hip Fracture Care Project proposes to reduce the incidence of errors in the provision of care to hip fracture patients age 65 and older. Using a collaborative care model, orthopedics and medicine will partner to minimize: 1) the risk of perioperative delirium; 2) nosocomial functional decline through early implementation of physical therapy; 3) iatrogenic complications such as urinary tract infections and hospital-acquired pneumonia with daily team rounds; 4) the use of potentially inappropriate medications (PIMs) and subsequent medication errors; and 5) 30-day readmissions by optimizing the transition of care from hospital to the community. These objectives will be promoted through EMR-generated standardized order sets and templates for assessment and documentation that focus on interdisciplinary education and application of geriatric best practices from admission through discharge. These EMR templates will be supplemented with interdisciplinary team rounds to facilitate daily face-to-face communication with the care team. The following outcomes will be tracked to measure the success of this project: 1) time to surgery, 2) length of stay, 3) surgical complications (e.g., delirium, pneumonia, acute myocardial infarction), 4) hospital mortality, 5) 30-day readmissions, and 5) post-discharge ED utilization. In addition to these global measures of health care quality, we will collect data from hip fracture patients regarding their ability to complete activities of daily living, their pain rating, and their mobility capabilities upon admission and at discharge, as well as the integration of orthopedics and medicine during the hospital stay and where the patient is discharged (e.g., acute care rehab, SNF, home). The co-managed care model is designed to improve clinical care and patient satisfaction with the care experience. By coordinating care from the time of admission through surgery and into the discharge planning process, patients will receive constant interaction with their care providers to ensure that they are ready for discharge with their functional status optimized for the next stage in their recovery.

Outcomes:

1. The overall rate of delirium is 53.7%, which is close to the rate of 60% general reported in the literature.
2. Collection attempted of morphine dose equivalent, although this is not yet in the standard dashboard.
3. Established partnership with acute rehabilitation facility.
4. **The proportion of patients who received fascia iliaca compartment block (FICB) in the ED initially increased from 6% to 49% ($p < 0.05$), and the proportion of patients receiving acetaminophen in the ED increased from 6% to 31% ($p < 0.05$) following the pain management bundle.**
5. FICB compliance is currently at 56.7% (76/134).
6. **We have set 24 hours as our goal for time from ED triage to OR and have achieved an average time to surgery of 35.7 hours and a median of 25.9. Patients who had a delay to OR of more than 48 hours had a mortality rate of 18.5% vs. 6.9% for patients who received surgery in 48 hours or less ($p < .05$)**

LOCATION

UCSF

PRINCIPAL INVESTIGATOR

Wendy Anderson, MD, MS - 2012 Fellow

PROJECT TITLE

Palliative Care Workforce Expansion: Nurse-Initiated Multidisciplinary Patient and Family-Centered Communication in the ICU (5-CAMPUS)

ABSTRACT

Significance: One fifth of Americans die after receiving care in an Intensive Care Unit (ICU). In ICUs, patients receive interventions that may not be consistent with their wishes. Their families experience significant distress, and the costs of unwanted care burden our health system. Palliative care is specialized medical care for patients with serious illness and their families. When integrated into ICUs, palliative care improves management of patients' symptoms, decreases family distress, and increases satisfaction. By aligning patients' care with their preferences, palliative care decreases ICU length of stay and costs. Quality gap: Nationally, many ICU patients do not have access to palliative care. Even in the UC medical centers, which have well developed palliative care services, many patients dying in ICUs do not receive palliative care.

Objective and Aims: The objective of this 2-year project is to increase the integration of palliative care in the ICUs at the 5 UC medical centers: Davis (UCD), Irvine (UCI), Los Angeles (UCLA), San Diego (UCSD), and San Francisco (UCSF). We will accomplish this objective through a multidisciplinary collaborative of ICU and palliative care nurse and physician leaders from the 5 centers. The collaborative will achieve two aims: 1)

Expand a training program to increase the involvement

of ICU bedside nurses in communication about prognosis, goals of care and palliative care for seriously ill patients, 2) Identify best practices in ICU-palliative care integration and implement them to complement and support the nurse education intervention. Anticipated impact: We are evaluating the following outcomes: 1)

confidence and perceived skill of ICU bedside nurses to communicate with families and other providers about prognosis, goals of care, and palliative care, 2) documentation of patients' wishes and provider-family discussions in the medical record, 3) rates of palliative care consultation for seriously ill patients, 4) family satisfaction with care provided during the ICU stay, 5) ICU length of stay, and 6) hospitalization costs.

