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CSHP Seminar 2016
Poster Session Abstract Review

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Peer Review

The California Journal of Health-System Pharmacy is a peer-reviewed publication!

The CSHP Editorial Advisory Board is pleased to announce that the California Journal of Health-System Pharmacy has completed the transition to peer review.

Peer reviewed, or refereed, publications utilize an editorial process to ensure that the articles published are as scholarly as possible. From this point forward, when an article is submitted to CJHP, the editors will send it out to other (peer) pharmacists and clinicians in the same field to obtain their opinion as to the appropriateness of the manuscript for publication, the relevance to the field of study, and the quality of the research.

Instructions for Authors

The California Journal of Health-System Pharmacy welcomes article submissions in any field pertinent to the practice of health-system pharmacy. All manuscripts submitted are subject to peer review. To submit a manuscript for publication, please visit http://cshpjournal.msubmit.net. Authors without access to the internet may send a printed copy of their manuscript along with a CD, DVD or USB drive to: CJHP, attn: Managing Editor, 1314 H Street, Suite 200, Sacramento, CA 95814.

For more information on article submission, Peer Review, or CJHP, please contact Cindy Hespe, Managing Editor, CJHP at chespe@cshp.org or 916.447.1033.
Dear CSHP members and poster session participants,

We are pleased to make available this special supplemental issue of the *California Journal of Health-System Pharmacy*. Within this issue, the reader will find abstracts showcased at the poster session from CSHP Seminar 2016 at the Disneyland Hotel.

CSHP’s purpose in presenting the poster session abstracts is two-fold: to provide interesting information on innovative developments within the field of pharmacy and to create an avenue of networking for our CSHP members. Consistent with the Seminar 2016 theme “Transitions in Pharmacy,” through posters, pharmacy practitioners, technicians, and students explore new concepts and ideas, share their innovative practices and research, along with their learning experiences with colleagues. A total of 115 posters were presented. This is an 185% increase in the number of posters presented since 2011, and we thank all of the participants for their tremendous enthusiasm and hard work! A very special thank you goes out to Dawn Long for her tireless and diligent efforts in coordinating the poster sessions and to Megan Page for manuscript preparation to publish the abstracts.

We are thrilled to see the tremendous growth, both in the number of poster abstracts submitted and also the wide range of research topics and projects, reflecting the rapid transition and successful advancement of pharmacy practice.

Thank you for your continued support, and we look forward to seeing you October 26-29 at Seminar 2017 at the Paris Hotel in Las Vegas, Nevada.

Cheers,

Tantri Budiman
Pauline Chan
Tristan Lindfelt

*Seminar 2016 Poster Session Co-chairs*
Minimizing Opioid Use While Alleviating Pain: Results of a Multimodal Approach

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Introduction
Pain management per pharmacy has been a service formally offered by the pharmacists at SMBHWN for at least 10 years or more. With time, the service has been accepted and increasingly utilized by our medical staff. The services provided include overall management of pain and sequelae, oversight of adherence to institutional guidelines for use of fentanyl patches, and continuation of methadone clinic enrollees, and now, generation of CURES reports for consult patients. Over the past several years, with the advent of public recognition of the opioid abuse epidemic and an onus being placed upon physicians for restricting the use of opioids, the workload of our pain service seems to have increased. In this report, we describe and quantify that increase.

Methodology
We examined the electronic medical records of every patient who was seen by the SMBHWN Pharmacy Pain Service for the calendar years 2014 and 2015, as well as work product for each patient. Demographic and quality assurance data were collected into spreadsheets and de-identified. Because this was primarily a retrospective, descriptive evaluation, no outcome measures for statistical analysis were identified.

Results
Data were collected for 160 patients: 60 in 2014 and 100 in 2015. The number of physicians ordering our service increased from 28 in 2014 to 43 in 2015. The majority of consults were for patients who were post C-section. The average number of days spent per patient in 2014 was 5.0; it was 3.7 days in 2015. This is further broken down by patient type (2014 vs 2015): pregnant patients (13.2 vs 4.8 days), post-partum (3 vs 3.5 days) and gynecologic patients (3.0 vs 2.4). Though the number of pregnant patients increased from 12 to 26, we achieved faster control of pain and decreased time on IV analgesics (and time on indwelling IV catheters) by promoting faster transition to oral therapies, incorporation of non-opioid analgesics earlier, and initial patient education about non-pharmacologic therapies for pain relief. To illustrate: 100% of patients had an order to receive an NSAID (IV or po) on post op day 0; 100% of patients had an order for acetaminophen (IV or po) within 48 hours of consult initiation; 100% of patients who were taking adjuvant or psychiatric medications prior to admission had these resumed within 24 hours of consult initiation. Finally, in 2014 only 27% of patients were offered non-pharmacologic therapies; by the final quarter of 2015, these modalities were extended to 100% of patients.

Conclusion
The pain service is utilized by all 3 main physician specialties but most commonly by the OB/GYN’s. The typical patient we are asked to see has acute on chronic pain with tolerance of opioids, and possibly abuse or dependence issues. The largest proportion of our time is spent with pregnant patients. We have suffered no adverse events so far. Our strong pursuit of multimodal analgesia has resulted in 100% of patients receiving non-opiate medications and non-pharmacologic education and therapies from the first contact, thus helping achieve the objective of minimization of opioid use while alleviating pain.

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Design and Implementation of a Web-Based Dashboard to Identify and Monitor Veterans with Recent Heart Failure Admissions

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Introduction
Decreasing readmissions for heart failure (HF) has been a national imperative given its preventability and high costs. Effective 2012, the Center for Medicare and Medicaid Service began reducing payments to participating hospitals with high rates of HF readmissions. The Department of Veterans Affairs implemented a national quarterly report called Strategic Analytics for Improvement and Learning (SAIL), which compares and benchmarks VA hospitals on several inpatient factors including HF readmissions. Veterans Affairs Central California Healthcare System (VACCHCS) became interested in developing an online dashboard to find and provide summary data for veterans with a recent HF admission to improve care and reduce 30-day readmissions.

Methodology
An electronic Structured Query Language (SQL) dashboard created by the SQL Report Builder was designed to identify patients who were either admitted or seen by VACCHCS emergency room (ER) within the last 30-60 days for heart failure exacerbation. A second dashboard was also created to monitor admission of any cause for patients who have heart failure listed in their outpatient history, with the intention of finding patients admitted for diseases related to heart failure (e.g. acute kidney injury, pneumonia, chronic obstructive pulmonary disease exacerbation). ICD-9 and -10 diagnosis codes were pulled from several data sources including admission, discharge, and hospital transfer diagnoses, as well as clinic visit diagnosis codes for ER visits. Selecting a particular patient gives a snapshot profile. Information in a patient’s profile includes age, whether they are enrolled in outpatient cardiology clinic, cardiovascular medication list and history (including issue date, dose, directions, and calculated medication possession ratio for each prescription), recent vitals and laboratory data. Vitals (e.g. blood pressure, heart rate, weight, and pulse oximetry) and laboratory (e.g. sodium, potassium, blood urea nitrogen, serum creatinine, brain natriuretic peptide, troponins, and magnesium) values are displayed graphically as trend lines. Information including sum of all ER visits for heart failure in the last 30 days, as well as last known echocardiogram, electrocardiogram, and catheterization are displayed as well.

Results
VACCHCS cardiology department provided feedback on the initial versions of the dashboard. Overall it was well-received and viewed as a tool that can identify vulnerable patients to ensure adequate follow-up and education has been provided. The dashboard will be automatically refreshed on a daily basis, and will be monitored by the cardiologists, or pharmacists working in the cardiology department.

Conclusion
Implementation of a web-based dashboard to identify patients admitted or seen by the ER for heart failure exacerbation was well-received by our cardiology department. The success of this dashboard requires the collaboration of several specialty fields including cardiology, VA regional data management, and pharmacy. Future directions may include analysis of heart failure readmissions and other outcomes for patients who were monitored by this dashboard.
Establishing a Pharmacy Call Center at VA Central California Health Care Systems (VACCHCS) for Increased Veteran Access

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Introduction
Patient access to care is a critical element being accessed at the VA. To enhance access to pharmacy, VACCHCS is establishing a pharmacy call center to provide veterans with one-stop-shop care, decreased wait time, lower call abandonment rates, and higher level of customer service.

Methodology
VACCHCS collaborated with the Office of Patient Centered Care and Cultural Transformation (OPCC&CT) on a project focused on improving the veteran’s pharmacy experience. One thousand veterans were invited to participate in providing feedback on pharmacy service through facilitated listening sessions (FLS) to gather the voice of the veteran. In addition to the veteran’s feedback, the LEAN systems principals were utilized to identify the current processes in place for incoming veteran calls to pharmacy. Areas examined included transfer points and multiple extensions, staffing shortages, speed of answer, call abandonment rates, and call handle time. CISCO Unified Intelligence Center (a web-based application used for reporting of call center data) was utilized to collect and analyze pharmacy call data for both incoming and outgoing calls. Data collected was then compared to national performance metric goals to assess the current service level being provided.

Results
The CISCO data for pharmacy performance metrics prior to the implementation of the call center revealed a low level of customer service with the average speed of answer at 6 minutes and 6 seconds, call abandonment rate at 34.1%, and the average call handle time of 2 minutes and 44 seconds. These findings mirrored the voice of the veteran, gathered in the FLS, stating that they experienced long wait times and would often come in to the facility because it was easier than waiting on the phone. It was also found that an additional 47.2% of pharmacy related calls were being transferred to a facility call center and not being addressed directly by a pharmacy staff member. Internally, calls that did make it into pharmacy were found to be inconsistently handled. Only 1 technician was answering calls leading to excessive wait times and higher call abandonment rates. Additionally, there was no dedicated pharmacist for technicians to reach out to when calls needed a higher level of service. The access gap data was presented to facility executive leadership resulting in the approval of 4 pharmacy call center technician positions along with a full-time pharmacy manager position dedicated to the implementation of the pharmacy call center. Training manuals, scripts, standard operating procedures and policies were developed promoting telephone customer care and prompt pharmacy access. Additional customer service trainings were provided to call center staff promoting the patient centered experience. Since the initial implementation in April 2016 with 2 of the 4 technicians, the abandonment rate has already decreased by 12.9% and speed of answer has been reduced by 2 minutes and 35 seconds. Further improvements are expected once fully staffed.

Conclusion
The development of the Pharmacy Call Center is already enhancing the patient centered experience and access for veterans of VACCHCS. Shorter wait times and lower call abandonment rates are being seen post implementation.
Implementation of the CSHP-Sacramento Valley Chapter Mentorship Program

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Introduction
The CSHP-Sacramento Valley Chapter (SVC) Mentorship Program was initiated in 2012 as a pilot. Initially the program was to serve new practitioners. In 2013, the program expanded to include students from California North State University (CNSU), and in 2014, students from the University of the Pacific (UOP).

Key Objectives:
Mentoring has been defined as “a nurturing process in which a more skilled or more experienced person, serving as a role model, teaches, sponsors, encourages, counsels, and befriends a less skilled or less experienced person for the purpose of promoting the latter’s professional and personal development. Mentoring functions are carried out within the context of an ongoing, caring, relationship between the mentor and protégé.” This is the foundation of CSHP-SVC’s program.

Methodology
The CSHP-SVC Mentorship Program is administered in partnership with Student Organizations of UOP and CNSU. Currently, there are 15 active mentees and 12 mentors, with equal representation from each school.

1. Structure: The CSHP-SVC board provides oversight to the program along with an Advisory Panel, which is composed of pharmacists, new practitioners and students.

2. Matching Process: Participants are admitted to the program through a matching process using Mentor and Mentee Inventories identifying preferences and skills of each. Mentors and Mentees are assigned in dyads initially based on “best match”. Participants may request a change by notifying the program chair and co-chair. A roster is maintained to ensure availability and to meet program needs.

3. Training: The program established a “Mentor and Mentee Guide” and a “Mentor and Mentee Core Expectations” as standards of practice, with ongoing training and support.

4. Activities: Mentors and Mentees are expected to develop their professional relationship based on individual preferences. The program chairs schedule regular group activities throughout the year. Since 2013, a major function, Mentor-Mentee “Meet and Greet” is held at the annual CSHP Seminar. An annual dinner recognition program was initiated in early 2016.

Results
A dashboard of key measures of success is used to track outcomes including:

a. Growth in CSHP membership: CSHP-SVC pharmacist membership saw an 8% growth from 2014 to 2015; CSHP-UOP student membership saw a slight increase; and CSHP-SNSU student membership will be tracked using a baseline of 83 members in 2015.

b. Professional accomplishments: Mentees were surveyed about their professional accomplishments, including obtaining a residency/fellowship/job, scholarships, awards, attendance at pharmacy conferences, participation in health fairs and community services. 79% reported increase from 2014 to 2015.

c. Mentees and mentor satisfaction: Both groups reported favorable satisfaction with an overall satisfaction score of 7.3 out of a 10-point scale.

Conclusion
The program aims to promote professional growth of individuals through mutual support in an engaging environment. Key measures of success are growth in membership, professional accomplishments of members, and favorable satisfaction from surveys.

Through guided professional development, mentees are encouraged to continue their involvement in professional pharmacy organizations after graduation and become future mentors. Our model could potentially help guide CSHP in implementing a mentor program statewide.
Implementation of a Regional Target Specific Oral Anticoagulant Pharmacy Service

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Introduction
There are currently four target-specific oral anticoagulants (TSOAs) on the market, dabigatran, rivaroxaban, apixaban, and edoxaban. Although the TSOAs require less frequent monitoring than warfarin, patients still need to be evaluated at least annually to ensure appropriate dosing based on renal function, and for review of adherence, drug-drug interactions, and interventions in the peri-procedural periods. The purpose of this poster is to evaluate the outcomes of a regional TSOA Pharmacy Service in a large integrated healthcare system.

Methodology
To evaluate the outcome of a regional TSOA pharmacy service, we reviewed intervention data, prescription refills, and hospitalization data using reports from the electronic medical records (EMR).

For PHASE 1, patients were enrolled in the regional TSOA safety net service starting 3/2014. Pharmacists in this service screened reports generated from the EMR and outreached physicians for management. Data collected from September 2014 to January 2015 and were compared to baseline, including type of interventions and number of prescriptions overdue.

For PHASE 2, patients were enrolled in the regional TSOA management service starting 5/2015. This proactive model of care assists physicians in initiating, educating and monitoring patients on TSOAs. Quality outcomes were measured by reviewing hospitalization data for patients on TSOAs with major bleeds or major clots.

Results
PHASE 1: TSOA safety net results showed that overdue refills significantly decreased from 20% in January 2014 to 14% in January 2015 (p<0.05) despite the increase in volume of TSOA from 1203 to 2940 during that time. In addition, there were a total of 852 total interventions with 277 clinical pharmacist interventions from 9/2014-1/2015 including dose adjustments based on renal function or drug interactions, perioperative consultation for physicians, patient education on drugs and to promote medication adherence.

PHASE 2: Patients enrolled into the regional TSOA management service were outreached for initiation and education, with follow up visits within 1 month and outreaches every 3 months for the first year to ensure safe use of medication. After the first year, patients will be contacted for routine lab reminders and when an intervention is needed. Although not statistically significant, the trend shows a decline in bleeding events from 4.29% Q1 2014 to 1.76% in Q3 2015 as well as a decrease in clotting events from 2.58% to 0.94% based on patient / years (p>0.05).

Conclusion
When first introduced to the market in 2010, TSOAs were advertised as “one dose fits all” and “no routine monitoring”. This generated the debate of whether clinical pharmacists were needed to help ensure the safe use of these medications. The results from PHASE 1 and PHASE 2 demonstrated the value of a regional TSOA Pharmacy service by improving medication adherence and minimizing major bleeding and clotting events despite increase in utilization of these medications.
Improving Medication Adherence at the Point of Care Using Healthcare Analytics

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Introduction
According to the Centers of Disease Control and Prevention (CDC), nearly half of Americans in 2013 are considered non-adherent to their medications. Medication adherence (MA) rate for most organizations has reached a plateau despite efforts to increase its awareness. An innovative approach is needed to further improve MA. The purpose of this descriptive study is to provide an overview of a seamless, ongoing process developed within Kaiser Permanente (KP) to improve MA, by leveraging data, analytics and technology. This new process empowers outpatient pharmacists and facilitates patient counseling to provide targeted and impactful care at the time of dispensing.

Methodology
Pharmacy Analytical Services (PAS), an inter-regional pharmacy analytical group within Kaiser Permanente, analyzes healthcare data from over 400 sources using Oracle Structure Query Language (SQL). PAS identifies members meeting specific clinical criteria, including medication non-adherence as defined by proportion of days covered (PDC) < 80% and member not meeting clinical goals such as elevated Hemoglobin A1c level. Once the cohort is identified, data is streamlined into outpatient pharmacy system (ePIMS) when prescription filling process was initiated and an Outpatient Clinical Information Summary (OCIS) sheet is printed alongside prescription labels for eligible members. At the time of prescription pick-up, pharmacist will then counsel the patient on non-adherence, using information on OCIS sheet, as part of Outpatient Clinical Services (OPCS) program. In general, outpatient pharmacies do not have clinical information readily available for pharmacists to perform in-depth counseling. An OCIS sheet, on the other hand, is populated with specific adherence intervention alerts, demographic information, laboratory results, prescription history, PDC rate and hospitalization data. The information provided creates an opportunity for a more directed counseling session focused on non-adherence and the importance of meeting clinical goals.

Results
Since 2012, this program has been implemented in 204 pharmacies, across 4 states (CA, CO, GA, HI). Nationwide rollout to over 420 pharmacies is expected to be completed by the end of 2016 to include KP pharmacies in District of Columbia, Virginia, Washington and Oregon. This program currently includes modules for members in diabetes and atherosclerotic cardiovascular disease (ASCVD) registries, with future expansion to include members in the hypertension, osteoporosis and asthma registries. The results of this program are pending and will be available at the time of presentation.

Conclusion
The convergence of big data, analytics and technological advancements has presented unprecedented opportunities for healthcare organizations to efficiently improve the quality of patient care. Through this program, we have combined the science of technology and art of patient care to transform the way we care for our members.
Cost Burden and Rate of Inappropriate Use of Proton Pump Inhibitors for GERD in the Elderly

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Introduction
Proton pump inhibitors (PPIs) are often prescribed without a clear indication and for a longer time period than recommended. The American Geriatrics Society updated the Beers Criteria in October 2015. The updated list now includes PPIs due to adverse events associated with their use, including: bone fractures, Clostridium difficile infections, and pneumonia. A number of studies have reported increased costs at their healthcare facilities due to high rates of inappropriate PPI prescriptions. Within a network of many healthcare facilities, one service area in particular in the central valley of California has the highest utilization rate of PPIs.

Purpose: To determine the incidence of potentially inappropriately prescribed PPIs and the associated cost burden for the treatment of GERD in the elderly at the service area with the highest utilization rate.

Methodology
This study consisted of a single-center retrospective chart review. Patients were included in the study if they met all of the following criteria: 65 years of age or older, filled a prescription for a PPI between April to June of 2015, have been a member of the healthcare network for at least three months, and prescribed a PPI specifically for the treatment of GERD. Exclusion criteria included non-prescription PPI use, less than 65 years of age, healthcare network member for less than three months, obtaining prescriptions outside of the healthcare network, PPI indication other than GERD, or multiple indications for PPI use. A complete refill history was reviewed for each patient to determine the treatment duration. Refills were included if they were requested by the patient within 14 days of the predicted refill date. Primary outcomes included the rate of appropriate versus inappropriate PPI prescriptions and the cost associated with the inappropriate prescriptions. Secondary outcomes included the rate of bone fractures, Clostridium difficile infections, pneumonia, and the total duration of continuous PPI use. Descriptive statistics were used to report the primary outcomes. The total treatment duration was analyzed using a 2-sided t-test, and the other three secondary endpoints were analyzed using the Fisher’s Exact test.

Results
1,071 charts were reviewed; 940 subjects were included. The average age was 75 years (+/- 7). Of the A total PPI prescriptions reviewed, 95% were considered potentially inappropriate, resulting in an estimated cost burden of 3.33 million dollars. During PPI treatment, 17% of patients had a bone fracture, 1% had a Clostridium difficile infection, and 12% had pneumonia. The average treatment duration for male compared to female when comparing appropriate to inappropriate PPI prescriptions was statistically significant (P<0.001) (40 vs 312 days).

Conclusion
There was a statistically significant difference in the treatment duration for the groups with appropriate versus inappropriate PPI use, but there was no significant difference in incidence of bone fracture, Clostridium difficile infection, or pneumonia. Up to 95% of patients aged 65 years and older were potentially taking a PPI longer than recommended for the treatment of GERD, accruing a cost burden of 3.33 million dollars.
Target: Setting Our Sights for Increasing Geriatric Wellness

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Introduction
According to the Accreditation Council for Pharmacy Education’s (ACPE) “Guidance for Standards 2016,” there is an emphasis placed on “the importance of students understanding and professionally addressing the patient-care issues for different patient age groups.” Keck Graduate Institute School of Pharmacy, in an effort to promote students’ awareness of the geriatric population, developed the “To Achieve Reachable Goals and Effective Treatment” (TARGET) program to be a key component for one of the four Introductory Pharmacy Practice Experience rotations.

Purpose: The TARGET program was designed to help students to more clearly understand the aspects of care and wellness in the geriatric population, develop the students’ ability to interact with the geriatric population, apply pharmaceutical knowledge to practice, and provide the students with an opportunity to practice the skills needed to compose a medication action plan.

Methodology
Each P-2 student was paired with two residents within local Claremont, California retirement communities, Mt. San Antonio Gardens and Pilgrim Place. Participating residents signed a consent form to partake in the program. Each student met with each of their assigned residents every two weeks for sixteen weeks for a total of eight visits per resident. At each visit, the student had to complete an activity with their resident. Examples of the assigned activities included: 1) interviewing the resident; 2) reviewing medication therapy; 3) assessing medication organization; 4) discussing proper storage and disposal of medications; 5) developing adherence tool and mechanisms; 6) educating residents on disease prevention such as vaccinations; and 7) developing a medication action plan. Students participated in class sessions every two weeks prior to meeting with their residents. Class sessions consisted of simulations and role-playing to prepare them for the upcoming activity with their residents. Students submitted journal entries after each visit reflecting on their experiences and interactions with their residents.

Results
Based on the student course-centric surveys, eighty-three percent of P-2 students agreed or strongly agreed that participating in the TARGET program helped them understand the care of the geriatric population more clearly. Eighty-nine percent of the students agreed or strongly agreed that the TARGET program developed their ability to interact with the geriatric population, apply pharmaceutical knowledge to practice, and practice the skills needed to compose a medication action plan.

Conclusion
Working with residents within local retirement communities provided the students with an opportunity to more clearly understand the care of the geriatric population, develop the ability to interact with the geriatric population, apply pharmaceutical knowledge to practice, and practice the skills needed to compose a medication action plan.
Evaluating the Use of Direct Oral Anticoagulants (DOAC) at a Veterans Affairs Hospital

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Introduction
Direct Oral Anticoagulants (DOACs) are often preferentially chosen over warfarin for several advantages, including minimal dose adjustments and coagulation monitoring. Clinical trials demonstrate a reduction in the incidence of intracranial hemorrhage, when compared to warfarin. However, little is known regarding the use of DOACs in the veteran population. The objective of this study was to evaluate the use of the DOACs at Veterans Affairs Greater Los Angeles Healthcare System (VAGLAHS), including indications for use, adherence, follow-up and adverse events.

Methodology
This was a retrospective cohort study at the VAGLAHS. Participants included 519 veterans who were initiated on dabigatran, apixaban or rivaroxaban between October 1, 2010 and April 30, 2015. Of the 519 possible participants, 300 veterans were screened and 114 were included in the study. Data collection began from the initiation of DOAC therapy, with a minimum of three months, up to a maximum of two years while on therapy. Four aspects were evaluated – indication, adherence, follow-up and incidence of adverse events. We used a revised version of The International Society on Thrombosis and Haemostasis to define major and minor bleeding. Clinical characteristics, laboratory results, pharmacy data and clinical encounters were extracted from the institution’s computerized electronic medical record.

Results
The study population comprised of 114 participants. The mean (SD) patient age was 68 (10) years for dabigatran, 80 (8) years for apixaban and 69 (10) years for rivaroxaban. Coexisting conditions included diabetes mellitus (32% on dabigatran, 31% on apixaban and 75% on rivaroxaban), congestive heart failure (23% on dabigatran, 25% on apixaban and 25% on rivaroxaban), and hypertension (86% on dabigatran, 88% on apixaban and 75% on rivaroxaban). The most frequent indication for DOAC therapy was the prevention of stroke in non-valvular atrial fibrillation (99% on dabigatran, 94% on apixaban and 75% on rivaroxaban). During the study period, more than half of patients were considered adherent to therapy (53% on dabigatran, 56.3% on apixaban, and 62.5% on rivaroxaban). Follow up visits occurred in more than 75% of patients during the first 3 months of therapy. However, after 3 months and at 6-month intervals thereafter, follow up visits show a steady downward trend. Adverse events included both ischemic events and bleeding events. For dabigatran, one ischemic event occurred (cerebrovascular occlusion) and 11 bleeding events occurred. Of those, there were no major bleeding events. For apixaban, no ischemic event occurred and three bleeding events occurred. Of those, there was one major bleeding event and two minor bleeding events. For rivaroxaban, no ischemic event occurred and two bleeding events occurred. Of those, there was one major bleeding event (gastrointestinal bleed) and one minor bleeding event.

Major and nonmajor clinically relevant bleeding rates were 16% per year for dabigatran, 17.1% per year for apixaban and 2.3% per year for rivaroxaban.

Conclusion
Among patients taking apixaban, bleeding rates per year was higher than that reported in the literature. This may be due to a preferential selection for initiating apixaban therapy in patients with an increased risk for bleeding at baseline. ©
Evaluating Safety and Efficacy of Enoxaparin in Bridging Subtherapeutic Mechanical Circulatory Support (MCS) Patients

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Introduction
Mechanical circulatory support (MCS) patients require long-term anticoagulation as implanted devices can increase thrombotic risk. MCS patients with subtherapeutic INR are traditionally admitted to the hospital and bridged with unfractionated heparin (UFH). Enoxaparin is a viable alternative to UFH that improves patient convenience, decreases risk of hospital-related complications, and decreases healthcare-associated costs. However, there are currently limited studies on bridging MCS patients with subtherapeutic INR using enoxaparin. The purpose of this study is to determine if enoxaparin in an outpatient setting is safe and effective in bridging MCS patients from a subtherapeutic INR to therapeutic INR.

Methodology
This IRB-approved, retrospective analysis reviewed data from January 2, 2011 to September 7, 2015. All Cedars-Sinai Medical Center patients who received an MCS device (i.e. left ventricular assist device, biventricular assist device, total artificial heart), were taking warfarin, and had a subtherapeutic INR during the study period were included. Patients were bridged with enoxaparin (n = 31 encounters) or UFH (n = 17 encounters) per physician’s discretion. The primary outcome measure was safety of enoxaparin, based on major and minor bleeding episodes, drug-drug interactions with warfarin, and dosing. The secondary outcome measure was efficacy based on thrombotic events, concurrent antiplatelet medications, drug-drug interactions with warfarin, and dosing. Hospital length of stay was measured to assess financial impact on the healthcare system.

Results
No major bleeding events occurred in either the enoxaparin or UFH group. The difference in number of minor bleeds between the enoxaparin group (4 events) and UFH group (no events) was not statistically significant (p=0.28) based on a two-tailed Fisher’s exact test. Major CYP2C9 inhibitors were introduced in 3 enoxaparin encounters, but did not contribute to the observed bleeding complications. No major CYP2C9 inhibitors were initiated in the heparin encounters. No thrombotic events occurred in either group during treatment.

Mean INR upon treatment initiation in the enoxaparin group was 1.41 +/- 0.20, and 2.37 +/- 0.37 upon enoxaparin discontinuation. Mean INR upon treatment initiation in the UFH group was 1.39 +/- 0.18, and 2.06 +/- 0.20 upon discharge.

The mean enoxaparin dose was 0.88 mg/kg twice daily, ranging from 0.47 mg/kg to 1.17 mg/kg twice daily. Per treatment guidelines, enoxaparin is dosed at 1 mg/kg twice daily. Despite a lower mean enoxaparin dose used, there were no thrombotic events during enoxaparin treatment.

Mean hospitalization time for patients on UFH was 8.29 days, compared with 0 days for patients on enoxaparin. Based on 2012 estimates from the Agency for Healthcare Research and Quality, this is conservatively estimated at $20,000 per inpatient bridging course.

Conclusion
There were no episodes of major bleeding or thrombotic events during treatment with enoxaparin. The incidence of minor bleeding events was comparable in the enoxaparin and UFH groups. Enoxaparin treatment resulted in minimal healthcare costs, while heparin treatment was associated with costly hospitalizations. The results suggest that enoxaparin can be a safe, effective, and more economic alternative to UFH in bridging MCS patients from a subtherapeutic to therapeutic INR.
A Quality Analysis of Pharmacy Oral Oncology Monitoring Services

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Introduction
Oral chemotherapy is rapidly increasing as an available treatment option for most cancers. With any chemotherapy, lab monitoring and side effect management are imperative to avoid complications when using these high cost drugs. Adherence is also a major component for oral chemotherapy since these drugs must be taken daily for patients to receive the full benefit. The pharmacist-managed Pharmacy Oral Oncology Monitoring Services program at Kaiser Permanente Downey Medical Center was established in September 2014. The program provides medication management and side effect monitoring for patients initiating oral chemotherapy. The program was designed to reduce complications and increase the effective utilization of prescribed oral chemotherapy, but our medical center has yet to fully explore the overall effectiveness of the program. This study aims to describe the drug therapy related outcomes of the program, along with its economic and humanistic impact.

Methodology
Primary outcomes of the study focus on the clinical impact of the program, while secondary outcomes encompass the economic and humanistic impact of the program. Patients were included in the study if they were enrolled and subsequently discharged from the program at any point since program inception in September 2014 to the pre-defined cutoff date of December 31, 2015. Patients were excluded if they were still actively enrolled in the program by the pre-defined cutoff date. A retrospective chart review was then performed on each patient to abstract data related to outcomes of the program, including interventions, adverse events, clinical outcomes, number of encounters per patient, number of days enrolled, and overall duration of oral chemotherapy. A descriptive analysis was then performed on the collected data to summarize the clinical outcomes of the program. Pharmacist time spent and cost were evaluated based on assumed Relative Value Unit (RVU), as defined by the current fee schedule from the Center for Medicare and Medicaid Services. Humanistic impact was evaluated utilizing the Triple Aims framework as defined by the Institute for Healthcare Improvement.

Results
70% of patients were successfully stabilized on their oral chemotherapy regimen and discharged from the program. Of those patients, 34.6% were still taking their originally prescribed oral chemotherapy as of the predefined cut-off date. Based on the RVU analysis, the relative value of the program is $210.50 per case, while the cost to staff the service with a pharmacist is $107.25 per case, suggesting that the program has a positive economic impact. The program fulfills the Triple Aims framework and provides a humanistic benefit by providing a better patient care experience, improving population health, and keeping costs affordable.

Conclusion
In summary, the POOMS program provides a positive clinical, economic, and humanistic benefit for our patients and our health system.
Pharmacist Managed Medication Reconciliation in the Emergency Department of a Community Hospital

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Introduction
Patients are most vulnerable to medication errors during transitions of care. Studies have shown over half of all patients admitted have an error on their home medication list. Over a quarter of all medication errors in the hospital are the result of incomplete medication reconciliation (MR) on admission. Our preliminary study involving a medical student and pharmacy technicians working with emergency department (ED) physicians confirmed that our institution was no different and that physicians had positive opinions of pharmacy involvement in MR. Studies have shown pharmacist involvement in MR increases accuracy of the medication list and decreases risk of medication errors.

Clovis Community Medical Center (CCMC) is licensed 208-bed non-academic, community hospital. At CCMC medication reconciliation is currently completed by nursing or physicians prior to or at admission in the ED. Our ED averages 5250 visits per month.

Methodology
In February 2016, a pilot program of clinical pharmacy services was initiated in the ED. A pharmacist would serve as a resource to the ED and would be located at the nursing station for 40 hours per week. The pharmacist would be responsible for prospective medication order review, formal clinical consults, providing drug information, attending codes, and assisting with MR.

MR was conducted with patients as they were designated as “to be admitted” or “admitted” in the EMR. MR may have been completed or partially completed by the RN at this point. The pharmacist documented any corrections made to the “prior to admission medication list” in interventions logged in the EMR. Interventions from a three-month period from March through May 2016 were reviewed.

Results
During the three months reviewed, 304 MR were attempted with 268 (86%) completed. The pharmacist was in ED for 38 days during the time period and preformed an average of 8 MR per day. There was a total of 1,294 corrections made to medication lists. During each MR there was an average of 4.9 corrections to the patient’s home medication list. 45% of all corrections were removal of a med, 35% were addition of a medication, and 20% were a change in dose or directions. 53% of medication histories were obtained from the patient, 35% were obtained from family or with family involvement, and 11% were obtained using records from the transferring facility.

Conclusion
Our ED pharmacist was able to make nearly 1300 corrections to over 300 patient’s home medication lists while providing other services to the ED. The pharmacist made these corrections after MR had been initiated, and in some cases completed, by an RN. Nearly half of all MR require information from family or a third party. Our current staffing does not allow a pharmacist to always be available in the ED, so it is reasonable to enlist pharmacy technicians to initiate MR with a pharmacist review. This data adds to a large amount of evidence that pharmacy should be involved in MR.
Strategies and Cost Savings Initiatives: Opportunities with High Cost Medications at a Single Center

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Introduction
Significant increases in the cost of select generic products within the last two fiscal years can have a substantial impact on the hospital pharmacy budget. This report is a description of ongoing cost savings initiatives at Cedars-Sinai Medical Center (CSMC), an 886-bed academic medical center in Los Angeles, CA.

Methodology
At CSMC, drug use policy reviews high cost medication purchases and drug utilization to identify potential cost savings opportunities on a monthly basis. Initial assessments of fluctuations in resource utilization and discrepancies between expenditures and usage are further investigated whenever deemed necessary. A summary report and current initiative targets are presented to pharmacy management for the purpose of receiving project directives and obtaining feedback on operational issues. Initiatives typically begin with a medication use evaluation, comparative benchmarking, and a review of literature, which is followed by an assessment of cost-effective alternatives, development of usage criteria and formulary restrictions, and optimization of pharmacy operations. Key stakeholders within medical leadership are involved in vetting proposed changes prior to Pharmacy and Therapeutics Committee evaluation and supporting house-wide implementation. This report is a description of cost savings initiatives for injectable acetaminophen, albumin, calcitonin, glycopyrrolate, isoproterenol, naloxone, neostigmine, and nitroprusside at CSMC. Criteria for use and formulary restrictions were developed in collaboration with physician leadership for acetaminophen, albumin, and calcitonin. To address the increased cost per vial of glycopyrrolate, adjustments were made to the electronic glycopyrrolate order to encourage formulary alternatives and options for glycopyrrolate doses were added in increments correlating to vial size to eliminate wastage. Additionally, proposed methods to reduce wastage include reduction in the dispensing volume of naloxone and glycopyrrolate infusions and conversion to vial-to-bag nitroprusside has been implemented. House-wide reduction in inventory has been an important strategy for both nitroprusside and isoproterenol to reduce budget expenses to maintain par levels. The leadership of the CSMC Anesthesiology Department has been instrumental in formulating strategies to reduce usage of nitroprusside in cardiac cases and in encouraging usage of edrophonium over neostigmine for reversal of non-depolarizing neuromuscular blockade.

Results
Annual expenditures for intravenous acetaminophen at CSMC have consistently been below reported spending of comparable institutions. Three months after implementation of albumin order criteria, there was a 20% reduction in overall inpatient usage. Initiatives for calcitonin, glycopyrrolate, isoproterenol, naloxone, neostigmine, and nitroprusside have an estimated combined annual cost savings of $2.2 million.

Conclusion
Cost savings initiatives require collaboration between pharmacy and the departments most impacted by the implementation of resource management initiatives. Through careful monitoring of financial expenses and medication utilization, proposals with a significant impact on the pharmacy budget can be enacted.
Development and Implementation of Clinical Pharmacy Services Aimed at Improving Diabetes and Hypertension Outcomes

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Introduction
Stanford Healthcare (SHC) strives to be a national leader in population health outcomes. Improving blood pressure and blood glucose control among patients with diabetes is of key importance in preventing morbidity and mortality. In September of 2015, leadership within the department of Primary Care and Ambulatory Care Pharmacy developed a quality improvement project integrating clinical pharmacists into SHC Primary Cares clinics. The goal of this project was to develop and fine tune collaborative drug therapy agreements between primary care providers and ambulatory care clinical pharmacists. The ultimate goal was to improve diabetes and hypertension control throughout Stanford Primary Care.

Methodology
We enrolled 66 patients into the care of two ambulatory care clinical pharmacists within two SHC model clinics. During this time, clinical pharmacists used diabetes and hypertension management protocols to adjust medications in collaboration with primary care physicians. Our aim was to improve A1C and blood pressure control as defined by HEDIS by 10 percent over the course of 6 months.

Results
Prior to integrating clinical pharmacists into SHC Primary Care, blood glucose control and blood pressure control among SHC primary care patients ranged from 65-70% and 60-65%, respectively. Although we only enrolled a small group of diabetic patients within these two clinics, blood glucose control among the entire population in clinics with pharmacists went from 68% to 79% (16% improvement) while blood glucose control among clinics without pharmacists went from 73.9% to 75%. At that same time, blood pressure control in clinics with pharmacists went from 61.3% to 64% (5% improvement) while clinics without pharmacists dropped from 65.7% to 60%. By 6 months, the two model clinics with pharmacists reached and continue to remain above the HEDIS benchmark of 81% for diabetic control.

Conclusion
With the passage of SB493, it is imperative that pharmacists within California seize the opportunity to improve access and quality of healthcare services. SHC strives to be a model for primary care.
Primary Care 2.0 is an institutional vision for making Stanford a national leader in primary care practice. This vision is predicated on the idea that an interdisciplinary team-based approach is critical in delivery quality patient care. This work highlights the importance of the clinical pharmacist as a member of the primary care team.
Impact of Chronic Kidney Disease (CKD) on Prognostic Factors of Patients with Heart Failure (HF)

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Introduction
Heart failure is one of the most prevalent diagnoses for hospitalization and 30-day readmissions. Recent studies have demonstrated that chronic kidney disease is an independent risk factor for unfavorable cardiovascular outcomes and yields a greater occurrence of mortality and hospitalization for patients with HF. However, little research has examined the impact of different CKD stages on rate of hospitalization, readmission, and length of stay (LOS) for patients with HF.

Methodology
This retrospective study identified patients with comorbid CKD and HF between January 1, 2015 and January 1, 2016 at Kaiser Permanente Los Angeles Medical Center. The population was stratified into two groups (CKD stage 1, 2 or 3 and CKD stage 4 or 5) based on their estimated glomerular filtration rate in accordance with the National Kidney Foundation.

Results
Of 1,892 patients, 71.7% (n=1357) had stage 1, 2 or 3 CKD and 28.3% (n=535) had stage 4 or 5 CKD. On average, patients with CKD 4 or 5 had significantly (p<0.0001) higher rates of all-cause mortality (15.33% vs. 8.03%), all-cause hospitalization per 1000 patients per year (1372 vs. 718), and longer LOS for all-cause hospitalization (6.36 days vs. 4.71 days). In patients with stage 1, 2, or 3 CKD, 533 patients (39.3%) had 975 hospitalizations, of which 161 (11.86%) were 30-day all-cause hospitalizations. In patients with stage 4 or 5 CKD, 316 patients (59.1%) had 734 hospitalizations, of which 228 (31.06%) were 30-day all-cause readmissions. Patients with 4 or 5 CKD also had a higher rate of ER/UC visits per 1000 patients (1925 vs. 1656) (p=0.0326).

Conclusion
CKD stages 4 and 5 confers a considerable burden on patients with HF, with greater hospitalization, length of stay, readmission, and ER/UC visits. The study results suggest there is a need to develop more effective systems of care for this high risk patient population.
Pharmacy School Interprofessional Education Models a Retrospective Evaluation of California and Nationally Cited Models

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Introduction
In the previous Accreditation Council for Pharmacy Education (ACPE) Standards from 2011, interprofessional education (IPE) was listed as a recommended component of the pharmacy school curriculum. The new 2016 ACPE Standards now officially require interprofessional education to be part of the pharmacy curriculum. This change was made to better prepare students to enter the field ready to participate as members of an interprofessional, patient-centered team. The goal of our research is to formulate the best IPE delivery model based on studying different pharmacy schools’ curricula.

Methodology
The California Northstate University (CNU) 2014 CAPSLEAD (California Pharmacy Student Leaders) Team conducted a retrospective study to determine if and how California pharmacy schools were implementing IPE prior to the new 2016 requirement standards. Based on information gathered, the CNU CAPSLEAD Team formulated an ideal model to most effectively deliver IPE prior to the new 2016 requirements. This extended to our previous study, our team collected current data on California pharmacy schools’ implementation and delivery of IPE, and evaluated interesting IPE models from other pharmacy schools in the US. This study was performed in an effort to evaluate and make any necessary adjustments to the previous CNU CAPSLEAD IPE model with the passing of the new accreditation standards.

Results
Analysis of data from 10 colleges of pharmacy showed: a variety of IPE delivery formats ranging from group discussions to actual courses where IPE was delivered, all IPE delivery ranged from the 1st through 4th years of pharmacy school, the schools’ disciplines that were included ranged from two to nine disciplines, and measures of success ranged from surveys to grades with undefined parameters (pass/fail versus letter grades with rubrics not identified). Based on these findings, the CNU 2014 CAPSLEAD model was adjusted from a three stage model to a four stage model including a longitudinal component. Stage 0 consisted of specific training of faculty to specialize in delivering IPE instruction. Stage 1 consisted of introductory IPE encompassing foundations of IPE, including individual roles and responsibilities of different professions. Stage 2 consisted of participation in face to face patient care sessions with other healthcare students followed by simulation or patient case presentation days, and added 5 hours of job shadowing outside the student’s respective field of study with a preceptor that is involved in IPE as an IPPE curricular component (to be delivered by a certified IPE preceptor). Stage 3 consisted of student surveys to assess IPE experience, as well as a graded portion to assess individual student performance outcomes during the APPE General Medicine cumulative portion. The longitudinal component consists of volunteering at health fairs or free-clinics to perform counseling, blood pressure screenings, and immunizations to provide real patient care while practicing within an interdisciplinary team in order to perform case based problem solving, learning and collaborative care delivery.

Conclusion
Since implementation of the new 2016 ACPE Standards, current pharmacy schools’ curricula data showed that adjustments of the CNU 2014 CAPSLEAD model were needed.
Advancement in Healthcare Through Integration of Rare Disorders in a School of Pharmacy Curriculum

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Introduction
Rare diseases affect 30 million Americans, meaning 1 out of 10 of our population suffers from rare disorders. There are approximately 7,000 different rare disease conditions that exist. The U.S. Food and Drug Administration (FDA) has approved about 500 orphan drugs since The Orphan Drug Act was passed in 1983. Although current approved treatments address only 5% of rare diseases, there are currently more than 450 medicines in development for rare diseases.

Pharmacists possess both the ability and opportunity to fill existing gaps in healthcare for the rare disease population. Pharmacists may influence factors aiding optimization of care for the rare disease population. Targeted areas benefiting from pharmacist influence include, but are not limited to: accelerated FDA approval process along with high rates of investment for FDA approvals, NIH & advocacy groups funding early research, new distribution models in reducing cost through direct patient engagement and personal support.

Methodology
Expanding scope of pharmacy practice in improving lives of patients with rare diseases.

Results
A gap exists in the provision of patient centered pharmaceutical care in the rare disease community. Pharmacists need to play a role in areas of: medication costs, treatment gaps, medication management, patient advocacy and education as well as building and maintaining databases for rare diseases.

Conclusion
Implement a model where a clinical pharmacist placed in a rare disease environment and mentors pharmacy students through a unique pharmacy curriculum for a career in rare diseases. Didactic curricular certificates in any of the following areas: clinical trials/regulatory affairs (CRA); medication therapy outcomes (MTO); healthcare management (HM); or health information technology (HIT) can lead to a career in the rare disease arena. Through a combination of 12 credits of didactic coursework and 15 hours of experiential (3-IPPE and 12-APPE), students will learn about the FDA approval process through CRA; manage medications, provide advocacy and education through MTO; design workflow in a pharmacy or work in the pharmaceutical industry with an emphasis on rare diseases (HM); manage and mine rare disease databases and registries for trend to improve care (HIT).
Interprofessional Health Coaching at a Safety-Net Hospital: A Program to Develop Student Competencies in Team-based Care

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Introduction
In 2003, the Institute of Medicine called for large-scale changes in health professional education and introduced five core competencies for all health professions, one of which was working as part of interprofessional teams. Pharmacy students often do not receive formal opportunities to work in interprofessional teams in clinical settings, until their Advanced Pharmacy Practice Experience (APPE) rotations. The complexity involved with chronic disease management has contributed to the renewed interest in interprofessional education. Health coaching is most often employed to promote improved management of chronic illnesses. By delivering health education in a patient-centered manner, health coaching promotes patient engagement. Programs that have integrated communication skills used in health coaching can increase the knowledge and attitudes of healthcare professional students.