Outcomes:

- 1. Trained 428 nurses in palliative care communication**
2. Identified palliative care needs for 82% of 1110 patients screened between May 2013 and December 2014, including 53% with uncontrolled symptoms, 50% with family distress, and 52% with quality of family-clinician communication issues
3. Formation of a UC-wide palliative care service consortium
4. Developed report on hospital palliative care consultation services at the UC medical centers that identified a **total variable direct cost reduction of \$27.2 million across all centers due to hospital palliative care consultation services.**

LOCATION

UCSF

PRINCIPAL INVESTIGATORKevin Bozic, MD, MBA - *2012 Fellow***PROJECT TITLE*****Orthopaedic Bundle Payment - LEARNING COLLABORATIVE (5-CAMPUS)****ABSTRACT**

This project will spread the lessons learned from the bundled payment implementation for total joint arthroplasty at UCSF Medical Center to other UC medical centers. The aim is to standardize clinical practices and administrative procedures for this high-volume area to both reduce costs and improve patient outcomes. A UC-wide roll-out strategy for bundled payment implementation is crucial to competing in the changing health care marketplace in California.

Outcomes (at UCSF):

1. **Readmission rate declined from 4.3% in June-December 2013 to 0.7% in January-October 2014.**
2. **Patients discharged to home increased from 39% to 45% and discharged to SNF decreased from 53% to 41%.**
3. **Direct costs declined by 4-5% per case.**
4. **Blood transfusion rate declined from 22.8% for hip arthroplasties and from 11.2 to 5% for total-knee arthroplasties.**

Multi-campus Outcomes:

1. Hosted one cross-campus meeting with senior clinical leaders, two webinars, and UCSF site visits to UCSD and UCI.
2. Collected standardized metrics across the dimensions of operations, clinical care, and finance for two different time periods for all participating institutions.
3. Held multidisciplinary meetings at each campus to review the comparative findings and discuss an institution-specific path forward.
4. Engaged all campuses in sustained dialogue across various stakeholders on the risks and benefits of engaging in bundled payment for total joint arthroplasty, leading to a greater understanding of the clinical and operational changes needed to make bundled payment successful.

LOCATION

UCSF

PRINCIPAL INVESTIGATOR

Nathaniel Gleason, MD - 2013 Fellow

PROJECT TITLE

eReferrals & eConsults (4-CAMPUS)

ABSTRACT

Program: The UCSF eConsult program allows Primary Care Providers to receive timely, low-cost input from specialists on lower-complexity and data-oriented clinical questions that do not require an in-person evaluation.

Impact: One year after its launch, UCSF experience demonstrates significant impact on referral rate, specialty care utilization, specialty care access time, and costs. eConsults now represent 8.2% of referrals to participating specialties. The referral rate for standard office visits declined by 20%. Access to a specialty care input within 14-days (via eConsult or office visit) improved from 29% to 46%, a 59% improvement. Mean professional-fees during the 120-day period following all referrals or eConsults decreased by 7.2%. Adoption of the program is robust, with 2/3 PCPs using eConsult, and high acceptability among providers.

Return on Investment: Conservative modeling yields an anticipated savings of \$250,000 annually per 50,000 primary care patients. Program costs for that same population will be approximately \$45,000 per year for eConsultant fees (to be replaced ultimately by payer reimbursement), as well as site-leader and site-analyst support (with personnel cost dropping sharply after the first year. **Implications for UC Health:** The UCSF eConsult program drives integration of primary care and specialty care – an essential step to deliver higher value care. The model supports the work of both the PCP and specialist involved in each eConsult exchange to build our capacity to provide efficient, cost-effective, high-quality care. The program will readily transition to population-based payment arrangements as these are adopted. The UCSF eConsult program is well-suited to dissemination given the strong early results in specialty care access time, utilization, and costs, and the significant potential return on investment.