Methodology
Pharmacy, medical, nursing, and physical therapy students received training on health coaching, hypertension, diabetes, nutrition, and physical activity in the context of a safety-net hospital. Training was provided by faculty from the Schools of Pharmacy, Medicine, Nursing, and Physical Therapy. Learners worked in interprofessional pairs to provide health coaching to hospitalized patients in an urban safety-net hospital. In addition to the experiential learning that occurred on the wards, preceptors spanning the four health professions met with learners during each session to reflect on their experience, discuss difficult topics, and emphasize the different viewpoints that various providers can bring to a patient’s care. Learners were surveyed before the program and after completing four health coaching sessions.

Results
83 students completed the interprofessional health coaching program between November 2014 and May 2016 and provided health coaching via 183 patient encounters. After completing their health coaching sessions, an increased percentage of learners reported feeling confident or very confident in their ability to provide health coaching for diabetes (33% vs 80%, p=0.03), hypertension (1% vs 60%, p=0.01), dietary changes (50% vs 80%, p=0.15), and physical activity (42% vs 70%, p=0.18). There was an increase in the percentage of learners who felt comfortable discussing homelessness (41.7% vs 80%, p=0.07), recreational drug use (42% vs 60%, p=0.39) and alcohol use (67% vs 70%, p=0.87) with patients. The percentage of respondents who felt comfortable working with underserved patients decreased (67% vs 20%, p=0.03). There was an increase in the proportion of learners who strongly agreed that they understood their own profession’s role (26% vs 50%, p=0.14) and the role of other health professionals (18% vs 40%, p=0.14) in an interprofessional work environment. 100% of respondents indicated they felt the interprofessional health coaching program was a worthwhile experience, and 100% would recommend the program to other early trainees.

Conclusion
A clinically based inpatient health coaching program can serve as a novel and effective model for interprofessional education. Learners gained confidence with use of health coaching techniques and have improved attitudes and understanding of the roles of various healthcare professionals.
Workflow Design of a Pharmacist Run Internal Medicine Refill Clinic in Suggesting Appropriate Statin Intensity

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Introduction
The UC Davis Medical Center Pharmacy Prescription Refill Clinic provides a method for processing outpatient prescription renewal requests for patients of the Internal Medicine Clinic.

Under a collaborative practice agreement, pharmacists and pharmacy technicians screen the prescription renewal requests for clinical appropriateness. Refill requests which do not meet the protocol requirements are deferred to the patient’s primary care provider (PCP).

The main function of the Refill Clinic is to streamline request workflow and improve physician efficiency. Protocol dictates that staff assess if LDL-cholesterol (LDL-C) blood level has been drawn within the prior 12 months when authorizing refills for statins. If the LDL-C has not been measured in the past 12 months, the PCP would be notified and the refill would be deferred to them.

Refill Clinic staff do not currently evaluate statin intensity. The 2013 ACC/AHA Blood Cholesterol guidelines are now the standard of care. A new workflow was developed to identify appropriate statin use and to make interventions accordingly.

Rationale
The 2013 ACC/AHA Blood Cholesterol guideline recommend annual cholesterol screening for most adult patients. The guidelines de-emphasized treatment to LDL-C goals, but rather focused on appropriate statin therapy in select patients. The 2016 ADA Standards of care also revised recommendations on initiation and intensification of statin therapy based on patients’ risk profile.

Previous studies demonstrate that ambulatory care pharmacists are effective in improving dyslipidemia by significantly lowering LDL-C. These studies were based on previous blood cholesterol guidelines that targeted LDL-C.1-4 A single study shows that adherence was only 30% to updated ACC/AHA guidelines.5 The Refill Clinic is in an ideal position to incorporate and improve adherence to guideline recommendations.

Objective
Describe a standardized workflow to evaluate and suggest appropriate statin intensity in a pharmacist run refill clinic.

Methodology
Method
Pharmacy technicians assess statin intensity upon prescription renewal requests for statins or diabetic supplies and medications. Patients are screened with an algorithm based on the 2013 ACC/AHA Blood Cholesterol guideline. The algorithm checks if patients aged 21-75 have clinical atherosclerotic cardiovascular disease (ASCVD), LDL-C ≥ 190 mg/dL, diabetes, or 10-year ASCVD risk ≥ 7.5% on statin therapy for primary prevention. Candidates for moderate or high intensity statin are routed to the pharmacist for review. Pharmacists notify and recommend adjustments in statin intensity to the PCP if appropriate.

Results
Importance to Current Practice
This workflow is unique because pharmacy technicians participate in assessing appropriate statin therapy in a Refill Clinic. Educating the pharmacy technicians on ASCVD definitions and protocol was key to successful implementation. Statin intensity protocol was executed appropriately 100% in screening patients.

Since implementation, 78 patients eligible for statin intensity screening were reviewed from December 17, 2015 through June 10, 2016. Sixty-two (79%) patients were on appropriate statin intensity. Sixteen (21%) patients were candidates for statin intensification. Recommendations to increase statin therapy was accepted for 5 (31%) patients, deferred for evaluation at future PCP appointments for 10 (63%) patients, and rejected for 1 (6%) patient.

Conclusion
Further analysis will evaluate the impact of pharmacy recommendations in suggesting appropriate statin therapy.
Role of Pharmacy Students and Residents in Smoking Cessation Intervention at a Safety Net Clinic in Skid Row Los Angeles

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Introduction
The Center for Community Health (CCH) is an urban safety net clinic located in the heart of downtown Los Angeles that serves patients with a variety of chronic illnesses, a significant proportion with co-occurring mental illness and substance use disorders. Safety net clinic providers describe barriers to offering smoking cessation interventions such as lack of time, perceived lack of patient readiness to change, and inadequate provider and patient resources. In 2011, student pharmacists from the University of Southern California (USC) School of Pharmacy launched a smoking cessation program at CCH in an effort to reduce barriers to smoking cessation interventions.

Methodology
Several changes were instituted to the USC School of Pharmacy smoking cessation program during the 2015-2016 academic year. First, student pharmacists were required to attend a training session at the beginning of each semester on counseling points for weight and stress management, behavioral modifications, motivational interviewing, and nicotine replacement therapy (NRT) to improve quality of patient counseling. While NRT was previously the main focus, strategies to avoid a slip, how to deal with cravings through the DEADS (delay, escape, avoid, distract, substitute) strategy, and setting SMART (specific, measurable, attainable/achievable, relevant, timely) goals were incorporated to help participants deal with triggers or cravings. Furthermore, a monthly check-in session through summer was initiated to ensure continuity of care. The role of resident pharmacists expanded to include more extensive discussion with students and under a newly developed collaborative practice agreement, the resident pharmacist prescribed nicotine gum, lozenges, and patches. Funds for nicotine patches were donated by USC Graduate Student Government.

Results
Since late-2015, the smoking cessation program has had 13 participants. Because of the nature of the population, many have been lost in follow-up. To date, 3 participants have been smoke free for at least 1 month. The presentation on healthcare related topics, NRT counseling, cessation management strategies, motivational interviewing, and writing SOAP notes reinforced learning from the classroom. Participants benefited from learning about their disease state and how it relates to smoking, having a social support group, one-on-one counseling, and pharmacist access. With the combination of all these services there was an increase in the success of the participants and check-in sessions ensure they remain smoke-free for life.

Conclusion
Since 2011, the USC School of Pharmacy has offered pharmacological tools and social support to a vulnerable population in the heart of downtown Los Angeles in an attempt to reduce barriers to smoking cessation interventions. Changes made in the 2015-2016 academic year allowed all individuals involved in this program to benefit: student pharmacists can apply their knowledge in a clinical setting, patients are provided the appropriate resources to quit smoking, and resident pharmacists can precept students and utilize their clinical expertise.
Introduction
Medication reconciliation is an important process to reduce medication errors at transitions of care. Inaccurate or incomplete medication reconciliation may lead to medication errors that can adversely impact patient safety. The process of medication reconciliation is a complex, time-consuming task for all healthcare providers. Pediatric medication reconciliation is especially challenging due to the availability of multiple drug formulations and non-standard concentrations. Pediatric pharmacists have extensive knowledge of various dosage forms and compounded formulations that are used in the pediatric patients. As part of the multidisciplinary care team, pediatric pharmacists may play an integral role in improving medication reconciliation throughout the continuum of care. The objective of this pilot study was to determine if pediatric pharmacist involvement in medication reconciliation in a tertiary care academic institution would reduce medication discrepancies at transitions of care.

Methodology
Prospective pilot study of a pharmacist's involvement in medication reconciliation performed from 10/19/15 to 11/21/15 for pediatric patients admitted to the cardiology service. A pharmacist reviewed each patient's medications prior to admission (PTA) medication list for omissions and discrepancies, and revised the list upon hospital admission. Based on the revised PTA list, the inpatient medication list was reviewed for any needed changes. As part of the discharge process, the pharmacist reviewed and updated the discharge prescriptions to reflect the most current medication therapy.

Results
Medication reconciliation was performed on 50 patients upon admission that included review of 243 PTA medications. Of the patients evaluated, 60% had PTA medication-related issues, which included incorrect medication dose/dosage form, incorrect dosing frequency or an incomplete list of home medications. Pharmacist review and reconciliation resulted in corrections to inpatient medication orders for 8% of patients. Discharge medication reconciliation was evaluated for 36 patients with 182 discharge prescriptions. Discharge medication-related issues were identified in 47% of patients. The errors included inadvertently omitted medications, incomplete discharge medication instructions, and electronic prescriptions sent to the wrong pharmacy. All prescription issues were resolved by the pharmacist prior to discharge.

Conclusion
This pilot study highlights the importance of a pediatric pharmacist in identifying and correcting medication discrepancies during the medication reconciliation process upon hospital admission and at discharge. The improved accuracy of the PTA medication list helped to eliminate discrepancies between a patient's home medications and inpatient medications. Medication reconciliation at discharge helped to prevent medication errors for discharge prescriptions while also potentially improving medication management in the ambulatory setting.
Evaluation of Outpatient Pharmacy Faxes Received by the Inpatient Cardiology Unit at UC Davis Medical Center

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Introduction
Inpatient hospital units within the University of California, Davis Medical Center (UCDMC) receive multiple faxes from outpatient pharmacies every day. A survey of hospital unit service coordinators (HUSCs) revealed that there is no consistent process on how the faxes are addressed when patients are discharged from the hospital. The purpose of this study is to evaluate the types of pharmacy fax requests received in the cardiology unit and determine the outcome of the request.

Methodology
A 10-day descriptive study was conducted in the cardiology unit from February 18, 2016 until February 29, 2016. When a fax was received, the outpatient pharmacy was notified by the HUSC that they have reached the wrong fax number. The faxes were then triaged to the discharging physician's clinic and collected for review. One transition of care (TOC) pharmacy technician performed a chart review and contacted the requesting pharmacies 2-4 weeks after the fax was received to determine if the request has been resolved or is still pending. Data was analyzed by one TOC pharmacist.

Results
32 faxes were received from outpatient pharmacies during the study period. 60% of the faxes received were refill requests, followed by 25% of requests related to communicating that the medication prescribed was non-formulary or requiring a prior authorization. Time to resolution of medications refill requests ranged from 1-13 days and 1-5 days for medications with coverage issues. 40% of the requests remained unresolved, with roughly 70% indicated for chronic heart and respiratory conditions.

Conclusion
The inpatient cardiology unit receives approximately 3 pharmacy-related faxes per day. UCDMC has 25 inpatient units. If this data is extrapolated to how many pharmacy faxes are received per unit, UCDMC may receive as many as 27,375 faxes per year. If 40% is assumed to remain unresolved, this could amount to roughly 11,000 medication-related faxes per year that are not addressed. Triaging requests from the inpatient unit to the outpatient clinics is time consuming and may contribute to delays in patient care, decreased patient satisfaction, and higher readmission rates due to interruption of medication therapy. This preliminary data has been shared with various groups including Health Information Technology analysts, Patient Care Services, and Multidisciplinary Transition of Care committee members. Additional data will be collected in August 2016 to determine the volume of incoming pharmacy faxes in all units at UCDMC. Results will help identify areas of improvement to optimize medication access as patients transition from hospital to home.
Bridging Health Disparity with Free Pneumococcal Vaccination

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Introduction
The Free Pneumococcal Vaccination Program offers free Pneumovax®23 vaccines to homeless and uninsured patients with assistance from the Merck Patient Assistance Program. Most free clinic patients do not have access to pneumococcal vaccines as there are no free of cost Pneumovax®23 vaccines in San Diego, California. In 2012, the student pharmacist-led Free Pneumococcal Vaccination Program began in partnership with the UC San Diego Student-Run Free Clinics in San Diego, California.

Purpose: To provide free access and administer pneumococcal vaccinations to high risk patients of the UC San Diego Student-Run Free Clinics.

Methodology
All free clinic patients are evaluated to determine if they meet the requirements to receive the Pneumovax®23 vaccine. The Free Pneumococcal Vaccination Program provides free Pneumovax®23 vaccines to all patients who are 65 years of age and older, and/or have a past medical history of diabetes, asthma, COPD, CHF, rheumatoid arthritis, lupus, and organ transplant procedures. The following patients were excluded: patients who refused the vaccine, had received the vaccine elsewhere, or did not meet the above age or past medical history criteria. In addition, the Pneumovax Program hosted several poster information sessions in the community to educate patients about the signs, symptoms, risks, complications and the prevention of pneumococcal infections. Based on free replenishments from Merck’s Vaccine Patient Assistance Program, our program maintains a continual supply of Pneumovax®23 vaccines. In 2015, our program was awarded the American Pharmacists Association Incentive Award in order to expand our services. Funding for the initial purchase of Pneumovax®23 was obtained via fundraisers hosted by pharmacy students.

Results
From 2012 to 2015, there were a total of 198 eligible patients, of which 123 patients (62%) received Pneumovax®23 vaccine. 27% of patients that were administered the vaccine were over 65 years of age, 52% were diabetics, 19% asthmatics and 2% other.

Conclusion
Pneumonia is a preventable disease and the Free Pneumococcal Vaccination Program has actively been involved in educating and helping to lower the incidence of pneumonia in the underserved community. Our program has successfully utilized the Merck’s Patient Assistance Program to offer Pneumovax®23 vaccines to economically disadvantaged patients. The program’s aim is to vaccinate all the remaining qualifying patients.
Combining Peer-created Videos with Lecture to Teach Professional Readiness for Advanced Pharmacy Practice Experiences

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Introduction
The Accreditation Council for Pharmacy Education defines professionalism as exhibiting behaviors and values that are consistent with the trust given to the pharmacy profession by patients, other healthcare providers, and society. Despite addressing professionalism at numerous times during the pre-clinical curriculum, preceptors continue to express their concerns with some students acting unprofessionally and/or coming unprepared to Advanced Pharmacy Practice Experiences (APPEs). The purpose of this study was to assess if peer-created video vignettes in combination with a faculty lecture were perceived to be useful to third year student pharmacists in recognizing poor and professional behavior, as well as learning how to prepare for APPEs.

Methodology
Brief video vignettes were created by three third year student pharmacists, with assistance from a clinical faculty member. The video vignettes were shown to third year student pharmacists as part of a mandatory one hour “Orientation to APPE” lecture, presented by a faculty member in Fall 2015. At the end of the lecture, students were invited to participate in a ten-item, multiple-choice questionnaire, developed by a student and a faculty member, using the Survey Monkey Platform™. The survey was designed to assess students’ perceptions of the usefulness of the video vignettes.

Results
Sixty-one (100%) third year student pharmacists attended the presentation, with 74.8% (n=45) responding to the survey. The survey showed that 77.8% (n=35) of students had worked in a pharmacy setting for at least one year, specifically outpatient (82.2%), inpatient (33.3%), compounding (8.9%) and specialty pharmacies (8.9%). When asked which video scenarios a preceptor may perceive as being unprofessional, 97.8% agreed that showing up late to a rotation, being late in emailing the preceptor of a new rotation (95.6%), and emailing the wrong preceptor (88.9%) were unprofessional. Only 68.9% perceived monopolizing shared space at a rotation site as being unprofessional. Additionally, when asked which scenarios might a preceptor perceive as being unprepared for an APPE, 91.1% agreed that forgetting a pen or writing paper would be included this category. However, fewer students perceived the following to be unprepared: not thoroughly knowing their assigned patients (75.6%), not knowing brand and generic names of medications for their patients (68.9%), not knowing appropriate medication dosages for their patients (66.7%), and not bringing a copy of the rotation syllabus on the first day of rotation (55.6%). Overall, 91.1% and 95.6% of pharmacy students agreed that the video vignettes in combination with a faculty lecture provided them with a clearer idea of professional behavior and how to prepare for APPE rotations, respectively.

Conclusion
Our results suggest that integrating peer-created video vignettes into traditional lecture-style presentations were well received, and may be an effective tool when teaching students about APPE professional readiness.
The Impact of a Clinical Pharmacy-led Controlled Substance Clinic: A Six Month Review

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Introduction
In January of 2016, UC Davis Medical Center’s General Internal Medicine Department, in collaboration with the Ambulatory Pharmacy Department, launched a clinical pharmacy-led controlled substance (CS) clinic. The role of the clinic is to support the IM residents in safe prescribing and monitoring of CS medications in patients treated for chronic non-cancer pain. The purpose of this study was to identify and quantify activities undertaken by pharmacists and pharmacy technicians implementing a CS clinic in an academic institution.

Methodology
The Pharmacy Controlled Substance Team (PCST), composed of 0.4 clinical pharmacist full-time equivalents (FTE) and 0.8 pharmacy technician FTEs, was implemented January 1, 2016. Interventions of the PCST include: performing risk mitigation strategies, processing controlled substance renewal requests and corresponding verification of prescriptions. The controlled substance risk mitigation strategies, employed by the clinical pharmacists, include executing patient-provider treatment agreement (PPA) renewals, ordering and interpreting urine drug screens (UDS) and reviewing Controlled Substance Utilization Review and Evaluation System (CURES) reports. All interventions were captured in an Excel database.

Results
A total of 113 patients established CS PPA renewals with the PCST during a six-month period (January 1, 2016 - June 30, 2016) out of 451 eligible IM patients. Of those, 48 were performed in the clinic and 65 via telephone with the clinical pharmacists. With an average of 45 minutes per clinic and 40 minutes per telephone encounter, this corresponded to 2160 and 2600 minutes over the quarter, respectively. An additional 154 UDS were interpreted for an additional 1540 minutes over the quarter (average of 10 minutes per UDS). Additional activities of the clinical pharmacists included retrieving and reviewing CURES reports (n=1327), verifying CS prescriptions (n=1955), and other supportive functions for a total of 41,756.5 minutes of clinical pharmacist time or 86.9 work days per quarter. Currently, the clinical pharmacist staffing is limited to only 52 work days per quarter.

The pharmacy technicians performed 1323 encounters facilitating CS renewal requests, averaging 50 minutes each, for a total of 66,150 minutes over the quarter. Additional activities included generating 2033 CS prescriptions (average time of 15 minutes each) for a total of 30,495 minutes and reviewing PPAs (n=269) for a cumulative 100,680 minutes or 1678 hours. This corresponded to 209.8 work days per quarter with a current staffing of 130 days per quarter.

A 40.3% increase (n=41) in patients utilizing UCDMC pharmacies for their controlled substance prescriptions was also seen with the establishment of the PCST.

Conclusion
The PCST clinic successfully integrated a pharmacist-led team into the UC Davis Internal Medicine Clinic as a collaborative partner providing medication management and the monitoring of controlled substance medications. The clinic’s initial experience suggests that the pharmacists’ and pharmacy technicians’ time is mainly allocated to clinical activities such as assisting providers in ensuring the appropriate and safe use of controlled substances. However, based on the time study and current allotment of FTEs, it appears that additional FTEs are required to ensure adequate staffing for the PCST clinic.
Using Leading Indicator to Decrease the Occurrences of Near Miss Safety Events with Automated Dispensing Machines

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Introduction
We deploy 23 Pyxis® automated dispensing machines (ADM) containing approximately 35,000 items including tablets, capsules, lozenges, ampoules and vials. Having the nurse retrieve the right medication from Pyxis® is a safety and quality priority within our pharmacy department. When a different medication is found within the Pyxis® drawer than what is listed, that would be considered a Near Miss Safety Event. The near miss is an error that is detected before it reaches the patient either by a planned process including barcode scanning, reviewing the patient five rights prior to administration or by chance. Introducing a leading indicator measure may lead to decreased errors. The leading indicator is a measure indicating a future event and is used to influence activities to prevent errors. Our purpose is to employ a leading indicator, “Days since our last Pyxis® near miss event” to lessen the frequency of Pyxis® filling errors with our pharmacy technicians.

Methodology
We post, update and discuss on a daily basis the last time we had a Pyxis® near miss error: The date of the last near-miss event, the number of days since our last Pyxis® error and “best record” number of days since our last near miss event.

Results
The leading measure began on September 17 and lasted for 15-days before a Pyxis® error was discovered. The second leading measure began and lasted for 38-days. The third leading measure was restarted and ran over 75-days without a Pyxis® error. The fourth leading measure is continuing at 5+ days. The technicians have been taking more time to scan and load the Pyxis®, have developed routines in double-checking their work and have started methodically auditing drawers for accuracy during less busy periods. We are currently organizing a Pyxis® drawer audit program run by our IPPE students. Our recent error was filled 1 month ago and took that much time to be uncovered. At day 50, a pizza lunch was provided to the technician staff.

Conclusion
Implementation of a leading measure is a way for pharmacy managers to empower pharmacy technicians and decrease or prevent automated dispensing machine near miss errors.
Impact of Expanding Pharmacy Services into the Emergency Department

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Introduction
Emergency departments (ED) are vulnerable areas for potential medication errors to occur due to the nature of the environment. Increased patient volume, order auto-verification, and the urgency of patients’ medical needs contribute to the high-risk environment of the ED. This risk can be compounded with integration of EMR and CPOE. These factors heighten the need for improvement of the medication reconciliation process in the ED to ensure accurate medication histories are obtained for patients upon admission or before discharge home. The purpose of expanding pharmacy services into the ED was to improve medication reconciliation accuracy and compliance and assist in optimizing drug therapy for patients. Prior to this pilot, there was not a dedicated pharmacist staffing in the ED.

Methodology
A pharmacist was placed in the ED for 12-weeks to assist with obtaining medication histories, to attend code-blue responses, as a resource for adult and pediatric therapeutic recommendations, and to provide surveillance for high-alert orders. The primary endpoint was the rate of provider-completed admission medication reconciliations. Rates of completion were compared when a pharmacist was obtaining medication histories to when other providers were obtaining medication histories. Additionally, as a secondary endpoint, pharmacist interventions were evaluated by determining cost avoidance for clinical interventions.

Results
254 patients were included in the analysis. The provider-completed medication reconciliation rates were 75% vs 60% for the pharmacist group and other providers, respectively, X2 (N=254) = 5.87, p=0.015. The estimated potential cost avoidance from 88 pharmacist interventions during the pilot was $116,002.

Conclusion
For the duration of the pilot, medication reconciliation rates improved with a pharmacist present in the ED. Additionally, pharmacists contributed to a variety of clinical interventions, providing substantial cost avoidance value. Future quality-improvement initiatives involving pharmacists in the ED are needed to establish the long-term impact of expanding pharmacy services into this department.
Developing an Effective Method to Control the Use of Liposomal Bupivacaine

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Introduction
Liposomal bupivacaine was approved by FDA in October 2011, originally with two indications, post surgical local analgesia for hemorrhoidectomy and bunionectomy, and later on, expanded for any type of surgeries. It was added to our hospital formulary in July 2012 per request of the surgeons, with no restriction placed. In 2014, 2,672 doses were dispensed for 1,412 patients, most of them off-label use, costing pharmacy $841,680.

Methodology
A retrospective hospital-specific MUE in April 2014 showed no superiority of liposomal bupivacaine over control group in terms of pain control, length of stay, or opiate usage. The result was presented to the surgery committee, and the proposal to remove the drug from the formulary was rejected. The top 17 surgeons that attributed to the 80% of the orders were then identified and educated on an individual basis started in January 2015. The use was monitored on a weekly basis and the surgeons prescribed for off-label use were contacted. This information was shared with the hospital clinical quality department and the administrators. In August 2015, with the support of the hospital administrators, the liposomal bupivacaine was removed from the surgery department, and only dispensed from the main pharmacy. The prescriber had to use a specific form and indicate the type of surgery that required the liposomal bupivacaine, and only one vial per patient would be dispensed.

Results
In February 2015, the monthly use of liposomal bupivacaine dropped to 88 doses (60.5% decrease from the monthly average of 2014), and in September 2015, the use further reduced to 5 doses (97.8%). Currently, it averages less than 10 doses (95.5% from year 2014 average) per month, resulting in more than $838,530 saving annually.

Conclusion
The current literature does not support the extensive use of the liposomal bupivacaine. Continual education to the prescribers and other healthcare professionals involved in perioperative patient care, and with the support of the hospital administrators, can effectively control the unnecessary use of the liposomal bupivacaine.
Development and Implementation of a Drug Use Management Initiative for Target Specific Oral Anticoagulants in NVAF

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Introduction
For years, there has only been one anticoagulant available for use in non-valvular atrial fibrillation (NVAF) – warfarin; but with the recent introduction of the target specific oral anticoagulants (TSOAs), healthcare providers now have many more options. The 2012 CHEST Guidelines recommends use of dabigatran over warfarin in atrial fibrillation but no other guidelines exist for the selection of anticoagulant. In order to promote quality, safety, and affordability, Kaiser Permanente Southern California region has selected dabigatran as the anticoagulant of choice for use in the management of atrial fibrillation. The purpose of this study is to describe the process of developing a drug conversion initiative to convert non-preferred TSOAs to dabigatran in the non-valvular atrial fibrillation population and to describe the clinical and financial outcomes of this process.

Methodology
This will be a retrospective, descriptive study conducted at three Kaiser Permanente Medical Center: South Bay, West Los Angeles, and San Diego Medical Centers. This study evaluated the period between October 2015 and March 2016. Major inclusion criteria include patients with a diagnosis of NVAF, age 18 to 79 years, with an active prescription for apixaban, edoxaban, or rivaroxaban. Major exclusion criteria include severe renal impairment (GFR <30 mL/min), ESRD/dialysis, last SCr > 1 year old, documented dabigatran intolerance/failure, history of dabigatran hypersensitivity, history of gastrointestinal bleed within the last year, scheduled cardioversion/ablation, concurrent therapy with rifampin, pregnancy, and breastfeeding. All data was obtained from Kaiser Permanente’s electronic health record - HealthConnect.

Results
The medication use evaluation determined that majority of patients on the non-preferred TSOAs were potential drug conversion opportunities. Of the 369 patients on the non-preferred TSOA agents, 39 patients (10.6%) were converted to dabigatran and 32 patients (8.7%) remained on dabigatran at the end of the study period. Of the 39 patients converted to dabigatran, 3 patients (7.7%) had a bleed event – 1 major and 2 minor bleed events; 5 patients (12.8%) were intolerant to dabigatran. Patient/caregiver preference accounted for 48.1% of the patients who were not converted to dabigatran. The calculated return on investment of the conversion initiative was 6.5:1.

Conclusion
This study demonstrated that a pharmacist-led drug conversion initiative can be successfully developed and implemented. Conversion from Kaiser Permanente’s non-preferred TSOAs to dabigatran appeared to maintain efficacy and safety, while improving affordability. With the availability of a specific reversal agent for dabigatran, dabigatran may be the preferred agent for use in non-valvular atrial fibrillation at Kaiser Permanente.
Increasing Venous Thromboembolism Prophylaxis Orders with a Clinical Decision Support Alert

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Introduction
Venous thromboembolism (VTE) is associated with significant mortality and morbidity. Hospitalization for an acute medical illness can specifically trigger a VTE event and has been highlighted as the single most important risk factor, with more than ten-fold increase in risk for developing a VTE as compared to an individual living in the community (The Surgeon General’s Call to Action, 2008). Despite strong evidence that prophylaxis effectively reduces VTE incidence, there is a substantial body of literature confirming that prophylaxis has been largely underutilized or inadequate for at risk patients. This failure to provide preventative therapy may be attributed to clinicians’ lack of awareness, as well as poor adherence to evidence-based practices. In response, Centers for Medicare & Medicaid Services (CMS) and The Joint Commission, developed consensus standards for VTE prevention and recommended that all inpatients receive prophylaxis as the standard of care. To help facilitate the dissemination and adoption of these recommendations into clinical practice, Sharp Healthcare implemented an evidence-based clinical decision support (CDS) tool in the EMR to alert and guide clinicians when prophylaxis is not addressed upon patient admission.

Methodology
The study is a retrospective data analysis and includes hospitalized patients (≥18yo) discharged between January 1st, 2013 and March 31st, 2015 from four Sharp hospitals. The CDS alert, implemented in November of 2013 at Sharp Healthcare’s multi-facility hospital system, consists of an interruptive alert at physician order entry that 1) identifies the absence of appropriate VTE preventative measures when a patient admission order is signed and 2) prompts providers to order pharmacologic and mechanical prophylaxis or to document an exclusion reason. An alert outcomes report tracked clinician responses when the alert fired (N=5,999) and the data was stratified by whether clinicians responded versus ignored the alert. Random sampling of CMS-reported VTE prophylaxis-related quality measure compliance was extracted from Crimson data systems (N=14,450). Compliance reflects administration of prophylaxis or documentation of an exclusion reason within 24 hours of admission or surgery. The raw data was processed using Microsoft Excel and analyzed using STATA. Each triggered alert was an opportunity for intervention. Rule effectiveness was defined as the percentage of alerted cases where providers initiated prophylaxis or documented an appropriate exclusion reason.

Results
Overlap between the alert fired data (N=5999) and compliance sample (N=14,450) was small (N=356), primarily because only a fraction of VTE quality measure compliance data is retained within the sampled datasets. Despite the sample size, greater compliance is achieved when clinicians responded to the alert (96% compliance, N=301) compared to when clinicians ignored the alert (67% compliance, N=55), and these results were statistically significant (p-value <0.0001). Further, compliance is more than twice as likely (OR=2.18, p-value <0.0001) after the alert was implemented.

Conclusion
Implementation of the VTE prophylaxis order alert and clinician response prompted by the alert are associated with greater compliance for VTE measures. Improved compliance suggests that the CDS tool was effective in ensuring greater adherence to evidence-based guidelines in enhancing VTE prevention efforts in the hospital setting.
Description of an Expanded Intravenous Pharmacy Student Training Program at a Veterans Affairs Health Care System

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Introduction
The Accreditation Council of Pharmacy Education (ACPE), the American Association of Colleges of Pharmacy, and the National Association of Boards of Pharmacy have all established guidelines related to sterile compounding competencies for pharmacy education. In 2009, a joint task force of American Society of Health-System Pharmacists (ASHP) and ACPE recommended that sterile compounding competencies be integrated at all experiential levels. However, studies have shown that pharmacy students still lack hands-on training to be competent in aseptic technique. In one study, 21 percent of APPE practice sites did not allow pharmacy students to prepare sterile admixtures because of extensive training requirements, liability concerns, and the cost and time associated with media-fill and glove fingertip testing. The objective of this process improvement project is to describe an expanded intravenous (IV) program at a Veterans Administration Health Care System in order to enhance practice readiness and confidence of APPE students when performing sterile compounding procedures.

Methodology
Literature search was performed via PubMed using the key words "sterile compounding," "sterile product preparation," and "compounded sterile preparations" for identifying ways to optimize the program. Verbal input from students and pharmacy staff were received to improve the program.

Results
APPE students who are assigned to take their hospital pharmacy practice rotation at the institution have the option to participate in the expanded intravenous (IV) program based upon their interest. The expanded IV program allows APPE students to have hands-on practice in sterile compounding after successfully completing the sterile compounding training. At least two weeks prior to the initiation of the training program, students are required to complete a pre-rotation learning assessment to allow program preceptors to tailor the experience based upon their baseline knowledge and skill level. Students are then required to review institution specific IV policies and procedures and online competency modules related to the preparation, handling, and management of sterile and chemotherapy products. Students then participate in a minimum of three sterile compounding practice sessions under the supervision of a trained pharmacist or technician. Following the practice sessions, students are expected to complete a written and practical IV certification assessment. Students must achieve a score of 70 percent or above on the written assessment. For the practical assessment, they must perform three glove fingertip and media-fill testings that demonstrate no bacterial growth. Once students obtain IV certification and based upon their skill level, students are integrated as part of the IV work flow and prepare a variety of IV admixtures, including total parenteral nutrition, IV antibiotics, and IV electrolytes. At the end of the rotational experience, students will complete a post-rotation learning assessment to determine if further program enhancements are indicated.

Conclusion
To date there are few studies that demonstrate the benefit of expanded IV APPE training for pharmacy students. This expanded IV program was designed to enhance the practice readiness, knowledge, and skill level of APPE students when preparing sterile compounds.
Impact of Transitions of Care (TOC) Pharmacy Interventions on Pneumonia Readmissions

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Introduction
Pneumonia is one of the six disease states measured under the Hospital Readmission Reduction Program (HRRP) by the Center for Medicare & Medicaid Services (CMS). Hospitals with readmission rates that exceed the national average will incur reimbursement penalties. The objective of this study was to determine whether transitions of care pharmacy interventions at discharge can reduce 30-day readmission rates for patients who were admitted with primary and secondary pneumonia.

Methodology
A list of patients discharged from Stanford Health Care general medicine service between October 1, 2015 and March 31, 2016 was generated using the electronic medical record system. Patients were screened for an admission diagnosis of primary or secondary pneumonia and included in the study if they were discharged home with or without home health. Patients discharged to skilled-nursing facilities, long-term care, or hospice were excluded from the study. Baseline characteristics, status of outpatient prescription pick-ups, and appropriateness of discharge antibiotics were compared between the TOC intervention group and control group. 30-day readmission rates of the two groups were compared to determine whether or not there was a difference.

Results
A total of 98 patients were included in the study; 42 in the non-TOC group and 56 in the TOC intervention group. 8 out of 42 patients in non-TOC group and 7 out of 56 patients in TOC group were readmitted within 30 days from discharge with corresponding readmission rates of 19.0% and 12.5%, respectively. For patients who were discharged home with antibiotics, 70.6% of patients in non-TOC group and 89.6% of patients in TOC group had appropriate outpatient antibiotics in terms of dose, frequency, and duration (p-value = 0.03).

Conclusion
30-day readmission rates for pneumonia patients who received TOC pharmacy interventions were lower than non-TOC group but the results were not statistically significant. However, TOC pharmacists made an impact by making sure that patients were discharged home with appropriate antibiotics.
Long Term Effect of a Heart Failure Post-discharge Management Clinic Hospital on Readmission Rates: One Year Outcome

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Introduction
Despite advances in medical care, heart failure readmission continues to be a major problem for most hospitals, and in recent years has become the focus for many policy makers. Recent policies have focused on reducing the number of heart failure (HF) readmissions as a means to curb hospital cost and improve patient outcome. Many hospitals have therefore adapted strategies to reduce the number of heart failure readmissions. Although, recent studies have focused on 30-day and 90-day readmission rates, limited data is available on the long-term outcome of these patients post heart failure discharge from the hospital.

Methodology
Objective
To evaluate the impact of a heart failure post-discharge management clinic on one-year HF readmission rates in patients following discharge from a HF hospitalization.

Methodology
In this retrospective cohort study, we used the Veteran Affairs Computerized Patient Record System (CPRS) and the Veterans Integrated System Technology Architecture (VISTA) to calculate the one-year readmission rates among patients discharged with a diagnosis of congestive heart failure. This study is an expansion of our previous study which focused on the 90-day readmission. We compared heart failure outcome between two cohorts; controls and clinic treatment groups. Control patients were defined as those discharged from the hospital between January 2009 and December 2009 with a primary diagnosis of heart failure. Clinic cohort consisted of patients who were discharged with a primary diagnosis of heart failure between July 2010 and February 2011, and were enrolled in the heart failure post-discharge management clinic. The primary end point was heart failure readmission at 12 months. Data analysis were performed using IBM SPSS Statistic version 23.0.

Results
Of the 277 patients analyzed, 133 were identified as control patients and 144 identified as clinic patients. Majority of the patients (98%) were males, with a mean age of 69±11 and 72±11 in the control group and clinic group respectively. 37% of the control patients and 35% of the clinic patients were readmitted for HF within one year (p=0.383). The unadjusted mean time to the first HF readmission in the control group and clinic group was 73 days and 170 days respectively (p<0.001). There was no statistical difference in unadjusted all-cause mortality between the control and clinic patients (17% vs 13%, p=0.293), however the mean time until mortality was lower in the control group compared to the clinic group (156 vs 233 days, p=0.036).

Conclusion
The HF post-discharge management (HF-PDM) transitional care clinic was only effective at delaying the time until the first HF readmission or mortality, however event rates were comparable among the two groups at the 12-months. Therefore, transitional care programs targeting patients discharged from the hospital with HF are effective at reducing 30-day and 90-day readmission rates, however our results show these benefits are merely a delayed response and the long-term effect on patient outcome may not be as significant.
Impact of Transitions of Care Pharmacists in Reducing Medication Errors for Pneumonia Patients

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Introduction
Unintended medication discrepancies during transitions of care have contributed to adverse drug events. To address medication safety, The Joint Commission has implemented National Patient Safety Goal 03.06.01 to guide hospitals in maintaining and communicating accurate patient medication information. At Stanford Health Care, a service line of Transitions of Care (ToC) Pharmacists was introduced to help with prior to admission medication histories, medication reconciliation, reviewing discharge medications, and providing discharge medication education to the patient.

Methodology
Retrospective chart review was conducted on patients discharged between December 2015 to Feb 2016 with a diagnosis of pneumonia. Patients were stratified based on whether they received ToC pharmacist medication review vs. standard of care (in which nurses reviewed discharge medications). Errors were identified by comparing the patient discharge medication list to the physician discharge summary, home and inpatient medication lists. Errors rates were compared and stratified by error type. Additionally, pharmacist interventions were quantified.

Results
A total of 125 patients were discharged with pneumonia; 69 patient’s medication lists were reviewed by ToC pharmacists, while 56 patients received standard of care. In the ToC intervention group, 5 patients had discrepancies on their medication list during chart view, which equates to an error rate of 7.2%. In the standard of care group, 36 patients had medication errors (64.3% error rate). The difference was statistically significant (P<.0001) and corresponds to an 88.8% relative decrease. There were 85 medication errors identified in the standard of care group, and 6 medication errors identified in the pharmacist intervention group. The most common medication error type recorded was incorrect medication, dose, or frequency. During this time period, the ToC pharmacist also documented 78 interventions, which were made prior to the patient’s discharge.

Conclusion
Having Transitions of Care Pharmacists led to a statistically significant decrease in discrepancies and an increased rate of accuracy of the discharge medication list for pneumonia patients. The Transitions of Care Pharmacists most documented interventions included resolving access issues/formulary issues and incorrect frequency/dose/duration of therapy. Continued metrics and interventions are being collected to assess the impact of the Transition of Care Pharmacists on patient outcomes.
NAC Induced Elevations in PT/INR when Treating Acetaminophen Toxicity – A Case Report and Literature Review

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Introduction
The approach to the management of acute acetaminophen toxicity includes supportive care, gastrointestinal decontamination, and antidotal therapy with N-acetylcysteine (NAC). Treatment with NAC can be considered when there are signs of hepatotoxicity or supratherapeutic levels of acetaminophen. Close monitoring of liver function for determination of hepatic injury and duration of NAC therapy is often necessary. Elevations of PT/INR can be impact the duration of NAC administration. However, elevations of PT/INR may not only be caused by acetaminophen toxicity. The purpose of this case presentation is to present findings that are supportive of literature that the administration of NAC for the treatment of acute acetaminophen toxicity can cause elevations in PT/INR despite normal AST and ALT values.

Methodology
A PubMed search using the terms "N-acetylcysteine," "acetaminophen," and "prothrombin time" was used to identify primary literature that demonstrated elevations in PT/INR when NAC was used for the treatment of acute acetaminophen toxicity.

Results
A 21 year-old male admitted to the hospital after he was found by his family with altered mental status and the inability to follow commands following intentional medication overdose. Upon admission to the emergency department, his plasma acetaminophen level was 86 mcg/mL approximately 10 hours after ingestion, AST 23 IU/L, ALT 23 IU/L, PT 13.5 seconds, and INR 1.18. The medical providers elected to administer activated charcoal followed by the 21-hour regimen for NAC, as recommended by the National Poison Control Center, with a repeated dose over 16 hours until the acetaminophen levels are undetectable or clinically unwarranted. On day 2 of admission, PT/INR was 13.5/1.18, respectively, and increased to 15.3/1.39 on day 3 of admission. Administration of NAC was discontinued on day 3 of admission. The following day the PT/INR began to decline to values of 12.8/1.12. He was subsequently transferred to an inpatient psychiatric facility. In the setting of acute acetaminophen toxicity it is an accepted recommendation to monitoring for normalization of AST, ALT, and INR levels prior to the discontinuation of NAC therapy. In the case with this patient, as well as current research, elevations in PT/INR can be witnessed with NAC administration. Therefore, such elevations in PT/INR are not solely due to acetaminophen toxicity. The cumulative effects of acetaminophen toxicity and NAC administration can contribute to the transient elevations in PT/INR.

Conclusion
This patient case supports limited data that NAC administration for the treatment of acute acetaminophen toxicity can contribute to an elevated PT/INR. Normalization of liver enzymes may accurately guide the duration of NAC therapy. Continued research in this area could help establish an acceptable range for PT/INR in the presence of NAC administration to assist in determining if additional doses of NAC are required in order to prevent further complications acetaminophen toxicity.
Effectiveness of a Pharmacist-managed Opioid Taper Pilot

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Introduction
Opioid overdose and misuse is a problem recognized nationally in the United States. The use of high-dose opioids for the treatment of chronic pain has been associated with a higher risk of overdose and adverse effects. Kaiser Permanente Napa-Solano service area has implemented a pharmacist-managed opioid taper pilot program aimed to assist primary care physicians in decreasing overall opioid use.

Methodology
Beginning in April 2014, patients who were prescribed opioids with total daily dose greater than 120 mg morphine equivalent (MME) were identified through pharmacy dispensing record. A pharmacist reviewed the patients’ charts to identify patients appropriate for taper. The pharmacist would develop a taper plan and discuss with the pain physician and primary care physicians. Once the taper plan is finalized, the primary care physicians would contact patients to review the plan and notify pharmacist when there’s an agreement to proceed with taper. Then the pharmacist would contact patients to implement the taper plan. The pharmacist would adjust taper speed, initiate non-opioid medications, rotate to different opioids, and address medication side effects during follow-up phone calls, which occurred every two weeks or sooner if needed. To be included in the study, patients had to be at least 18 years old, patients had to agree to work with a pharmacist, and the primary opioid prescriber was a primary care physician enrolled in the pilot. The primary outcome measured was the mean reduction in daily MME dose over 4 months. Secondary outcomes measured were: 1) reduction in daily MME at 2 and 6 months, 2) reduction in daily MME in pharmacist-managed taper versus standard of care, 3) number of referrals made for alternative treatments such as pain skills classes, psychological evaluation, and acupressure trial, and 4) average time to taper to less than 120 MME

Results
Seventy nine patients were reviewed with 55 patients included in the study, 20 patients in the pilot group and 35 patients in the standard of care group. Baseline characteristics were similar between the two groups. Patients included in the study mostly white females with an average of 2-3 pain diagnoses and baseline MME of approximately 270. For the primary outcome, the mean reduction in MME at 4 months was 112 mg in the pilot group (p<0.001). The mean MME reduction at 2 and 6 months was 65 and 149 MME (p<0.001). At 6 months, the reduction in MME was also significantly lower in the pilot group vs. the standard of care group 150 mg vs 27 mg (p<0.001). For secondary outcomes, one non-opioid medication was initiated per person, 10 referrals to pain skills class, 1 referral for acupressure, and 3 referrals to psychiatry. By 6 months, 55% of the patients in the pilot group were able to achieve an MME of less than 120 mg.

Conclusion
A pharmacist was effective in assisting primary care physicians significantly reduce MME. The reduction in MME was significantly greater in the pharmacist managed opioid taper versus standard of care group.
Long-term Follow-up of Patients with Chronic Hepatitis C Infection Following Treatment with Direct Acting Antivirals

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Introduction
Significant advances in the treatment of chronic hepatitis C have been made with the introduction of direct acting antiviral (DAA) regimens. While sustained virologic response (SVR) rates may now be achieved in the majority of patients, data describing long term virologic and clinical outcomes with these regimens are needed.

Methodology
We report interim data from two 3-year registry studies capturing long-term outcomes in patients with chronic hepatitis C treated with DAAs. Subjects are enrolled into the two registries according to SVR status; SVR versus non-SVR (Sequence registry). We determined the durability of SVR, relapse rates and reinfection rates. The persistence of resistance associated periodic clinical and laboratory evaluations.

Results
Results: 5433 patients enrolled in the SVR registry with a median (range) follow-up of 71 (0-156) weeks. 536 patients enrolled in the Sequence registry with a median (range) of follow-up of 44 (0-159) weeks. Demographic and disease characteristics are described below. In the SVR registry, at the time of data analysis 99.7% (5414/5433) of patients have maintained SVR with 0.3% (19/5433) having emergent virus (6 relapses, 8 new infections, 5 to be confirmed). Viral emergence occurred by Week 96 in all patients. In the Sequence registry, of 89 patients who received an NS5A inhibitor and had baseline sequencing data 91.0% (81/89) had NS5A resistance associated variants (RAVs) at Week 96. Hepatocellular carcinoma (HCC) was reported in 0.3% (16/5433) and 0.9% (5/536) of patients in the SVR and Sequence registries through Week 96 respectively. There were no significant changes in laboratory evaluations or liver disease assessments.