UCSF 2013 Outcomes:

Findings:

1. Five specialties were added, with 3 additional specialties nearing the launch date-based upon groundwork laid during the grant period. The specialties launched differ from the specialties proposed initially.
2. Launch of orthopedics as a specialty is being conducted with a more formal development process to explore the utility of this approach.
3. **eConsults were used for 8.2% of total referrals, and the referral rate for standard office visits decreased by 20%.**
4. **Mean pro-fees during the 120-day period fell from \$557 to \$517 per referral, a decrease of 7.2%. The proportion of these referrals with an ED visit within 120-days decreased from 9.8 to 8.6%, and hospital admissions among these patients decreased from 6.6 to 5.9%.**
5. During the first eight months of the program, over two-thirds of PCPs placed at least one eConsult and 91% strongly agreed that the response was helpful. Feedback from providers has been overwhelmingly positive.

Campus-wide Outcomes:

1. Launched eConsult for 14 specialties at all 5 UC medical centers.
2. **High adoption rates among PCPs at UCD and UCSD: 84% of UCD PCPs and 78% of UCSD PCPs sent at least one eConsult.** Adoption slower but also high among UCLA (40%) and UCI (58%) PCPs.
3. **Mean eConsult response time is well under 3-day goal in nearly every specialty**
4. Preliminary results suggest that 60% of patients who received an eConsult would prefer continuing to receive eConsult for further specialty care needs.
5. UC Care providing reimbursement for eConsults across UC Health, other groups reimbursing at UCSF and UCLA
6. **UCSF implementation of eConsults saved Anthem \$345,600 last year** through averted specialty new patient visits.

LOCATION

UCD

PRINCIPAL INVESTIGATOR

Elisa Tong, MD - 2013 Fellow

PROJECT TITLE

UC Tobacco Cessation Network

ABSTRACT

Background: Tobacco is the leading cause of preventable mortality, and tobacco cessation is one of the most beneficial and cost-effective interventions providers can offer. A systemwide approach to tobacco cessation is important, since tobacco cessation requires multiple quit attempts, prompts by providers, and assistance with counseling and medication for greater success. However, none of the UC hospitals have a dedicated inpatient tobacco counselor, and outpatient group counseling is limited in appeal and not available at all UCs. Fortunately, the federal Meaningful Use program has created an unprecedented opportunity to address tobacco cessation on a systemwide basis, spurring each medical campus to adopt an EMR and screen patients for tobacco status. The gap in clinical service can be remedied with the UC campuses connecting with the California Smokers' Helpline, an existing UC-based telephone counseling resource. Not only does the Helpline counseling and support double quit rates, but electronically connecting with a quit-line increases utilization 13-fold. UCD has successfully launched the first two-way e-referral with the Helpline in California, and utilization is expected to increase with forthcoming changes. **Objective:** This proposal will scale-up the UCD project to the 4 other UC medical campuses to create a UC Tobacco Cessation Network. By the end of two years, all UC medical campuses will have a two-way e-referral capacity with the Helpline, departments systemwide will engage in tobacco cessation orders, and a UC Tobacco User Registry will allow for future monitoring and intervention. **Methods:** The UC Tobacco Cessation Network will be led by Elisa Tong (UCD) with UC Tobacco Champions at each site. Champions are needed to accelerate systemwide tobacco cessation implementation. Technical documentation for the e-referral order build has already been shared with UCSD and UCLA. Each site, however, must build its own EMR orders and adapt it within their unique infrastructure and department workflows. In collaboration with each campus' medical informatics leadership and programming team, a strategic workplan to adapt and promote the UCD modifications will be implemented. Year 1 will consist of building the infrastructure and promoting the changes with a first wave of departments to create a common core. Year 2 will consist of continuing promotion with a second wave of departments, and developing the UC Tobacco User Registry for evaluation. **Anticipated Return on Investment:** UC Health will be more competitive by being a rapid adopter of reform while demonstrating quality improvement and savings with more efficient and systematic tobacco cessation services. These EMR modifications are self-sustaining once implemented with the start-up costs of programming and outreach. The projected cumulative health care savings, which would continue to accrue and grow in future years, is \$1,031,813 by the end of the project period (Year 3 with Year 1 as UCD only) and \$4,795,964 by Year 5. The UC Tobacco Cessation Network is also a platform for intervention and research grants for future innovation. This project is a blueprint for UC Health to integrate e-referrals external to each site and improve coordination of care for future projects beyond tobacco.