Conclusion
SVR achieved following treatment with direct-acting antiviral regimens is durable. In patients failing NS5A-containing regimens, treatment-emergent NS5A RAVs persist. Rates of clinical disease progression and HCC are low. Ongoing reporting from the registry studies will be required to confirm these findings.
Evaluation of Weight Loss Medications Used by Veterans at VAGLAHS

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Introduction
Veterans who receive medical care from the Veterans Health Administration (VHA) have a high prevalence of obesity. Obesity related conditions, including hypertension, diabetes, ischemic heart disease, and arthritis are very common among the VHA population and add to the burden of health care costs within the VA health care system. Weight loss has been shown to reduce risk factors for diabetes and cardiovascular disease by reducing blood pressure, cholesterol levels, and blood glucose levels. The MOVE program (Managing Overweight/Obesity for Veterans Everywhere) was developed in 2002 to provide support to veterans seeking weight loss. In addition to providing group classes focused on lifestyle changes to veterans, the MOVE clinic also prescribes weight loss medications to qualifying veterans. Data from Phase 3 trials have shown clinically significant results in terms of weight loss and maintenance of lost weight using weight loss medications compared to lifestyle changes alone. However, the extent to which these medications help with weight loss in the veteran population is currently unknown.

Methodology
A retrospective chart review was conducted to identify all patients who were prescribed weight loss medications from January 1, 2007 to November 1, 2015. Baseline demographic data, clinical data, laboratory data were collected using CPRS for patients who met inclusion criteria. Medication refill history and MOVE clinic attendance were also collected using CPRS. Descriptive statistics and paired two-sample t-test were used for statistical analysis.

Results
Patients on orlistat (n=73) experienced an average weight loss of 5.4 kg (p<0.001). This was driven by patients who completed > 12 weeks of therapy (-6.4 kg, p<0.001). Patients who were adherent to both MOVE and to medications achieved more weight loss through the end of therapy and were able to maintain more of their lost weight compared to the other subgroups. Patients on phentermine/topiramate (n=12) experienced an average weight loss of 5.4 kg (p<0.001). This also driven by patients who completed > 12 weeks of therapy (-5.5 kg, p<0.005). Patients on lorcaserin (n=3) experienced an average weight loss of 10 kg. Most metabolic parameters improved for patients on orlistat, phentermine/topiramate, and lorcaserin who were able to lose >5% of their baseline weight.

Conclusion
The veteran population in this study was able to achieve statistically significant weight loss and improvement in metabolic parameters with use of orlistat, phentermine/topiramate, and lorcaserin. Those who were adherent to both MOVE clinic and to medication experienced the most optimal outcomes in terms of statistically significant weight loss compared to baseline, continued weight loss in the initial 12 weeks of treatment and through the end of treatment, and less weight regain after medication discontinuation. Thus, veterans utilizing weight loss medications at VAGLAHS should be encouraged to attend monthly MOVE meetings and comply with medication therapy throughout the course of treatment.
Pharmacist Impact on Reducing Days of Therapy of Piperacillin/Tazobactam

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Introduction
Piperacillin/tazobactam is one of the most commonly used antibiotic medications at St. Joseph’s Medical Center (SJMC) for moderate to severe infections due to its wide spectrum of activity against gram positive and negative organisms, including the multi-drug resistant organism (MDRO) Pseudomonas aeruginosa and anaerobes. Over the past year, the use of piperacillin/tazobactam has steadily increased at SJMC. The antibiotic’s broad spectrum of activity also increases the risk of Clostridium difficile, however. In 2015, the total number of hospital-onset Clostridium difficile infections at SJMC was 63 compared to the nationally expected number of approximately 54. Ensuring the appropriate use of piperacillin/tazobactam may minimize the emergence of MDRO’s while achieving therapeutic goals and reducing healthcare costs.

California law mandates that general acute care hospitals develop a process for monitoring the judicious use of antibiotics. Currently, SJMC antibiotic stewardship efforts include monitoring antibiotic consumption rates by analyzing direct expenditures on antibiotics, IV to PO transition, and renal dosing adjustments. Effectively tracking and monitoring the usage patterns of antibiotics through days of therapy (DOT) may enhance SJMC’s antimicrobial stewardship program.

Methodology
Retrospective chart review of 100 patients at SJMC who received piperacillin/tazobactam between October 15, 2015 and November 24, 2015. Areas of improvement such as ordering cultures and sensitivities to guide therapy, appropriate duration of therapy based on source and site of infection, and modifying therapy in a timely manner based on culture and sensitivity results were identified. From February to April 2016, prospective chart review was performed to actively assess piperacillin/tazobactam usage at SJMC. The physician was contacted to change or de-escalate antibiotic therapy, or to define the duration of therapy once culture and sensitivity results became available or if the patient demonstrated an improved clinical presentation, if deemed appropriate. Mann-Whitney test was used to examine the difference in DOT between pre- and post-intervention phases.

Results
From February to April, 697 patients received piperacillin/tazobactam and 136 interventions were conducted. The average DOT from the retrospective chart review (October to December) versus intervention (February to April) phase was 4.28 versus 3.66 (P<0.05). Physician acceptance rate was 75.7%. Hospital-onset Clostridium difficile infections increased from baseline to the intervention phase from 13 to 18 cases.

Conclusion
Pharmacists can facilitate the de-escalation of broad-spectrum antibiotics and physicians are accepting of pharmacist recommendations to de-escalate antibiotic therapy. Limitations included interventions were not performed 7 days per week, a difference in time periods between pre- and post-intervention, and the length of time required for final culture and sensitivity results to become available. Future directions of the project include a potential role for a dedicated infectious disease pharmacist and providing antimicrobial stewardship education for clinical staff and prescribers.
Medication Adherence Among Medicare Beneficiaries: What Factors Matter?

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Introduction
Medication adherence can be a serious challenge for older adults due to higher medication utilization rates. We sought to assess adherence in a population of Medicare beneficiaries via the Morisky Medication Adherence Scale (MMAS-8-Item). Factors that may influence adherence levels were also examined.

Methodology
Medication therapy management (MTM) services were provided to beneficiaries at 13 Mobile Clinic sites in 2015. Responses to the validated MMAS-8-Item were used to stratify each beneficiary’s medication adherence into three levels. The Williams & Heller Medicare Screening Segmentation Tool (SST) helped categorize beneficiaries into four segments (“Active,” “Passive,” “High Effort,” or “Complacent”) based on their health care decision-making skills and motivation. Sociodemographic, attitudinal, and health information data were also collected during each MTM intervention.

Results
Among the 740 beneficiaries assisted, 672 (90.8%) were 65 years of age or older and taking an average of 5.8 (SD=3.5) medications. Medication adherence levels were low (n=170; 23.0%), medium (n=284; 38.4%) or high (n=286; 38.6%) among those assisted. High medication adherence levels were significantly more common among the “active” and “complacent” SST segments. Adherence levels were significantly different based on gender, marital status, race, type of prescription drug coverage, and beneficiary subsidy status.

Conclusion
Medication adherence can have a direct and profound impact on effective chronic illness management. By understanding the various factors that affect adherence, health professionals can be better positioned to ensure positive patient outcomes. Further studies aimed at developing effective strategies to improve medication adherence in older adults are required.
Complications Associated with Staphylococcus Aureus Bacteremia in Children Over a 25-Year Period

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Introduction
Staphylococcus aureus is a leading cause of bacteremia in children and limited data exists on the incidence and outcomes of metastatic complications caused by S. aureus bacteremia in the pediatric population. Our objectives were to assess the prevalence, methicillin resistance and outcomes of complications associated with S. aureus bacteremia in hospitalized children.

Methodology
Cross-sectional study of 376 neonatal and pediatric patients less than or equal to 18 years of age with S. aureus bacteremia from 1990 to 2014.

Results
This study was presented in part at the 2010 Infectious Disease Society of America International Conference with data spanning the first 20 years. The following results are derived from the full 25-year study period. Overall, 197 (52%) patients experienced focal infections, with the most common being osteomyelitis (31%), skin and soft tissue infection (30%), pneumonia (25%), septic arthritis (18%), and respiratory distress syndrome (16%). Among those with complications, 63 (32% of 197) had more than 1 focus and 48 (34% of 140) had an unsuspected focus. Patients with complications were older than those without (median age 3 vs 0.7 years [p=0.05]). Compared to those without, more patients with complications had community-associated S. aureus bacteremia (66% vs 34%, p=0.001), but fewer had concurrent infections (31% vs 47%, p=0.01) and S. aureus bacteremia-related visit to emergency department or hospital within 2 years (10% vs 19%, p=0.014). Methicillin resistance increased significantly from 1990-1999 to 2000-2009 (5% vs 26%, p<0.0001), but drastically decreased in incidence in 2010-2014. Patients with complications associated with methicillin resistance were more likely to have > 1 focus (58% vs 26%, p<0.001). Children with S. aureus bacteremia also had more intensive care unit admissions (67% vs 49%, p=0.008) and longer length of stay (median 28.5 vs 19 days, p=0.006). From multivariate analysis, children with community-associated infection were almost twice as likely to develop complications (OR 1.82 [1.1-3.02], p=0.021) while those with concurrent infections were at a lower risk of acquiring complications (OR 0.58 [0.34-0.97], p=0.038).

Conclusion
As half of patients had complications and a significant percentage had unsuspected foci, children with S. aureus bacteremia should be carefully evaluated for complications. Although methicillin resistance appears to have decreased in incidence, it may be associated with worse outcomes in children with S. aureus bacteremia. Clinicians should still be mindful and pursue a more aggressive course of treatment if appropriate.
To Stick or Not to Stick: DPP-4 Inhibitor vs. Insulin as Third-line Therapy

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Introduction

Background

Type 2 diabetes is a progressive disease that often requires treatment with multiple antidiabetic agents to achieve glycemic control. Metformin is typically initiated as the first-line pharmacological agent, and if needed, a sulfonylurea is commonly added as a second-line oral antidiabetic agent. For patients on this regimen in need of further glycated hemoglobin (HbA1c) lowering, basal insulin is the preferred third-line option at Kaiser Permanente Southern California, an integrated health care system. The large body of experience with insulin therapy demonstrates a nearly universal response with theoretically unlimited efficacy. Dipeptidyl peptidase-4 (DPP-4) inhibitors are a newer pharmacological class of antidiabetic agents that have become an increasingly utilized third-line option rather than starting NPH insulin, currently the preferred basal insulin at Kaiser Permanente Southern California. Besides providing an oral alternative to insulin injections, DPP-4 inhibitors have a favorable side effect profile of low risks of weight gain and hypoglycemia. However, there is limited data to directly compare the HbA1c lowering results of DPP-4 inhibitors and NPH insulin in patients who have suboptimal glycemic control on the maximally tolerated dose of metformin plus a sulfonylurea.

Objective

The aim of this study is to evaluate the comparative effectiveness of starting a DPP-4 inhibitor versus NPH insulin as third-line therapy to reduce HbA1c.

Methodology

This retrospective cohort study included members of Kaiser Permanente in the Southern California Region with type 2 diabetes age 18 to 75 years who had an elevated HbA1c of 7% to 10% after being on a maximized dose of metformin plus a sulfonylurea and were then newly started on a DPP-4 inhibitor or NPH insulin in the seven-month period from January 1, 2015 to July 31, 2015. To minimize treatment selection bias, patients were matched 1:1 between the DPP-4 inhibitor and NPH insulin groups based on age, gender, body mass index, and baseline HbA1c. Statistical analysis of the change in HbA1c during 24 weeks of follow-up after initiation of either a DPP-4 inhibitor or NPH insulin was performed to compare the two treatment groups.

Results

Patients starting a DPP-4 inhibitor had a mean reduction in HbA1c of 0.67%. Patients starting NPH insulin had a mean reduction in HbA1c of 0.78%. There was no statistically significant difference between the mean change in HbA1c for the two groups. The percentage of patients reaching HbA1c target of <7% was 20.7% in the DPP-4 inhibitor group and 22.1% in the NPH insulin group. The difference in the percentage of patients reaching HbA1c target of <7% was also not statistically significant.

Conclusion

Patients starting a DPP-4 inhibitor or NPH insulin for third-line therapy after having elevated HbA1c on metformin and a sulfonylurea had similar reductions in HbA1c after up to 24 weeks of follow-up. Challenges in this retrospective observational study design limit the applicability of a broad comparison of effectiveness between the two therapies.
Clinical Outcome of Patients Stepped Down From Etanercept High Dose Therapy at Different Intervals

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Introduction
According to a 2015 article from the Journal of American Medical Association, Dermatology, 3.2% of the U.S. population (10.2 million people) have some form of psoriasis. The annual U.S. cost of psoriasis is now estimated to be more than $135 billion. The treatment of psoriasis involves the use of topical corticosteroids, ultraviolet light therapy, or disease-modifying antirheumatic drugs (DMARDs). If these are ineffective, biological-DMARDs are considered. Currently, five bio-DMARDs are available. A loading dose is required before conversion to a maintenance dose. Of these five medications, etanercept requires a longer twice weekly, 12 week loading period before it can be stepped down to a once weekly maintenance dose. Longer time periods increase the chance for physicians to forget stepping down therapy after 12 weeks. In 2012, more than 300 patients in Southern California Kaiser Permanente were identified as treated with etanercept high dose for more than 12 weeks before dose reduction.

An etanercept step down initiative was implemented following FDA recommendations, to ensure patients were given the lowest effective biologic dose, minimize adverse effects, and decrease medication costs for patients and Kaiser Permanente. The purpose of this study is to provide objective findings to compare efficacy between a group of patients who were stepped down at the FDA recommended duration of 12 weeks and a group that was on chronic high dose etanercept for at least 24 weeks, before step down.

Methodology
In this retrospective observational cohort study, all data will be pulled from electronic medical records. The study population will be selected from January 2014 to June 2015, and will consist of Kaiser Permanente Southern California members, 18 years of age or older, confirmed psoriasis diagnosis, and received subcutaneous chronic high dose etanercept for 12 weeks or a minimum 24 week period before therapy was stepped down. The difference in disease improvement for step down therapies between 12 weeks or a minimum 24 week period will be analyzed using an independent z-test.

Results
The study sample consisted of 35 patients stepped down at 12 weeks and 35 patients stepped down at 24 weeks or more of therapy. The average age and BMI were significantly higher (P< 0.05) in the ≥ 24 week group. The clinical outcomes were similar in both groups. The average PASI scores post-step down were not statistically significant.

Conclusion
Although the data suggests no difference in clinical outcome between stepping down etanercept at the FDA recommended 12 weeks versus ≥ 24 weeks for psoriasis patients in the this population, no definitive conclusion can be formed from this study based on the sample size and other limitations. Future analysis with a larger patient population is needed. Future studies should implement additional statistical methods to prevent selection bias with a larger patient population. Also, tendencies for patients in the ≥ 24 week group to have older patients, higher BMI and higher PASI should also be researched more extensively.
Effective and Timely Hyperglycemia Management in Non-Critically Ill Patients

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Introduction
Hyperglycemia occurs as a metabolic response to illness and stress, regardless of previously diagnosed diabetes. Persistent hyperglycemic states in hospitalized patients are known to lead to adverse outcomes, including multiple organ failure and death. This study assess whether hyperglycemia is managed effectively and timely in non-critically ill patients in a community hospital facility.

Methodology
This is a retrospective observational study involving non-critically ill patients with insulin orders at a community hospital. A medical chart review was completed between April 2016 and June 2016 with institutional IRB approval. The study included patients with consistently elevated blood glucose of ≥180 mg/dL for 24 hours (hyperglycemic event). Insulin regimens were assessed at baseline. The primary objective was to assess the number of additional days of hyperglycemia. Additional objectives were physician intervention within 24 hours at the hyperglycemic event, types of interventions made, additional hyperglycemia days, and hospital length of stay.

Results
687 patients were screened and 113 patients were included in the analysis. 47% of all the patients were only on correctional insulin, and 2% had no insulin regimen at the time of the hyperglycemic event. The mean number of additional days of hyperglycemia was 4.41 days, with physicians making no intervention 54% of the time following a hyperglycemic event. When an intervention was made, most frequently interventions were dose titration (24%) or the addition of basal insulin (16%). The medical-surgical floor had the greatest number of patients with above mean days of additional hyperglycemia (25 vs. 17 patients). The mean hospital length of stay if known was 9.6 days (range of 3-32 days).

Conclusion
Hyperglycemia is not effectively addressed on the non-ICU units, with elevated blood glucose of ≥180 mg/dL persisting on average of 4 days and up to 23 days, and with a majority of patients with no immediate intervention after the hyperglycemic event. Lack of timely intervention may be due to lack of awareness by the healthcare providers and lack of protocols to guide insulin therapy titration for uncontrolled hyperglycemia. The study support the implementation of a pharmacy-driven protocol to improve blood glucose control in non-critically ill patients and a further study is needed to reassess the outcomes.
A Pilot Study of Medication Detection in Urine in CHF Patients

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Introduction
Heart disease is the leading cause of death in the Western society; with the highest rates of morbidity and mortality. Numerous clinical trials on cardiovascular drugs have linked use with overall improvement of health and life expectancy. Studies have shown that medication adherence helps reduce health care costs and hospitalizations. Currently, direct measures of drug detection have not been cited in literature. Purpose: To determine the impact of medication detection rates in urine to the rate of hospital or emergency department (ED) admissions related to cardiovascular (CV) issues in heart failure (HF) patients.

Methodology
Prospective, non-blinded study performed at UCSD HF clinics from June 2013 to August 2013. Typical heart failure medications were detected using a Triple Quad LC-MS/MS with concentrations above lower level of quantification (LLOQ) showing up as detected. Eligible patients were interviewed by a pharmacy student to perform medication reconciliation, obtain an accurate medication list, and to evaluate reported level of adherence to their regimen. The degree of detection was stratified by high (>80%), moderate (50-80%), and low (<50%), taking into account all of their cardiovascular (CV) medications. Electronic medical records were screened up to 6 months after to identify hospital and ED admissions related to CV complications.

Results
139 patients were contacted; 54 urine samples were analyzed. Average number of CV medications per patient was 2. 79.6% of patients fell in the category of high detection, 14.8% moderate, and 5.5% poor. The poor and moderate detection group were combined and compared to the high detection group. Hospital and ED admissions for each patient was noted up to 6 months after urine collection. The high detection group had a total of 11 admissions and the moderate/poor group had 15, with an average of 0.225 and 1.36 respectively per patient (p value = 0.0055). There was no difference in admissions between genders (p value = 0.529).

Conclusion
Heart failure patients who had high medication detection in their urine had fewer hospital and ED visits versus the patients who had moderate-poor medication detection. Gender did not play a role in level of detection. This study was limited because it did not evaluate the impact of the number of medications per patient and level of detection, other objective measures of adherence including pill counting, or measure severity of CHF.
An Evaluation of Veterans at High Cardiovascular Disease Risk with LDL Greater Than 190 at VA Long Beach

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Introduction
Low-density lipoprotein (LDL) cholesterol is widely recognized as a surrogate marker for cardiovascular health. However, recent treatment algorithms from the American College of Cardiology / American Heart Association and the Department of Veterans Affairs / Department of Defense have focused on treatment with the appropriate statin intensity as the goal of treatment. On the other hand, the National Lipid Association guidelines continue to define target LDL levels. The primary objectives of this study are to characterize patients with LDL ≥190mg/dL and to describe the management of their hyperlipidemia in the VA Long Beach Healthcare System.

Methodology
This is a retrospective chart review study. Inclusion criteria include patients with LDL ≥190 mg/dL during the baseline data collection period 8/1/2012 to 8/1/2013. Patients without lipid panels obtained within the follow-up period 3/1/2015 to 2/29/2016 were excluded. Statin adherence data was collected for patients with refill history available for one year prior to the most recent lipid panel. Descriptive statistics and the Wilcoxon signed-rank test were performed to assess the primary objectives or compare the study groups. Adherence was calculated using the medication possession ratio (MPR).

Results
Of the 393 patients included in the study, 29% were not on statins, and 69% were on moderate or high intensity statins. The mean LDL decreased from 211mg/dL at baseline to 145mg/dL at the end of the follow-up period with a mean decrease of 31.1% (p<0.0001). When stratified by statin intensity, the mean LDL decrease was 18% without statins, 28% with low intensity statins, 35% with moderate intensity statins, and 39% with high intensity statins.

Of the patients with diabetes and/or ASCVD, 81% were on a moderate or high intensity statin, 31% achieved an LDL goal <100mg/dL, and 17% had LDL≥190 mg/dL at the end of the follow-up period. Of patients without diabetes or ASCVD, 62% were on a moderate or high intensity statin, 18% achieved an LDL goal <100mg/dL, and 25% had LDL≥190 mg/dL. Of the 113 patients not taking a statin, 74% were not prescribed any class of lipid-lowering therapy, and the most common reasons for withholding statins were patient refusal and myalgias. Of the 200 patients included in the statin adherence subgroup analysis, 46% had MPR greater than 80%, 25% had MPR between 50% and 80%, and 29% had MPR less than 50%. There was a trend toward greater LDL lowering with improved statin adherence.

Conclusion
The analysis revealed that most patients with LDL≥190 mg/dL are being prescribed a moderate or high intensity statin rather than a low intensity statin. However, few patients achieve a lipid goal of LDL<100mg/dL, and a significant proportion of patients are not taking a statin or any other class of lipid-lowering medication. Less than half of the patients with a statin prescription for at least one year are adherent to statins. Additional research is needed to identify patients not taking statins who may be candidates for statin therapy.
Influence of Antipsychotic Drugs on Alcohol-Related Readmission in Concurrent Schizophrenia and Alcohol Abuse Patients

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Introduction
The rate of alcohol-use disorder (AUD) in the general population is 6.8%, a rate which increases to 43% in patients suffering from concurrent schizophrenia. While the treatment of schizophrenia and AUD individually is challenging – the treatment of both illnesses concurrently becomes more daunting. The effect of antipsychotics on alcohol consumption is unclear. The primary objective of this study was to evaluate whether discharging patients, suffering from both schizophrenia and AUD, with a new prescription for an antipsychotic will reduce future alcohol-related readmissions compared to patients who did not receive a prescription for an antipsychotic. Secondary objectives were to evaluate whether antipsychotics prolonged the time between admissions and identifying factors that may influence readmission rates, such as gender, smoking history, homelessness, concurrent depression, and inpatient psychiatric evaluations.

Methodology
This retrospective cohort study was conducted at a large, academic county hospital examining patients with schizophrenia and AUD from 1/1/2005 to 12/31/2015. An initial list of 7,000 patients was identified. Included are: documented schizophrenia, current alcohol abuse, and no current use of antipsychotics. Excluded are: age<18 and lack of medical record. Included in the study were 108 patients (n=84 discharged with antipsychotics and n=24 discharged without antipsychotics). Data on demographics, patient medical and social history, comorbidities, urinary toxicological screening results, index admission date, date of readmission, medications, and discharge diagnoses will be collected. Unpaired t-tests and Mann-Whitney test will be performed on continuous variables and Chi-squared or Fisher's Exact tests on categorical variables. Chi-squared or Fisher's Exact tests will be performed on predictor variables for readmission such as discharge with an antipsychotic medication, gender, smoking history, homelessness, concurrent depression, and inpatient psychiatric evaluation. Statistical significance will be set at p<0.05.

Results
Baseline characteristics (age, gender, social history, comorbidities) were not statistically significant between the two cohorts. For the primary objective, patients discharged with antipsychotics (13%) had significantly lower rates of alcohol-related readmissions compared to those who were discharged without an antipsychotic (33%; p=0.033, RR=0.39, 95%CI 0.18-0.87, OR=0.30, 95%CI 0.10-0.87). Median days between index admission and alcohol-induced readmissions were 152 days and 86 days for those discharged with an antipsychotic compared to those who were not, respectively (p=0.66). Subgroup analysis for potential factors that may influence readmission did not reveal any statistical significance: male gender (p=0.067) homelessness (p=0.26), smoking history (p=0.79), concurrent depression (p=0.14), cocaine abuse (p>0.99), and amphetamine abuse (p=0.65).

Conclusion
Readmission rates were significantly lower in patients discharged with antipsychotics than those who were not. Time between readmission was not significant. This suggests antipsychotics upon discharge may have a positive effect on AUD and reduce future alcohol-related readmissions. Prospective studies are necessary to substantiate these findings.
Redefining Normal Serum ALT and AST Reference Values in HCV-Infected Patients Based on DAA Treatment Outcomes

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Introduction
Revised ALT reference values have been implemented for HBV infection. Although it is known that 25-30% of HCV-infected patients may present with ALT < 40 IU/mL, it remains unknown if the current ALT and AST reference values underestimate HCV-related liver injury. The purpose of the study is to redefine the appropriate serum ALT and AST reference values and the related factors based on a cohort of HCV-infected patients who received DAA treatment (Rx) with SVR12.

Methodology
A single center retrospective study on 97 HCV-infected patients who received DAA Rx and achieved SVR12. Clinical data were collected at baseline, during Rx and 12 wks post-Rx. SPSS program was used for statistical analysis.

Results
In these 97 patients, the mean age was 59.3 (20-85); 52.6% and 20.6%, Caucasian and Asian; 41.7%, HCV Rx experienced; the mean baseline ALT and AST, 81.2 (12-484) and 70.5 (18-244) IU/mL; 75.3% or 61.9%, ALT or AST > 40 IU/mL; 66.3% had both ALT+AST > 40, 8.4% and 4.2% had isolated ALT or AST > 40 IU/mL; 57.7%, baseline HCV RNA > 6 log IU/mL; 78.4%, GT-1 infection; 47.5% (29/61), liver biopsy report of stage 3-4 fibrosis; 49.5% (48/97), histological or clinical evidence of cirrhosis; 83.3% and 16.7%, Child-Pugh (CPC) class A or B-C, respectively; 20.8%, MELD > 10; 24%, BMI > 30; 62.5% (40/64), biopsy proven fatty liver and 11.3%, histological diagnosis of NASH; 4 had biopsy diagnosis of AIH; and 32.5%, serum AFP > 10 IU/mL. At Rx wk 2, 31.3% had HCV RNA < 15 IU/mL and all others had HCV RNA in 1-2 log range, and both were associated with normalization in 78.4%, 66.7%, or 59.4% of baseline elevated ALT, AST, and ALT+AST, respectively. Additionally, 83.3% of patients with baseline ALT < 40 IU/mL had further decline in ALT at the same time. These ALT and AST improvements occurred even in patients with NASH, AIH, obesity and other comorbid conditions. At post-Rx wk 12, 88.2% and 85.7% of patients with baseline ALT or ALT+AST ≥ 30 IU/mL had the corresponding ALT or ALT+AST decrease to < 30 IU/mL. Absence of MELD > 10 was associated with ALT and ALT+AST decline to < 30 IU/mL. Absence of CPC class B-C, was only associated with ALT+AST decline to < 30 IU/mL.

Conclusion
DAA Rx-mediated rapid HCV clearance at Rx wk 2 is associated with immediate normalization in serum ALT and AST independent of concomitant comorbid conditions, providing clinical evidence that HCV is directly cytopathic. Following SVR12, serum ALT and ALT+AST can improve to < 30 IU/mL in most patients even with co-existing NASH or AIH, excluding CPC class B-C or MELD > 10. Our data suggests that normal reference values for both ALT and AST should be decreased from 40 to 30 IU/mL in HCV-infected patients.
Impact of Reducing Serotonin Burden in Elderly Long-term Care Residents

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Introduction
Mild to moderate symptoms of serotonin syndrome are often overlooked as symptoms of an existing chronic disease such as hypertension, undetected infection, or insomnia. The aforementioned symptoms of serotonin syndrome are non-specific and can easily be misdiagnosed with the potential for addition medications leading to an increase risk of polypharmacy. The primary objective of this study is to determine if pharmacist recommended interventions reduce the serotonin burden (mild to moderate symptoms associated with serotonin syndrome) in elderly skilled nursing facility (SNF) residents.

Methodology
A retrospective chart review of SNF residents from August 5, 2013 to February 15, 2016 was performed to identify residents taking 2 or more serotoninergic modulators who are potentially at risk for serotonin syndrome. The control group consists of residents where the provider did not accept the pharmacist recommendation to reduce the serotonin burden. The intervention group included residents that had a reduction in serotonin burden. The data was collected over a period of 5 weeks after the provider reviewed the pharmacist’s recommendation. Results measured the average change in vital signs. The secondary outcomes measured the change in the total number of prescriptions, average time for a provider to review a recommendation, and the frequency of valid contraindications documented to support unneeded dose reduction of a serotonin modulator. Statistical analysis include descriptive statistics, as well as but not limited to student t-tests, ANOVA, and chi squared calculations.

Results
A total of 31 patients met the inclusion criteria. Baseline characteristics for both groups showed no differences with the exception of the comorbidities of anxiety and mild cognitive impairment. The Charlson comorbidity index for both groups was greater than 8. The average change in Mean Arterial Pressure (MAP) from baseline to one week showed a decrease of 3.49 for patients with a decrease in serotonin burden and an increase of 7.02 for patients that did not have a decrease in serotonin burden (p = 0.01). The average change in heart rate, respiration rate and body temperature showed no statistical significance. The total number of prescriptions trended downward in the intervention group (excluding the serotonin modulator in question), (p=0.4). On average psychiatrists took twice as long to review a recommendation compared to primary care providers, 155.6 days vs 77.7 days (p=0.4).

Conclusion
The acceptance of pharmacist recommendations to decrease serotonin burden resulted in a statistically significant decline in MAP after one week. The current study had several major limitations such as small sample size, changes in activity affecting body temperature and poor documentation of the subjective symptoms of serotonin syndrome. Prospective studies should be conducted to assess the clinical significance of reducing serotonin burden in this population.
Benzo-Caine or Benzo-Can’t: Current Trends in Outpatient Pharmacists’ Infant Teething Recommendations

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Introduction
Methemoglobinemia is a potentially life-threatening condition characterized by impaired oxygen transport within the hemoglobin molecule. Most reported cases have been attributed to the use of over-the-counter (OTC) topical anesthetic products containing benzocaine. The ease of accessibility to these products paired with the limited awareness of their potential risks in the infant population has led to inappropriate use of benzocaine products and resulted in numerous cases of methemoglobinemia. The American Association of Poison Control Centers reports approximately 100 cases of methemoglobinemia per year. Of these cases, a majority involves pediatric patients, most of whom are two years of age or younger. In 2011, the FDA released a drug safety announcement avoiding use of any benzocaine-containing products for anyone less than two years of age. In spite of this, there are cases of methemoglobinemia-related hospitalizations being reported. The purpose of this study is to determine what percentage of outpatient pharmacists are inappropriately recommending benzocaine-containing products for treatment of infant teething, identify the most common medications recommended by pharmacists for infant teething, and the most preferred educational resource.

Methodology
A 16-item in-person, paper-and-pen survey was administered to 200 California registered and practicing outpatient pharmacists. Questions included demographic information, work and educational background, infant teething recommendations, and preferred educational resources. Exclusion criteria consisted of non-practicing and licensed pharmacists, those who declined to participate or complete the survey, and non-English speaking individuals. Statistical analyses was conducted using STATA vs. 13 (College Station, TX). Means and standard deviations were reported for continuous data, and frequency and percentages for categorical data.

Results
A total of 200 pharmacists completed the survey. Over half (58.0%) would recommend a benzocaine-based product for treatment of infant teething. The most commonly recommended medications included topical benzocaine 7.5% (55.0%), systemic acetaminophen (30.5%), and systemic ibuprofen (20.0%).

Conclusion
The majority of outpatient pharmacists would still incorrectly recommend benzocaine-containing products for treatment of infant teething. Further continuing education is warranted to ensure pharmacists are aware of current infant teething recommendations.
Do Males Cheat More than Females? An Analysis of Northern California Pharmacy Students

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Introduction
Academic dishonesty is of particular importance among students in the healthcare field as such actions may lead to continued unethical behavior after graduation. Studies suggest that healthcare professional students who are academically dishonest may be more likely to alter laboratory data, patient history, or physical examination findings in a clinical setting. A prior study performed by our research team revealed that 11.8% of pharmacy students admitted to cheating in pharmacy school. However, limited data exists contrasting male and female pharmacy students regarding academic dishonesty. The objectives of this study were to analyze differences between male and female pharmacy students regarding academically dishonest behavior as well as perceptions of academic dishonesty using hypothetical scenarios. Information from this study may aid pharmacy schools in developing strategies to identify and reduce academically dishonest behavior.

Methodology
Between November 2014 to March 2015, a 45-item cross-sectional survey was conducted at four Northern California pharmacy schools (Touro University California College of Pharmacy, University of California San Francisco School of Pharmacy, University of the Pacific Thomas J. Long School of Pharmacy & Health Sciences, and California Northstate University College of Pharmacy). Inclusion criteria consisted of pharmacy students in the second year of their didactic curriculum who consented to take part in the study. The survey was distributed by a pharmacy student on the research team via paper and pencil. The current subanalysis compared male and female pharmacy students. Data analyses were conducted using STATA version 13.0 (College Station, TX). Means and standard deviations were reported for continuous data, and frequency and percentages for categorical data.

Results
A total of 331 students (115 male, 215 female) completed the survey. No statistically significant differences were found between males and females regarding admitted cheating in pharmacy school (10.4 vs. 12.6%; p=0.569) as well as various other forms of academically dishonest behavior (e.g. plagiarism, asking details of an oral exam/OSCE, fabricating lab data, etc). Regarding hypothetical scenarios, there were two instances where males and females differed in their responses to cheating. One scenario involved a student stealing an exam and sharing with his friends; male respondents were less likely to perceive this as cheating compared to females (45.2 vs 77.2 %; p<0.0001). Another scenario presented a student who had directly copied another student’s calculations assignment; male respondents were less likely to report observing this in pharmacy school in compared to females (19.1 vs 31.6%; p=0.015).

Conclusion
Overall, there were no major differences between male and female pharmacy students regarding admitted cheating and performing various forms of academically dishonest behavior. Males may view certain forms of academically dishonest behavior as less severe than females.
Assessing the Effect of Telephone Screening in a PGY1 Pharmacy Residency Selection Process

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Introduction
According to the American College of Clinical Pharmacy (ACCP), it is recommended that by the year 2020, residency training become a prerequisite for pharmacists involved in direct patient care. There is an increased interest in postgraduate pharmacy residency training. In the 2010-2011 application cycle, there were 3277 candidates, compared to 4609 candidates in the 2015-2016 application cycle.

Residency programs have experienced difficulties in differentiating between similarly qualified candidates and identifying best fit candidates from a large pool. Additionally, onsite interviews represent high time and cost investment for both candidates and programs. Because not all candidates from the onsite interviews are ranked, this represented a poor investment of time and resources.

A study in the literature demonstrated that conducting Web-based teleconferencing prior to in-person interviews can help streamline the residency interview process. The percent of candidates ranked from the onsite interviews was calculated using the number of candidates ranked divided by the total number of candidates invited to the onsite interview. The time investment for the telephone screening was calculated using the amount of time needed to set up, conduct, and score the telephone screenings. Descriptive statistics and chi-square test were used to analyze the satisfaction survey responses from candidates and selection committee members.

Methodology
Data were evaluated for all postgraduate year 1 (PGY1) candidates who applied to the Kaiser Permanente San Mateo Area Pharmacy Residency Program during the 2015-2016 application cycle. The percent of candidates ranked from the onsite interviews was calculated using the number of candidates ranked divided by the total number of candidates invited to the onsite interview. The time investment for the telephone screening was calculated using the amount of time needed to set up, conduct, and score the telephone screenings. Descriptive statistics and chi-square test were used to analyze the satisfaction survey responses from candidates and selection committee members.

Results
Of the 76 candidates who submitted an application through the Pharmacy Online Residency Centralized Application Service (PhORCAS), 65 candidates were invited for the telephone screening. The percent of candidates from the onsite interviews who were ranked in 2016 was 76% compared to 61% and 59% in 2015 and 2014, respectively. The total amount of time needed to implement the telephone screening process was 54 hours. For the satisfaction surveys, 38 candidates (58%) replied to the survey. All of the candidates who participated in the telephone screening and onsite interview were overall satisfied with the telephone screening experience versus 41% of candidates who participated in the telephone screening only. Of the 12 selection committee members (92%) who responded to the satisfaction survey, 92% were satisfied with the telephone screening experience and recommended its use.

Conclusion
Inclusion of a telephone screening helped to improve the selection process prior to the onsite interview, which may have contributed to selecting more rankable candidates for the onsite interviews and matching with candidates higher on the rank list. The candidates who participated in the telephone screenings and onsite interviews, and the selection committee members were overall satisfied with the telephone screening experience and recommended its use.
Effectiveness of Melatonin for the Prevention of Intensive Care Unit Delirium

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Introduction
Intensive care unit (ICU) delirium is an acute brain injury associated with increased mortality, prolonged ICU and hospital length of stay, and development of post-ICU cognitive impairment. Despite the lack of sufficient evidence, antipsychotics are commonly used in clinical practice to prevent and treat delirium, but pose a risk of significant adverse effects. Melatonin is a natural hormone released by the pineal gland with major roles in sleep regulation and management of the circadian rhythm, both of which are often disturbed in patients with delirium. Melatonin and its synthetic analogs (such as Ramelteon) may provide a natural alternative for restoring sleep and reducing the incidence of ICU delirium.

Purpose
To characterize the use of melatonin and its effects on the prevention of ICU delirium in adult ICU patients.

Methodology
An observational study that examined adult ICU patients who received melatonin for ≥ 48 hours for the prevention of ICU delirium from 2013-2015. Patients were excluded if they were receiving antipsychotic medication at the time of admission, admitted to the hospital for a primary neurologic condition or injury, had a history of hepatic encephalopathy or end-stage liver disease, were actively withdrawing from alcohol, or had a condition that prevented delirium screening. The primary outcome measured was incidence of delirium, which was assessed using the Confusion Assessment Method for the ICU (CAM-ICU). Secondary outcomes included duration of delirium, ICU and hospital length of stay, mortality, and antipsychotic medication usage. In addition, melatonin dose and duration were recorded.

Results
One hundred and seventeen patients received melatonin for the prevention of ICU delirium, with 8.6% of patients developing ICU delirium. Of those patients who developed delirium, time spent in delirium was 44 ± 16 hrs. Average ICU and hospital length of stay was 15 ± 30 days and 30 ± 40 days, respectively, with 85% of patients being alive at discharge. Melatonin was used for 6.3 ± 7.9 days, with a median dose of 3 mg (range 1-10 mg). Twenty-two patients received one or more doses of antipsychotic medications (17 patients received quetiapine and 5 patients received quetiapine plus haloperidol). Of these patients, median quetiapine use was 2 doses (range 1-7 doses) with a median dose of 25 mg (range 12.5-200 mg). Median intravenous haloperidol use was 1 dose (range 1-4 doses) with a median dose of 2 mg (range 1-4 mg).

Conclusion
This is one of the only studies to date that has examined the use of melatonin for the prevention of ICU delirium. ICU delirium occurred in 8.6% of patients receiving melatonin, a much lower incidence rate than previously reported at this institution (33%). Melatonin may be a promising agent for the prevention of ICU delirium; however, prospective data is needed to validate its safety and efficacy for this use.
A Nationwide Analysis of Specialty Drugs Across all Medicare Part D Stand-alone Prescription Drug Plans

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Introduction
We examined the full drug cost and utilization management requirements for common specialty drugs across all 2016 Part D stand-alone prescription drug plans (PDPs). Each Medicare Part D sponsor can vary its plan formulary, use of utilization management tools (i.e., quantity limit [QL], step therapy [ST], prior authorization [PA]), and drug cost-sharing amounts. Sponsors are allowed to place high cost drugs, defined by the Centers of Medicare & Medicaid Services (CMS) as >$600/month, on a plan formulary’s specialty tier.

Methodology
The top 20 Part D specialty drugs, by total annual spending per user, were identified via the 2014 Medicare Drug Spending Dashboard. Each drug was populated into the Medicare Plan Finder Tool (www.medicare.gov). The full monthly cost and utilization management requirements for each drug, across every 2016 PDP, were recorded.

Results
Drug data were retrieved from 818 PDPs. The absolute monthly cost difference of the same drug across all examined PDPs varied an average of $3,316.15 (range: $283.67-$16,819.75), equating to a relative mean cost savings of 20.6% (range: 13.6%-70.2%). In terms of utilization management: QLs were required by 24.1%-91.4%, PAs were required by 0%-100.0%, and ST was required by 0%-8.1% of all PDPs, depending on the specialty drug.

Conclusion
CMS reports that 14.1% of all drugs meet specialty tier criteria. Although the proportion of Part D claims for specialty drugs is low (0.95%), there has been a 21.8% increase in such claims from 2012 to 2014. Our study highlights the significant variability in specialty drug costs and utilization management requirements across PDPs. Full drug costs directly impact beneficiaries whose out-of-pocket cost-sharing amounts during different phases of the Part D benefit are dependent on their plan’s negotiated drug costs. Annual plan reexamination by beneficiaries can reduce their out-of-pocket drug costs and make access to essential drugs less restrictive.
Introduction
The benefits of beta-blockers (BB) need to be weighed against their risks, particularly in the airway disease population. The impact of BB on hospital admission or emergency department (ED) visits due to airway disease exacerbations is controversial.

Purpose
To characterize the rate of hospitalizations and/or ED in patients with a diagnosis of airway disease being treated with selective or non-selective BB.

Methodology
A retrospective pharmacy claims analysis was conducted from January 1, 2013 to June 1, 2015 among patients who were taking BB (selective/non-selective) at least 30 days prior to the hospital/ED admission for respiratory complications. The appropriateness of hospital/ED admission was identified by primary diagnosis codes (ICD-9) in hospital claims data for asthma, chronic obstruction pulmonary disease (COPD) and other respiratory related conditions. The major exclusion criteria were patients younger than eighteen years old and patients unable to maintain continuous enrollment during the study. Three patient groups were compared and listed as (1) a control group of hospital/ED admitted patients due respiratory related conditions who were not on BB; (2) a treatment group using selective BB; (3) and a treatment group using non-selective BB.

The primary outcome was the rate of hospitalizations and ED admissions. The secondary outcome was the length of stay (LOS) among the three groups. Rates, relative risk (RR), confidence intervals (CI) and LOS were examined using a statistical program (XXX), ordinal logistic regression and Cox proportional hazards models. All analyses were conducted using SAS for Windows, version 8.1 (SAS Institute Inc., Cary, NC).

Results
280 patients met inclusion and exclusion criteria. 10 patients were admitted to the hospital and 270 patients were admitted to the ED. The RR of hospitalization in selective versus non-selective BB groups is 1.5 (95% CI=0.44-5.7). The ED admission rate due to airway disease in patients who were taking selective BB versus non-selective BB was significant with a RR reduction of 0.9 (95% CI= 0.8-0.9). In an analysis of BB vs. control, there was no significant difference in hospitalization events between the two groups regardless of the BB type (selective vs. non-selective). Regarding the rate of ED events, there was no significant difference in the non-selective BB vs. control group. However, there was a statistically significant reduction of ED visits by 18% with the use of selective BB compared to the control group. LOS in hospitalization and ED visits were similar between the groups with an average of 4 days in hospitalization and 1 day in ED visits.

Conclusion
There was no significant difference in hospital admission, ED visits and LOS in the presence of BB. Moreover, selective BB demonstrated a significant benefit in ED reduction by 18% and 10% compared to the control and non-selective BB group, respectively. The limitations of the study include its retrospective nature and the lack of data in airway disease treatments and cardiovascular diagnosis. More future studies are needed to examine in depth the benefits or side effects of BB especially in patients with a cardiovascular clinical indication.
Evaluating Adherence to a Probiotic Drug Use Criteria at San Francisco Veterans Affairs Health Care System

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Introduction
Bio-K+ is a probiotic formulation of Lactobacillus acidophilus, L. casei, and L. rhamnosus and studies have shown it reduces the rate of antibiotic associated diarrhea (AAD) and Clostridium difficile (C. diff) associated diarrhea (CDAD). In August 2013, the San Francisco Veterans Affairs Health Care System (SFVAHCS) began to implement initiatives to reduce hospital-acquired C. diff infections, including the use of Bio-K+. The Bio-K+ drug use criteria was approved February 2014, however, limited data exists regarding its usage. Our quality improvement project aimed to assess adherence to the Bio-K+ drug use criteria and to find the rate of CDAD in patients who received Bio-K+.

Methodology
Data was obtained through retrospective chart review of all patients who were prescribed Bio-K+ in the inpatient setting or at the Community Living Center (CLC) between April 2014 and August 2015 at the SFVAHCS. The SFVAHCS’s drug use criteria for Bio-K+ was used to determine if patients were appropriately prescribed, continued, and discharged on Bio-K+. C. diff rate in patients who received Bio-K+ was determined by including all positive assays from the time Bio-K+ was prescribed to 3 months after the antibiotic course was completed.

Results
Between April 2014 and August 2015, 256 patients were prescribed Bio-K+ and 87.5% of patients were appropriately prescribed Bio-K+ per the inclusion and exclusion criteria. Of the 32 patients inappropriately prescribed Bio-K+, 60% did not meet all inclusion criteria and 40% had an exclusion criteria present. Ten patients had a C. diff positive assay from the time Bio-K+ was ordered to 3 months after the antibiotic course was completed, however only two of those patients were appropriately prescribed and discharged on Bio-K+. In August 2015, the incidence of C. diff at the SFVAHCS was less than 2 cases per month.