UCD 2013 Outcomes:

1. **Generated 441 referrals, resulting in \$11,000 in savings from reduced healthcare utilization.**
2. 50.6% of patients were reached after an average attempt of 4.9 calls.
3. Created the first two-way referral system between an electronic health record system and the California Smokers' Helpline.
4. Referrals from diverse departments with low-intensity outreach reached 50.6% of patients after an average attempt of 4.9 calls, higher than the 33% reported by the University of Wisconsin for e-referrals in the outpatient clinics.

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5. Of those contacted, the majority (72.6%, n=162) agreed to complete the intake questionnaire and were mailed self-help educational materials, with most (82.1%, n=133) receiving counseling. Thus, 36.7% of those referred accepted and received a tobacco cessation intervention, which is higher than the 5% reported in Wisconsin.
 6. UCD has disseminated the technical build documentation of the two-way e-referral build to the other 4 UC medical campuses.

Multi-campus Outcomes:

1. Team consists of 40 members from 5 UC sites reflecting inpatient/outpatient physicians, including residents and fellows; nursing, respiratory services, pharmacy, and IT.
2. Over 5400 eReferrals made to California Smokers' Helpline, led Helpline to be the first quit-line designated nationally as a Meaningful Use Specialized Registry for eReferrals.
3. Nearly \$880,000 in short-term savings from over 280 long-term quitters.
4. Created provider website resource: www.ucquits.com with 8 training videos providing CME/CEU credits
5. Contributed to DSRIP DY8 report on UC documentation and performance on outpatient tobacco intervention and DHCS PRIME projects for UCD and UCSD, providing assistance to other safety net hospitals participating in PRIME.
6. Project featured in Epic Clinical Programs Document and North American Quitline Consortium report.
7. Supporting UC performance on Joint Commission tobacco measure for UC inpatient psychiatry hospitals and UCI entire hospital
8. Helped secure First 5 funding for UC pediatric secondhand smoke education and treatment program

LOCATION

UCSD

PRINCIPAL INVESTIGATOR

William Perry, Ph.D - 2011 PI

PROJECT TITLE

Patient-Centered Recovery Program & ED Community Placement Program: Reducing emergency department recidivism and length of stay among patients w co-occurring psychiatric and substance abuse disorders (5-CAMPUS)

ABSTRACT

Over-utilization of emergency department (ED) services by psychiatric patients is a national crisis. The Agency for Healthcare Research and Quality (2010), reports that almost 12 million visits to hospital ED (12.5% of all ED visits) involved a mental health or substance abuse (MHSA) diagnosis¹. A new research letter published in The Journal of the American Medical Association (JAMA) found that from 2005 to 2010 Medicaid patients in California (MediCal) visited the ED more often than any other group, often for psychiatric, substance-related and non-emergency needs². This steady rise in MHSA-related ED visits has resulted in ED overcrowding and a reduction in services offered to other medically ill patients. The increasing number of patients with MHSA-related conditions has been identified as a primary reason for reduced patient flow, extended length of stay (ELOS), and increased rates of return to the ED for assistance. Research has shown that ELOS patients accounted for only 4% of the patient population but 17% of patient care hours³. Risk factors for ELOS include lack of insurance, suicidal ideation, homicidal ideation, homelessness, male gender, previous hospitalization, and most prominently substance abuse and psychiatric co-morbidity. Additionally, patients with co-occurring substance abuse and other mental disorders (COD) have been found to have a higher number of visits⁴ and tend to be individuals who are unemployed, disorganized, and/or homeless; consequently, they have difficulty following through with recommended discharge plans, especially when they are placed on long waiting lists or required to make repeated phone calls to obtain services. With this in mind, the UCSD Patient-Centered Recovery Program (PCRP) was designed to provide Screening, Brief Intervention, and Referral to Treatment⁵ (SBIRT) services to COD patients in the ED. The goal of the PCRP was to reduce ED length of stay and recidivism (return visits to the ED). The PCRP team, a clinical social worker and peer specialist, are a part of the psychiatry consult team and collaborate with ED physicians and nurses to provide client-centered motivational enhancement for behavior change, promote integrated outpatient treatment of substance abuse and psychiatric illness, community reintegration and, direction to appropriate medical care homes. Following two years of this CHQI-funded program, the UCSD-PCRP has reduced the average ED LOS of psychiatric patients 9.1 % and reduced 30-day psychiatric patient recidivism by 15.3% all within the context of a 50% increase in new psychiatric patients coming to the ED for care. Consistent with the PCRP effort is a companion project entitled the UCSD ED Community Placement Project, headed by Karen Mitchell RN, MSN and implemented at the bedside by ED nursing staff. The highest ED utilizers with excessive recidivism rates were identified. The vast majority of these patients have co-occurring psychiatric and substance abuse disorders and are unfunded or under-insured. The number of people inappropriately using the ED to address their unmet primary care and social needs has increased in part due to shortages of skilled nursing facilities, step down programs, detoxification centers and home health services that facilitate alternatives and early discharges from hospitals. Furthermore, Pitts and colleagues (2010) reported that uninsured patients received more than half their acute care in EDs. Two-thirds of acute care visits to EDs took place on weekends or on a weekday after office hours when access to appropriate disposition and case management is unavailable. To facilitate appropriate disposition and case-management options to prevent further inappropriate use of the ED, partnerships were formed with community service providers. These service options include non-medical detox and substance abuse treatment and a homeless prevention center. Both phases of the project have resulted in palpable changes in our ED. These programs have resulted in significant cost savings for UCSD, from reducing LOS and recidivism of psychiatric patients to direct cost savings by placing the highest utilizers