Conclusion
Majority of patients were appropriately prescribed Bio-K+, however, more than half of patients were not appropriately continued on Bio-K+ for an extra 5 days after their antibiotic course was completed. C. diff rates at the SFVAHCS have decreased since implementing the use of Bio-K+.  

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Implementation of an Acute Care Rotation Simulation Scenario that Utilizes a Validated Assessment Tool

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Introduction
Accreditation Council for Pharmacy Education (ACPE) standards state that "graduates must possess the basic knowledge, skills, attitudes, and values to practice pharmacy independently at the time of graduation." To achieve this objective, in addition to preparing students for Advanced Pharmacy Practice Experiences (APPEs), pharmacy schools are utilizing active learning centers to enhance student learning outside of the classroom setting. Although active learning scenarios that simulate ambulatory care settings have been largely adopted by pharmacy schools across the country, there is a lack of focus on scenarios mimicking acute care. Due to the limited number of published studies that address acute care learning scenarios for pharmacy students, particularly those that include a validated assessment tool, it is difficult to incorporate this essential expansion of pharmacy education into the curriculum. The purpose of this study is to describe an acute care active learning scenario and the methods used to validate an assessment tool.

Methodology
During spring of P2 year, students at Touro University-CA College of Pharmacy participated in three active learning scenarios that closely mirrored an acute care APPE. Each session consisted of: 1) one hour to utilize a mock electronic medical record to review and work-up one acute care patient, 2) seven minutes to present the patient to a faculty preceptor, and 3) fifteen minutes of feedback. Ten faculty preceptors independently scored two control students to validate the inter-rater reliability of the (70-point) assessment rubric developed to evaluate student performance. In addition, a 10 question student survey was administered at the end of the semester to gauge the students’ overall impression of the experience. The survey included two 5-point Likert Scale questions asking the student to rate their readiness for Acute Care APPEs pre and post the learning scenario interventions.

Results
Inter-rater reliability among the 10 faculty utilizing the Acute Care rubric was found to be overall very good (Krippendorff’s Alpha=0.86). Self-assessed student readiness for Acute Care APPEs increased significantly from pre to post active learning scenarios (2.2 ± 0.68 vs. 3.5 ± 0.74; P<0.001). In addition, students reported the activity to be beneficial at improving specific skills such as presenting cases, navigating electronic medical records, and prioritizing patient problems.

Conclusion
The acute care active learning scenario significantly improved acute care readiness as measured by student self-assessment, and the activities appeared to be beneficial as reported by student surveys. Future work will examine the usefulness of the faculty rubric at predicting actual Acute Care APPE readiness. In addition, the intervention technique and scoring rubric may be considered for adaptation in other therapeutic areas.
Effectiveness of a Mobile App for Patient Education in Older Adults on Warfarin Therapy

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Introduction
Older adults with atrial fibrillation or heart failure require long-term oral anticoagulation (OAC) such as warfarin therapy. Despite its proven benefits, older adults report dissatisfaction with warfarin therapy and reduced quality of life (QOL), which leads to low adherence to warfarin therapy and decreased treatment efficacy. Mobile health (mHealth) tools such as health applications (app) via smartphones or tablets can assist in managing OAC but such tools have not been tested among older adults including Spanish speaking elders. Objective: To test the effectiveness of Mobile Applications for Seniors to enhance Safe anticoagulation therapy (MASS), a mobile-based health technology intervention designed with culturally appropriate and age-sensitive components to promote independence and self-care and improve QOL.

Methodology
This pilot study used a single-arm, experimental, pre-post design to assess the feasibility of a 12-week mHealth-based intervention in older adults on warfarin therapy by examining changes in outcomes (i.e., knowledge, adherence, QOL, perception, depression) and usability of the warfarin app on a 10-inch tablet computer after 3-month use. Participants completed surveys about their knowledge, attitude of, and adherence to OAC, as well as their emotional well-being at baseline and at a 3-month follow-up. A satisfaction survey of the intervention was also completed at 3-month follow-up.

Results
Twenty-one patients from two anticoagulation clinics enrolled in the study but only 18 participants completed 3-month follow-ups; one died and two dropped out during the intervention period. Those who completed the study intervention were: average age 67.3 ± 8.7 years; predominantly male (14/18, 78%); Caucasians (9/18, 50%), Hispanics (7/18, 39%); high school completion (13/18, 72%); living with family (11/18, 61%); average number of comorbidity 3.4 (±1.4). Among outcomes measured at 3-month follow-up evaluation, only one significant change was observed: anticoagulation knowledge improved from baseline (Mean=12.5± 5.51) to follow-up (Mean=14.78± 3.93), X2=-2.69, p=.007. The mean satisfaction with and mean usefulness of the app were 5.4 of 7 (±1.5) and 5.4 of 7 (±1.4) in usability survey after 3 months.

Conclusion
Our findings suggest that mHealth based self-care intervention for older adults with warfarin therapy show potential in being able to enhance anticoagulation knowledge. The satisfaction of mHealth intervention using the health app was moderate to high in this sample. The findings can be used to modify the health app to make the mHealth intervention more elder-friendly. Using mobile health apps may be a feasible method to enhance self-care among older adults with chronic conditions.
Evaluation of Dexmedetomidine Administration in Critically Ill Patients

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Introduction
In 2013, the American College of Critical Care Medicine (ACCM) issued practice guidelines for the management of pain, agitation, and delirium in adult patients in the intensive care unit (ICU). ACCM recommended that a nonbenzodiazepine sedative agent such as dexmedetomidine (DEX) be the preferred sedative agent for mechanically ventilated patients or mechanically ventilated patients presenting with delirium that is unrelated with alcohol or benzodiazepine abuse. Our current institutional practice restricts the administration of DEX to not exceed 24 hours and use beyond 24 hours requires authorization renewal from the critical care physician. This study was primarily aimed at characterizing the use of DEX in an institution with such restrictions. An evaluation of DEX and midazolam or propofol administration was performed to determine if DEX administration affected patient outcomes such as mechanical ventilator days. Additional study objectives included a cost analysis.

Methodology
A retrospective observational study included adult ICU patients on mechanical ventilator with continuous hemodynamic monitoring. Patients were excluded if they were not on an institutional-approved sedation protocol for the propofol, midazolam, or DEX. Medical charts from June 2015 to November 2015 were reviewed.

Results
A total of 111 patients were screened, and 71 patients were included for analysis. Baseline characteristics were not significantly different with the exception of APACHE score and ICU admission. Patients receiving DEX presented with a higher APACHE score in comparison to patients receiving propofol or midazolam (24±6 vs.14±8, p<0.05) and were mostly admitted to the non-medical ICU (91% vs. 69%, p<0.05). All the patients were on midazolam/propofol prior to the initiation of DEX. The DEX patients had a longer duration of mechanical ventilator days [3 (2 to 6) vs. 9 (3 to 26) days, p<0.05]. Unplanned extubation was similar between the DEX and midazolam/propofol groups (4% vs 4%, p=NS) and a total of 73% of the DEX patients were successfully extubated in 1.6 days. The estimated drug cost of sedation per patient was higher in DEX patients versus midazolam patients ($182 vs. $57).

Conclusion
Based on this medication utilization evaluation, DEX was initiated for patients with an APACHE score greater than 14 and patients requiring mechanical ventilation for greater than 3 days. Successful extubation occurred within two days after the initiation of DEX and the administration of DEX would be three times the cost of midazolam.
Hit Them with the Best Shot: A Look into Predictors of Immunization Status in Medicare Beneficiaries

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Introduction
Despite Medicare beneficiaries having relatively high vaccination coverage, the rates for influenza, pneumococcal, and shingles vaccines remain below targets set by Healthy People 2020. Patient segmentation procedures utilize the principles of cluster analysis and could be used to identify beneficiary subgroups with similar characteristics. Analysis of segmentation groups and other factors associated with vaccine noncompliance among beneficiaries may permit better outreach and targeting of these under-vaccinated populations.

Methodology
A total of 788 patients 65 years of age and older were evaluated during mobile Medicare clinics conducted at 13 locations in Northern and Central California. Patient demographics, vaccination status, health conditions, and segmentation data were collected via a standardized survey. Patients were offered influenza and pneumococcal conjugate vaccines on-site based on current Advisory Committee on Immunization Practices recommendations.

Results
Vaccination rates were highest for any pneumococcal vaccine (73%) and lowest for shingles (54%). Most patients who had not received the shingles vaccine were either unaware of the vaccine or thought it was unnecessary. When offered on-site, 53% of unvaccinated patients received influenza and 78% received pneumococcal conjugate vaccines. A significant difference (p<0.05) in receipt of the shingles vaccine was observed based on the patient’s segmentation group. Older patients were significantly more likely to have received influenza and pneumococcal vaccines (p<0.01). Patients with high-risk conditions were more likely to have received the influenza vaccine (p<0.05).

Conclusion
Medicare beneficiaries who unaware of vaccine recommendations, of younger age and/or healthier were less likely to be vaccinated.


Evaluation of Accidental Poisonings in Older Adults Resulting in Deaths as Reported in the National Poison Data System

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Introduction
As the geriatric population continues to grow, the risk for hospitalized unintentional overdose or poisoning becomes more significant. We believed that the elderly are at an increased risk of adverse effects from overdose as well as accidental ingestion of toxic substances. The purpose of this project is to identify and analyze hospitalized unintentional overdose or poisoning reported to poison control centers in the United States.

Methodology
Cases reported to poison control centers by emergency rooms or hospitals from the last 15 years for patients 65 years or older were pulled from the American Association of Poison Control Center National Poison Data System.

The top three substances at highest risk of resulting in overdose leading to hospitalization will be determined by sorting the database to determine the highest frequency substance. Once the highest risk substances are determined, data collection will include (if available): age, year reported, hospitalization outcome, prehospital arrest, comorbid conditions, route of administration, medications and dosing, adherence, lab values (ex. drug levels, blood glucose, INR, vitals), social history (alcohol, smoking, substance abuse), family history, and allergies.

Results
Pending

Conclusion
Pending
Can Antimicrobial Stewardship Tools Improve Outpatient Antibiotic Prescribing?

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Introduction
Antibiotic resistance and Clostridium difficile (C. difficile) infections have become a major clinical and public health problem. Antimicrobial stewardship, which is a coordinated program that promotes the appropriate use of antimicrobials, has been shown to decrease antibiotic resistance and C. difficile infections in the hospital setting. Unfortunately, data correlating the success of outpatient antimicrobial stewardship programs on specific antibiotics have been lacking.

Based on the Kaiser Permanente (KP) Greater Southern Alameda Area (GSAA) 2015 antibiogram, Escherichia coli showed >20% resistance to sulfamethoxazole/trimethoprim (SMX/TMP). There has also been increasing resistance of both levofloxacin and ciprofloxacin. These fluoroquinolones are important as they are the only two oral options for pseudomonas. The antibiogram revealed that most bacteria susceptibilities are >90% to the cephalosporins. The infectious disease (ID) specialists recommended increasing the use of cephalosporin agents for empiric infections when clinically warranted. The ID specialists also recommended increasing the use of the oral vancomycin 6 week taper for C. difficile infections to reduce C. difficile relapses.

Methodology
A retrospective review study design was performed and included prescriptions for ciprofloxacin, levofloxacin, SMX/TMP, cefadroxil, cepodoxime, and oral vancomycin 6 week taper. The data was collected from November 1, 2014 - March 31, 2015 and November 1, 2015 - April 30, 2016. The study objective was to evaluate if provider education with an antibiogram led to any changes in prescribing with specific targeted antibiotics. To answer this question, prescriptions for the antibiotics of interest were measured pre- and post- stewardship interventions. The data was normalized by dividing the number of prescriptions by 1000 members per month (PMPMK).

Results
A total of 12,029 patients were identified to be on the selected antibiotic therapy. For ciprofloxacin prescriptions in 2014-2015 vs. 2015-2016, there were 1.9 prescriptions PMPMK vs. 0.72 prescriptions PMPMK (p<0.001). For SMX/TMP prescriptions in 2014-2015 vs. 2015-2016, there were 0.9 prescriptions PMPMK vs. 0.56 prescriptions PMPMK (p<0.001). For oral vancomycin 6 week taper for C. difficile infections in 2014-2015 vs. 2015-2016, there were 0.00434 prescriptions PMPMK vs. 0.024 prescriptions PMPMK (p=0.05). For cefadroxil prescriptions in 2014-2015 vs. 2015-2016, there were 1.22 prescriptions PMPMK vs. 1.22 prescriptions PMPMK (p=0.98). For cepodoxime prescriptions in 2014-2015 vs. 2015-2016, there were 0.44 prescriptions PMPMK vs. 0.38 prescriptions PMPMK (p=0.27).

Conclusion
There was a statistically significant decrease in prescriptions for ciprofloxacin, levofloxacin, and SMX/TMP between the first year and the second year. The oral vancomycin 6 week taper saw an increasing trend in prescriptions for C. difficile infections, but there was no statistical difference. There was no statistical difference in prescriptions for cefadroxil and cepodoxime between the two years.

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Introduction
Widespread use of combination antiretroviral therapy (ART) starting in 1996 has led to a decreased number of deaths due to AIDS-defining cancers (ADCs) — specifically non-Hodgkin lymphoma (NHL) and Kaposi sarcoma (KS). Several studies of persons with AIDS (PWAs) have reported elevated standardized incidence ratios that have gradually decreased over time for NHL and KS. However, there are only a few recent studies that have examined cancer-related mortality and assessed mortality trends in PWAs. To help inform cancer prevention, screening and treatment in the HIV/AIDS population, we evaluated ADC (NHL, KS, and invasive cervical cancer) mortality trends among PWAs in the ART era.

Methodology
A retrospective cohort study was conducted using data from the San Francisco Public Health Department HIV/AIDS surveillance registry. The study included deceased AIDS cases, aged 13 or older, who died in 1996 through 2013. Information on underlying causes of death was obtained from the matches with the National Death Index through 2013 (the most recent year available). To assess the impact of ART on ADCs, we divided our observation time into three periods corresponding to improvements in ART: 1996-1999 (early years of effective ART), 2000-2005 (following FDA approval of Kaletra® and Viread®), and 2006-2013 (following FDA approval of multi-class combination therapy). For each time period, we calculated proportional mortality ratios (PMRs) for ADC-specific underlying causes of death, and performed age, race and sex-adjusted standardized mortality ratios (SMRs) with 95% Poisson confidence interval (CI) using the California population as the reference group.

Results
There were 5,822 deaths among PWAs who met the study inclusion criteria. Of these, 90% were male, 68% were aged 35-54 at time of death, 61% survived more than 4 years post AIDS diagnosis, and 79% had initiated ART. Sixty-three percent were White, 20% African American, and 12% Hispanic; 59% were men who have sex with men (MSM), 22% MSM with a history of injection drug use (IDU), and 16% IDU. From 1996 to 2013, the PMRs for NHL as the underlying cause of death significantly decreased (p<0.01) while PMRs for KS and cervical cancer showed no significant change (p=0.94 and 0.3, respectively). Furthermore, age, race, sex-adjusted SMRs for NHL significantly decreased from 1996 to 2013 (p=0.014) while SMRs for KS and cervical cancer showed no significant temporal change (p=0.94 and 0.3, respectively). The SMR for NHL was 40.7 (CI 29.6-51.9) in 1996-1999, 10.1 (CI 5.68-14.6) in 2000-2005 and 4.89 (CI 2.56-7.21) in 2006-2013. The SMR for KS was 59.8 (CI 1.20-118) in 1996-1999, 776 (CI 96-1456) in 2000-2005 and 910 (CI 18.2-1801) in 2006-2013.

Conclusion
The temporal decline in the PMRs and SMRs for NHL is likely attributed to recent advancements in and use of ART. However, cancer mortality among PWAs is still significantly elevated above mortality in the general population for both NHL and KS. These two AIDS-defining cancers should remain targets for improved cancer prevention, cancer screening, and HIV and cancer treatment strategies.
An Examination of Over-the-Counter Medication Use Patterns in Medicare Beneficiaries

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Introduction
Over-the-counter (OTC) medication use is often difficult to quantify. Though Medicare beneficiaries have access to a prescription drug benefit (Part D), OTC medication coverage is unavailable for most. We sought to examine the extent to which beneficiaries self-medicate with OTC drugs, the types of products they take, and factors that explain differences in OTC use.

Methodology
Thirteen Mobile Health Clinics were held in fall 2015. Beneficiaries were offered multiple services including comprehensive medication evaluation and counseling. Health, drug, disease state, and sociodemographic data were recorded during each beneficiary intervention. The type/frequency of beneficiaries' OTC medications were evaluated. Differences in OTC use as a function of beneficiary characteristics were also examined.

Results
A total of 866 beneficiaries were provided medication evaluation and counseling. The mean number of OTCs used was 3.30 (SD= 2.51). OTC use varied as a function of gender; females were significantly more likely to be taking vitamins or supplements, while males were more likely to be taking aspirin. OTC use also varied as a function of race; Asians were less likely to take allergy medications, but more likely to take natural health products. White/Caucasians were significantly more likely to take heartburn medications and pain relievers. OTC use patterns also varied as a function of marital status, education level, subsidy status, and certain chronic conditions.

Conclusion
A better understanding of OTC medication use by Medicare beneficiaries, most of whom are seniors, can ensure that healthcare professionals are best prepared to provide individualized medication counseling and optimal patient-centered care.
Effectiveness and Perceptions of Adding Animated Clinical Case Videos to Enhance Active Listening and SOAPing Skills

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Introduction
Communication skills are a core competency for student pharmacists. Adding an additional course dedicated solely to enhancing active listening and communication skills may not always be feasible with curricula constraint. Limited studies are available on how to improve communication skills in the didactic setting without incorporating additional courses. Use of simulations and virtual technology has been shown to enhance student communication skills. The purpose of this study was to determine the effectiveness and perceptions of adding a series of animated patient encounter videos to clinical cases on students’ active listening skills and ability to obtain accurate subjective information when writing a progress SOAP note.

Methodology
A prospective cohort study was performed comparing second-year student pharmacists in the class of 2018 (intervention group) to second-year student pharmacists in the class of 2017 (control group). The intervention group received 11 clinical cases involving animated patient encounter videos starting in the first semester of the first year; the control group received the same number of clinical cases during the same time frame without the video component. The primary outcome was performance on a clinical case-based oral exam in the second year in both cohorts. Student perceptions of the animated videos were obtained via an anonymous survey.

Results
The intervention group demonstrated higher scores on the subjective section of a clinical case-based oral exam compared to the control group (p=0.03). No differences were seen in performance on overall exam scores, objective, assessment and plan or presentation style sections of the oral exam. Students strongly agreed/agreed that the videos enhanced their active listening skills and ability to gather accurate subjective information from a patient.

Conclusion
Adding a series of animated patient encounter videos to clinical cases in therapeutics courses not only improves active listening and subjective scores on a clinical case-based oral exam, but also is perceived favorably by pharmacy students.
Stop the Beers Drugs! An Examination of Potentially Inappropriate Medication Use in Older Medicare Beneficiaries

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Introduction
In late 2015, the American Geriatric Society released the updated Beers Criteria for potentially inappropriate medication (PIM) use in older adults. Currently, ~84% of 55 million US Medicare beneficiaries are 65 years of age or older. We utilized the updated Beers Criteria to examine the prevalence of PIM use by older Medicare beneficiaries.

Methodology
We held 13 Mobile Clinics in northern/central California during fall 2015. Beneficiaries at each clinic site were provided a myriad of health services including Medication Therapy Management (MTM). Each MTM intervention included a comprehensive review of the beneficiary’s medication regimen. The intervention was conducted via a structured interview during which drug, disease state, and sociodemographic data were collected. Each beneficiary’s current drug therapy was examined against the 2015 Beers Criteria.

Results
MTM services were provided to 860 beneficiaries; 703 were 65 years of age or older and taking at least one medication. This latter group comprised the study sample. In total, 328 (46.7%) beneficiaries were taking at least one PIM. Therapeutic categories in which the highest number of PIMs were found included: Benzodiazepines (n=87 [26.5%]), Non-cyclooxygenase-selective oral NSAIDs (n=45 [13.7%]), and Nonbenzodiazepine/Benzodiazepine receptor agonist hypnotics (n=37 [11.3%]). The prevalence of PIMs significantly varied as a function of race, subsidy status, and presence of certain disease states.

Conclusion
In light of the updated and more inclusive Beers Criteria, prescribers, pharmacists and other healthcare professionals should closely examine the medication regimen of older adults; doing so may improve medication selection, reduce adverse drug events, and improve a patient’s quality-of-life.
Evaluating the Impact of Pharmacy Services in the Operating Room

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Introduction
The United States Pharmacopeia’s (USP) 7th annual national MEDMARX Data Report evaluated medication error findings from different sectors within the perioperative setting. The data revealed that more than 11,000 medication errors were reported over a seven-year period from 1998 to 2005. Given these findings, the USP recommends that health systems encourage pharmacists to actively participate in the perioperative process so that the distribution of medications can be overseen and that a culture conducive to improving patient safety and reducing medication errors can be established.

Methodology
Retrospective chart review of all surgical cases for the month of November 2015. Preference cards use in surgery were evaluated on how they affect the pre- and intra-operative medication use process. Additional chart review will assess the appropriateness of antibiotic dosing of cefazolin pre-operatively and drug use patterns of intravenous sodium nitroprusside at our institution.

Results
Approximately $11,000 was attributed to medication waste in part to the outdated preference cards. Ninety percent of patients who received cefazolin as a pre-operative antibiotic for surgical prophylaxis met the recommended dose, but ten percent did not meet the recommended dose. Approximately $29,600 was spent on nitroprusside, but $7,200 was wasted as the compound bags remain unused.

Conclusion
Opportunities exist for expanding pharmacy services into the operating room to improve workflow efficiencies and reduce medication waste. Pharmacy services expanding into the OR, as seen in our study, have shown that there are potential areas for significant reduction in medication waste and cost. This may potentially justify expanding our clinical services into the OR through the addition of another clinical pharmacist.
Impact of Ribavirin Dose Reduction on Sustained Virologic Response in Sofosbuvir-Based HCV Treatment

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Introduction
Chronic hepatitis C virus (HCV) affects over 150 million people worldwide. Recent approval of highly effective direct-acting antiviral therapy for chronic hepatitis C has resulted in improved cure rates and improved adverse event profiles. Inclusion of ribavirin with newer direct-acting antivirals (DAA) continues to show improved rates of sustained virologic response (SVR) in difficult to treat groups such as those with cirrhosis and those who are treatment-experienced. However, due to ribavirin-related adverse events, dose reduction of ribavirin is at times still required and is a common first line action taken in clinical practice when patients experience significant anemia or other adverse reactions thought to be related to overexposure to ribavirin. Limited data exist on the impact of treatment success in patients who need dose reductions of ribavirin during treatment with DAA. This research evaluated the effect of ribavirin dose-reduction on SVR in real-world patients receiving sofosbuvir-based all oral DAA treatment in combination with ribavirin.