into contracted community beds directly from the ED (See Tables 1-3). These interventions have also contributed to improving the patient experience in the ED, the gateway to the UCSD Health System. Collectively these programs have saved UCSD over \$120,000 in annual direct costs. This does not include the opportunity gains from improved ED capacity and patient care environment or that the targeted patients are now more likely to get more appropriate substance abuse and psychiatric treatment. We have definitively improved the patient experience in our ED, the gateway to the UCSD Health System.

UCSD 2011 Outcomes:

1. **80% of PCRCP patients placed in crisis houses did not return to ED for six months**
2. **Generated \$300,000 in savings and achieved an overall ROI of 3.8.**
3. **The UCSD-PCRCP has reduced the average ED LOS of psychiatric patients 9.1 % and reduced 30-day psychiatric patient recidivism by 15.3% all within the context of a 50% increase in new psychiatric patients coming to the ED for care.**

Multi-campus Outcomes:

1. Initial focus has been on campuses similar in size to UCSD: UCI and UCD.
2. Facilitated hiring and training a team of clinical social workers and peer specialists to integrate with the psychiatry consult and emergency medicine team to provide client-centered motivational enhancement for behavior change. Fully implemented at UCSD and UCI. Trainings completed at UCD.
3. Promoted integrated outpatient treatment of substance abuse and psychiatric illness, community reintegration and direction to appropriate medical care homes.
4. The Electronic Screening and Brief Intervention (eSBIRT) is now being used for patient admitted to psychiatric and medical/surgical inpatient units at UCSD.
5. Social Services have been permanently added to the Emergency Department at UCSD.

LOCATION

UCSF

PRINCIPAL INVESTIGATOR

Hanmin Lee, MD

PROJECT TITLE**Mitigation of Hospital Acquired Pressure Ulcers Using "SmartDerm"****ABSTRACT**

Pressure ulcers (PU) are common and often preventable, occurring in 2.5 million people in the U.S. with an annual cost of \$11 billion. The Centers for Medicare and Medicaid Services (CMS) no longer reimburse for hospital-acquired pressure ulcers (deemed "never events"). Current preventive strategies include subjective risk assessments and manual patient repositioning, which are variable between settings and require significant personnel time. At this time, there is an unmet need for effective, low-cost technology to monitor at-risk patients for the development of pressure ulcers. Further, there is no cost-effective alternative available to replace nurse labor costs in performing clinical assessments and manual re-positioning. We propose to close the feedback loop and provide a real-time risk factor and automated pressure detection and redistribution system that improves patient safety and reduces cost. Our multidisciplinary team of engineers, doctors, and nurses are working on a 3 part strategy for PU prevention that we have called SmartDerm: 1) an improved algorithm for assessing risk that will automatically download information from the electronic medical record giving each patient a PU risk score. 2) a low-cost pressure-sensitive wound dressing that will continuously monitor pressure at high risk areas (e.g. lower back and heels) and 3) a low-cost automated movement device coupled to the pressure sensors. 12 Month goals: 1) Develop an algorithm: Current work to date on the algorithm consists of analysis of a large data-set of 4 million patients to identify variables that increase risk for PU formation. In the next year we will create a proprietary algorithm that will give patients an individual PU risk. Depending on EMR innovations and potential partnerships with companies such as EPIC, this will happen either within the EMR or through an external app. 2) Pilot clinical testing: Focal pressure-sensing: We have spent the last year creating several prototypes of low-cost, focal pressure-sensing devices. We will spend the next 6 months continuing with design of a usable sensor and then the next 6 months testing it in patients. We already have IRB approval to test our devices in patients at UCSF. 3) Develop and prototype: Automated movement device: We have several engineering concepts for an automated movement device and over the next year will prototype several different versions. We propose to have a working prototype in twelve months. Regulatory Pathway: Upon completion of these aims, we will have developed a clinically usable device capable of collection, transmission, and analysis of real-time pressure data in order to generate a patient-specific risk level for ulcer development to improve pressure ulcer monitoring and prevention efforts. The sensor will likely be a class 1 medical device and we expect an uncomplicated process for our first claim of focal pressure sensing. The automated movement device carries more risk and will likely be classified as a class 2 medical device and will take a longer regulatory path for our second claim of pressure sensing and adjustment to prevent pressure ulcers. Both will require human clinical trials. We expect to have a marketable pressure sensor in 2-3 years and a marketable movement device in 3-4 years.

Outcomes:

1. Designed and created three generations of sensor devices, which can be embedded in a wound dressing layer.
2. Based on feedback from nurses, increased breathability and pressure accuracy of sensor.
3. Reduced need for dressing changes of sensor has potential to reduce cost of treatment.
4. Tested risk algorithm and increased sensitivity and specificity by adding risk factors identified in HAPU reports.

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5. Began testing sensor on operating room and intensive care unit patients
 6. Assessed cost savings potential: 1% reduction systemwide in pressure ulcers could save \$20 million per year

LOCATION

UCSD

PRINCIPAL INVESTIGATOR

Christian Tomaszewski, MD, MS, MBA

PROJECT TITLE

Mitigating Legal Risk in the Emergency Department

ABSTRACT

Emergency Departments (EDs) within the University of California system face some of the same risks seen in EDs throughout the country. Diagnosis-related errors are a leading cause of claims for ED providers. To help mitigate UC-wide emergency department (ED) risk, we reviewed UC-wide ED claims data, developed an online risk assessment survey based on a medico-legal risk literature review, analyzed non-public California Office of Statewide Health Planning and Development (OSHPD) ED and inpatient utilization data, and held a UC ED-wide focus group. Our assessment identified two main areas that can be targeted to decrease medico-legal risk in our UC EDs: (1) improved patient risk assessment at discharge with subsequent follow-up; and (2) the identification and proper monitoring of high risk patients during ED care, which includes those with risk of self-harm, elopement or fall. The overarching goal of this proposed project is to decrease medico-legal risk associated with ED patient care. This will be accomplished by the following three specific aims: 1) Identify, develop and refine intervention based on evidence-based literature and experiences at participating UC campuses. 2) Pilot interventions at identified medical centers (UCSD will be primary). 3) Scale-up successful interventions across the UC system. The proposed interventions are inherently sustainable after the completion of the project because most involve leveraging our current EMRs. This project will also provide an opportunity to continue collaboration between UC sites as well as the potential to obtain extramural funding opportunities to evaluate methods to further decrease legal risk while enhancing ED patient care through the UC Health System. Ultimately, we plan to create a dynamic UC ED Risk Task Force that can leverage best practices across our entire UC institution.

Outcomes:

1. Created new functionality in EPIC that will allow for ongoing risk stratification and notifications.
2. Radiology: UCLA has been successful in implementing a policy of having final reads for all imaging prior to patient discharge.
3. Medical risk assessment has identified Coumadin and immunotherapy as high risks at UCSD and hypoglycemia at UCI.
4. EMR alerts and/or special gowns and special gowns/bands implemented at four sites.
5. Decision support needs identified in pulmonary embolism at UCSF, and pediatric head injury/trauma and sepsis at UCD.