Methodology
Retrospective chart review of 1302 patients from all Northern California Kaiser Permanente facilities who started HCV treatment after December 2013 and had SVR12 results prior to March 2016. The primary end point was rate of SVR, 12 weeks after completion of HCV therapy, in patients who had a dose-reduction of ribavirin during treatment compared to those without. Included patients were those 18 years old or older, infected with any HCV genotype, had completed their original planned treatment duration, and had an SVR12 result available.

Results
952 patient charts were included in the final analysis. 208 patients received a reduction of their ribavirin dose during treatment and 744 had no dose reduction of ribavirin. The primary outcome of undetectable HCV RNA, 12 weeks post treatment, was observed in 194 (93%) patients who received a dose reduction of ribavirin and 686 (92%) patients who did not receive a dose reduction. No significant difference in SVR was identified when patients were analyzed by cirrhosis status, treatment experience, or regimen received.

Conclusion
We concluded that patients who received dose reduction of ribavirin during treatment with a sofosbuvir-based all oral direct-acting antiviral regimen achieved SVR at similar rates compared to patients without dose reduction.
Knowledge, Experience, and Perspective of Pharmacy and Medical Students in the Advanced Integration of Pharmacogenomics

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Introduction
Pharmacogenomics has been recommended to be part of pharmacy schools’ curricula and recognized as important knowledge for physicians to have by the American Association of College of Pharmacy (AACP) and the American College of Physicians (ACP). The Accreditation Council for Pharmacy Education (ACPE) and the National Human Genome Research Institute (NHGRI) of the National Institutes of Health (NIH) agree that there is a need to enhance current education on genomics in pharmacy schools and to prepare health professionals for an era of genomic advances. Knowledge and appreciation of pharmacogenomics as it relates to pharmacy and medical students’ didactic and clinical education have not yet been evaluated. The primary objective of this study is to compare pharmacy and medical students’ knowledge, experience, and perspective of pharmacogenomics in correlation to their didactic and clinical practice education. This study also aims to assess both pharmacy and medical students’ perspective on their role in using pharmacogenomics in patient care.

Methodology
This is a cross-sectional survey study. Questionnaire included Likert-scale, true/false, multiple choice, and “select all that apply” to assess students’ knowledge, experience, and perspective. Likert-scale was out of 5 points, with 1, 2, 3, 4, and 5 corresponding to strongly disagree, disagree, neutral, agree, and strongly agree, respectively. Invitation to complete the survey through Qualtrics® was sent out via email to representatives from six California schools with both pharmacy and medical programs in April 2016. Student’s t-test and Chi-squared test were used to analyze the differences between the two groups.

Results
A total of 310 students participated in the survey, with a completed response rate of 88% (277). 53% (148) were students enrolled in a Doctor of Pharmacy (PharmD) program and 45% (126) were enrolled in either a Doctor of Medicine (MD) or Doctors of Osteopathic Medicine (DO) program. PharmD and MD/DO students generally had similar perspective on the value of pharmacogenomics, with both agreeing that both professions play an interprofessional role in enhancing patient care through the use of pharmacogenomics (4.28 vs. 4.29, p=0.9167). More PharmD students identified that pharmacogenomics has been an important part of their graduate school didactic curriculum than compared to MD/DO students (3.39 vs. 2.91, p=<.0001). However, no difference exists between both clinical practice experiences (3.07 vs. 2.90, p=0.1415). PharmD students also had a stronger agreement on being able to identity medication and resources for pharmacogenomics than compared to MD/DO students. In fact, there were statistically greater percentages of PharmD students who correctly identified that abacavir, carbamazepine, and clopidogrel are drugs that elicit variable population responses due to a patient’s genetic background and that captopril did not. No significant differences were found for nine other drugs.

Conclusion
Both pharmacy and medical students consider pharmacogenomics as an important area in patient care and that the use of pharmacogenomics require an interprofessional effort. Although the study was limited to the majority of responses coming from two schools, the results suggest that a uniform curriculum on the topic of pharmacogenomics adopt in both professional programs may reduce knowledge gaps.
Improving Opioid Prescribing Practices Using e-Consults in a Safety-Net Primary Care Clinic

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Introduction
Since 1999, opioid use in the United States has increased by 300%. Providers in primary care lack sufficient training to manage chronic non-cancer pain. A model that connects specialists with primary care providers has emerged and shown promise in supporting the knowledge gap. However, direct consultation remains a barrier in safety net clinics. Ole Health implemented an initiative to support providers using e-Consults with an interdisciplinary team. The recommended safe opioid prescriptions of less than 120 mg morphine equivalent daily dose were identified by the American Society of Interventional Pain Physicians (ASIPP). The primary objective of this study is to evaluate the impact of e-Consults with an interdisciplinary team on reducing opioid for patients with chronic non-cancer pain. This study also aims to assess the effect of e-Consults on providers’ adherence to pain management guidelines and the usage pattern of referrals and precautionary tools.

Methodology
A longitudinal prospective panel study was conducted. Subjects with chronic non-cancer pain were identified using the electronic health record. E-Consults were performed by a Pain Management Oversight Committee, which consisted of an interdisciplinary team of providers, a behavioral health specialist, and a clinical pharmacist. For each patient, a comprehensive review of the patient was conducted. Detailed recommendations were sent to providers using the electronic health record. The primary outcome was total decrease in daily morphine equivalent dose. Secondary outcomes included appropriate referrals to behavioral health, physical therapy, or acupuncture, and drug use agreements. All outcomes were collected at baseline, 3 months, and 6 months from the date of review. Paired t-test was conducted to compare the mean change in morphine equivalent dose from baseline to three months and six months. Fisher’s exact test was used for categorical variables. A p-value of <0.05 was used to indicate statistical significance.

Results
A total of 296 patients with diagnosed chronic pain or chronic pain syndrome were initially identified at Ole Health. Of those patients, 80 met the inclusion criteria with active record and had a total daily morphine equivalent dose greater than 120 mg per day. However, only 47 patients were reviewed by the committee and involved e-Consults during the study period from March 2015 through March 2016. Of the 47 patients, only 24 patients continued to meet inclusion criteria at 3 months mark and 17 patients at 6 months mark. The mean daily morphine equivalent dose decreased significantly from baseline to 3 months with a mean difference of -41.63 mg (CI 95%, -69.85 to -13.41, p=0.0057, n=24), and from baseline to 6 months with a mean difference of -92.53 mg (CI 95%, -166.6 to -18.47, p=0.0175, n=17). No significant increase in referrals to behavioral health, physical therapy, or acupuncture, and up-to-date drug use agreement was found from baseline to 3 months and 6 months.

Conclusion
Incorporation of e-Consults with an interdisciplinary care team improved opioid prescribing for patients with chronic non-cancer pain. Further studies involving a system-level intervention to address appropriate screening practices around managing patients on opioid are needed.
Effectiveness of a Residency Education Series on Pharmacy Students Knowledge, Confidence and Desire to Pursue Residency

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Introduction
Residency is an invaluable experience offering benefits such as enhanced preparation for pharmacy practice and advantages for future employment opportunities. Data from the American Society of Health-Systems Pharmacists regarding match results reveal a 57% increase in the last 4 years of students entering the match. This number is projected to continue to increase. As competition to match for a position increases, students considering residency have an increased need during their time in school for more support to enhance their success in the match process. The purpose of the study is to assess if a four-part lecture series has an effect on student’s knowledge, confidence, and desire to obtain a residency [topics include: what is residency/fellowship, how to be a more marketable candidate, navigating showcase/site visits, and the application/match process].

Methodology
This IRB-approved prospective study was conducted at Western University of Health Sciences. The study included 1st through 3rd year students from the college of pharmacy. A survey assessing knowledge about residency, desire for pursuing a residency position, confidence in obtaining a residency position, and overall satisfaction with the lecture provided was conducted post-each lecture. A baseline survey conducted after the 1st lecture assessed student perception of their knowledge, confidence and desire to pursue a residency position (1 = low perception and 10 = high perception). Subsequent surveys (surveys 2 to 4) evaluated the change in self-assessment from each previous survey using a scale ranging from -5 to +5; negative values indicated a decrease in self-rating and positive values indicated an improvement in self-rating. Descriptive analysis was performed and summarized using the mean and standard deviation across the four surveys.

Results
A total of 101 students participated in the study (N=74 P1 (1st year), N=10 P2, and N=17 P3). The self-rated score for knowledge about residency increased from baseline to survey 2 by an average of 3.72 points (SD 0.8). A smaller increase of 3.24 (SD 1.24) was seen after survey 3 which remained unchanged after survey 4 at 3.24 (SD 0.88). Students rating their desire to pursue a residency increased on average by 2.93 points (SD 1.16) from baseline to survey 2, and continued to increase for surveys 3 and 4. Similar trends were seen when assessing confidence in obtaining a residency. Mean increases of 3.48 (SD 1.18), 2.64 (SD 1.43), and 2.24 (SD 1.39) were observed after surveys 2, 3, and 4, respectively.

Conclusion
A lecture series educating students on residency increased student self-rating of their knowledge, confidence, and desire on pursuing a residency position. This observed increase may translate to more students who apply for, and potentially match, to a residency program. Overall, a residency education lecture series can provide pharmacy students beneficial skills for pursuing postgraduate training for the continuously expanding practice of pharmacy.
Effects of Ginger on Glycemia and Body Weight: A Meta-Analysis

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Introduction
Ginger (Zingiber officinale) has been shown to improve glycemic markers in patients with diabetes. The purpose of this research was to perform a meta-analysis to evaluate the effects of ginger supplementation on A1c, fasting plasma glucose, body weight, and body mass index (BMI) in patients with type 2 diabetes.

Methodology
We searched Pubmed, Cochrane Central Register of Controlled trials, Scopus from inception to January 2016 for randomized controlled trials (RCTs) comparing ginger supplementation to placebo in human patients that reported data on A1c, fasting plasma glucose (FPG), weight, or body mass index (BMI). The studies were selected and the data was extracted by two investigators. The results were meta-analyzed by random effects model to give weighted mean differences and 95% confidence intervals.

Results
In a meta-analysis consisting of 7 RCTs, each with 18-41 participants (n= 204), ginger doses of 2g-9g per day for 45 days to 12 weeks statistically significantly decreased A1c (-0.77%; 95% CI, -1.28% to -0.27), and FPG (-15.58 mg/dL; CI, -26.55 to -4.61). Compared with placebo, ginger showed no statistically significant effects on body weight (-0.01 kg; 95% CI, -0.13 to 0.11) nor BMI (-0.12 kg/m2; 95% CI -0.52 to 0.28). High degrees of heterogeneity were present for all analysis except body weight (I2 ranging from 84.8% to 87.8%)

Conclusion
Ginger supplementation compared with placebo showed statistically significant decreases in A1c and FPG, but no significant effects on body weight or BMI.
Ledipasvir/Sofosbuvir 8 Weeks in GT 1 Treatment-Naïve Noncirrhotic Patients with HCV Viral Load <6 Million IU/mL; Comparative Analysis

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Introduction
The optimal duration of therapy to achieve sustained virologic response (SVR) depends on multiple factors. Patients treated with LDV/SOF with 8-24 weeks achieved SVR12 from 94-100% in the ION Phase 3 studies. A decision to shorten therapy to 8 weeks is based on treatment history, cirrhosis status and baseline VL. In a post-hoc analysis of the ION-3 (TN, NC patients) 8-week data, a VL <6M was shown to be the best predictor of SVR. RWE is often different from Phase III trials and there is a need to understand real-world 8-week regimens in a broader spectrum of patients.

Methodology
RWE 8-week LDV/SOF data is emerging from multiple single-center and multi-center retrospective and prospective cohorts. In this analysis, the phase-3 ION-3 data is compared with data from several diverse real-world populations and one post-marketing investigator sponsored HIV/HCV trial. Patient demographics, characteristics, SVR12 and discontinuation data has been collated and compared.

Results
The ION-3 post-hoc analysis reported 123 patients who were TN, NC and VL<6M and treated with 8 weeks of LDV/SOF. Mean age was 52, 22% black, 72% GT1a; the SVR12 was 97% (119/123). The overall SVR12 rate from six diverse real world and post marketing cohorts was also 97% (638/658). There was no significant impact of HCV genotypes or subtypes (GT1a, 1b versus GT4), prior treatment history, presence or absence of cirrhosis, high viral load (HCV VL>6M), or HIV/HCV co-infection.

Conclusion
LDV/SOF for 8 weeks yielded high SVR rates in ION-3. Analysis of RWE data from several diverse and heterogeneous cohorts from the United States and European Union show SVR outcomes that were consistent with the Phase-3 ION-3 results and supports the use of 8 weeks LDV/SOF in treatment-naïve, non-cirrhotic GT1 patients with a baseline HCV VL <6M and possibly in other populations including HIV/HCV co-infected patients. Discontinuation rates were low despite diverse patients and clinical settings. Data from the TARGET and TRIO cohorts also suggests that the 8-week regimen is underutilized.
Analysis of Reported Incidence of Angioedema with Entresto Versus Enalapril in Paradigm-HF Trial

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Introduction
In the Prospective Comparison of ARNI With ACEI to Determine Impact on Global Mortality and Morbidity in Heart Failure (PARADIGM-HF) trial, valsartan/sacubitril (ENTRESTO) significantly reduced mortality and hospitalization for heart failure, compared with enalapril in patients with heart failure with reduced ejection fraction, HR 0.80 (95% CI 0.73-0.87, P<0.001). Angioedema has been reported as one of the serious adverse events associated with ACEI and ARNI. This has been attributed to inhibition of at least 2 pathways involved in the degradation of bradykinin and substance P, major effectors of angioedema.

Methodology
Purpose
To investigate the incidence of reported angioedema in Paradigm-HF and to compare the overall findings and reported outcomes for Blacks to the respective reported outcomes for Enalapril in the Octave trial.

Methodology
Reported incidence of angioedema per paradigm-HF and Octave trials were pulled from the primary published sources using Medline and the incidence rates were compared.

Results
In the PARADIGM-HF trial, there were 19 confirmed cases of angioedema in patients treated with ENTRESTO compared with 10 cases in patients treated with enalapril (0.5% with ENTRESTO versus 0.2% with enalapril; P=0.13). The rate of angioedema during each run-in portion of the trial was 0.1%. 6532 of 8442 patients enrolled in the trial were previously treated with an ACE inhibitor and that all patients were exposed to enalapril during the single-blind run-in period. The incidence of angioedema in Black patients was 2.4% with ENTRESTO and 0.5% with enalapril. In contrast angioedema occurred in 86 (0.68%) of the enalapril subjects (n=12,634) in the Octave trial during the 24-week treatment period. Angioedema was about 3 times more likely to occur among black patients (1.62% vs 0.55% for white patients) and logistic regression analysis showed OR =2.88 (95% CI: 1.72-4.82, p<0.001) for Blacks vs non-blacks.

Conclusion
Including a high proportion of patients who tolerated exposure to an ACE inhibitor or sacubitril, either before the study or during the run-in phase, may have introduced selection bias in Paradigm-HF and led to an underrepresentation of angioedema in the trial, because vast majority of cases of ACE inhibitor-associated angioedema usually occurs within the first few weeks of treatment initiation. Given the serious implications especially for black population there is a need for further real-life/observational studies of angioedema post exposure to ENTRESTO.

©
Comparing an In-Person Versus a Telephonic Type 2 Diabetes Management Model

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Introduction
Studies have shown that adding a clinical program focused on diabetes can improve outcomes as well as reduce diabetes-related hospitalizations and long-term cardiovascular risks. Recent attention has focused on identifying new strategies to further improve diabetes care. At Kaiser Permanente (KP) Baldwin Park, the standard diabetes care management (CM) model involves pharmacists, nurse practitioners and physician assistants managing patients via telephone. In June 2015, a new glucometer download (GD) program was implemented, in which patients are seen by the same practitioners during face-to-face encounters. Currently, both models are being utilized to manage type 2 diabetes patients at KP Baldwin Park. The purpose of this study was to evaluate the effectiveness of the in-person approach versus the standard telephone-based model in improving hemoglobin A1c (A1c) levels in adults with uncontrolled type 2 diabetes. Further, it sought to identify which practice model utilizes clinicians more efficiently.

Methodology
This was a retrospective observational cohort study. The study population was selected from July 1, 2015 to September 30, 2015 and consisted of patients 18 to 74 years old with a diagnosis of type 2 diabetes and a recent A1c ≥8%. Patients who were no longer KP members were excluded from the study. Patients were followed for six months, and the primary outcome was change in average A1c. The difference in A1c reduction between the two groups was analyzed using an independent, two-tailed t-test. Secondary outcomes were the proportions of patients with A1c <9% and <8%, average number of encounters per patient to reach an A1c <8%, and average length of each patient encounter.

Results
A1c levels improved from 9.63% to 8.12% (-1.51%) in the in-person GD group and from 10.01% to 8.21% (-1.8%) in the telephonic CM group. The 0.29% greater reduction in A1c by the CM group was not statistically significant (p=0.072). There was also no statistically significant difference in the proportions of patients achieving A1c <9% (78.47% in GD vs. 77.78% in CM; p=0.774) and <8% (55.02% in GD vs. 59.26% in CM; p=0.378). GD patients had fewer encounters to achieve an A1c <8% (3.01 vs. 8.04; p<0.001) and GD encounters were longer compared to CM encounters (21.09±6.93 min vs. 13.25±10.83 min; p=0.001).

Conclusion
The primary limitation of the study was that the GD and CM groups were not matched by baseline characteristics, such as age, average initial A1c, and diabetes treatment regimen. In addition, they had different follow-up intervals. However, these differences were inherent to both groups and the purpose of the observational study was to evaluate two existing diabetes programs. Diabetes management delivered in person and via telephone was equally effective in improving A1c, and both methods had similar proportions of patients achieving set A1c targets. Individual GD encounters took more time. However, the GD group had fewer encounters to reach an A1c <8%, in part due to longer follow-up intervals (2-3 weeks for GD vs. 1 week for CM). These data suggest that some patients may be followed less frequently without a compromise in outcomes. ☐
Evaluating SFVAHCS-Modified CAM-ICU Compliance and Delirium Interventions

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Introduction
Delirium is a presentation of an acute brain dysfunction that is associated with increased mortality and morbidity and is often under-diagnosed in the intensive care unit (ICU). San Francisco Veterans Affairs Healthcare System (SFVAHCS) modified CAM-ICU protocol was implemented to encourage daily ICU delirium screening and improve efficiency. A recent parallel-form reliability study conducted at SFVAHCS also demonstrated comparable ICU delirium detection rates between the modified CAM-ICU protocol and the validated CAM-ICU protocol.

Since the implementation of the protocol, compliance rate has not been determined and an institution-specific guideline for ICU delirium management in our unique veteran population has not been established. The objectives of this quality improvement project are to determine the compliance rate to the modified CAM-ICU protocol and to evaluate appropriateness of SFVAHCS provider response to a positive CAM-ICU result.

Methodology
The electronic medical record system was used to identify patients admitted to the ICU from May 2015 to July 2015, up to a cohort of 250 patients. A retrospective chart review was performed to collect data on patient demographics, the CAM-ICU assessments, and pharmacological and non-pharmacological interventions. Patients were excluded if they were transferred from an outside facility or have confounding factors such as active delirium on admission. Descriptive statistics were generated for continuous and categorical variables.

Results
Out of 216 patients reviewed, 140 met the inclusion criteria with 76 excluded based on the exclusion criteria. SFVAHCS CAM-ICU protocol compliance rate was 71.25% from a total of 880 CAM-ICU assessments. CAM-ICU was positive in 6 out of 140 (4.29%) patients. Three out of 6 CAM-ICU positive patients received appropriate provider interventions.

Conclusion
SFVAHCS-modified CAM-ICU assessment compliance rate was lower than the target goal of at least 80% and the management of ICU delirium was also inconsistent. Based on our project findings, improvement of protocol compliance and development of an institutional guideline may improve ICU delirium management at SFVAHCS.
Assessing the Durability of DPP-4 Inhibitors in a Real World Clinic

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Introduction
Dipeptidyl Peptidase-4 (DPP-4) inhibitors remain a popular second or third line option in Type 2 Diabetes, to delay initiation of insulin. However, there are concerns regarding this class of drugs. One such concern is safety. Recent reports of pancreatitis, incidences of heart failure, as well as severe and disabling joint pain with long term use of DPP-4 inhibitors have been published. Another concern is their limited efficacy. Various clinical trials have shown that DPP-4 inhibitors decrease the hemoglobin A1C (HbA1C) value by 0.5% on average over 12 to 24 weeks, with this effect diminishing over time. Therefore, the question arises: how much time do DPP-4 inhibitors give a patient before they must consider another option such as insulin to achieve their glycemic goal? In fact, minimal data exists in the literature regarding HbA1C decreases achieved in the clinic setting and moreover how long this decrease is sustained before addition of other antihyperglycemic medications. In this study, a retrospective analysis was conducted to determine the effects of DPP-4 inhibitors over a two year period in outpatient clinic patients with Type 2 Diabetes Mellitus.

Methodology
This was a retrospective chart review. The study period was from October 2006 – December 2013. Data collection included chart review and pharmacy dispense data. The primary outcome of this study is the change in HbA1C values (initial drop of 0.5% or better) measured within 6, 12, 18, 24 months post-initiation of the DPP-4 inhibitor. Secondary outcomes include percentage of patients receiving additional antidiabetic medications (both oral and insulin) after DPP-4 inhibitor initiation, discontinuation rates of DPP-4 inhibitors over the 24 months, and patients achieving their glycemic control targets after addition of the DPP-4 inhibitor.

Statistical analysis used for the Primary Endpoint was the Paired T-Test. The power study estimated N = 125 to detect 0.5% difference in HbA1C with 80% power, alpha = 0.05. The inclusion criteria included: Age ≥ 18 years old, diagnosis of Type 2 Diabetes, and patient on a DPP-4 inhibitor with an HbA1C lab at least 6 months prior to initiation. The exclusion criteria included: Patients with diagnosis of Type 1 Diabetes, Gestational Diabetes, Steroid-induced Diabetes, patients already on insulin therapy, and patients with a proportion of days covered (PDC) < 80%.

Results
Primary outcome: There were a total of 208 patients that were newly started on DPP-4 inhibitors during the study period. After filtering through all the exclusions, there were 69 patients in the study. The main reasons for exclusion were non-adherence to medications, lack of HbA1C labs, or patients that were already on insulin at initiation. Out of the remaining 69 patients included, only 41 (59%) of patients had a HbA1C decrease of at least 0.5% at 6 months, which allowed them to be followed in the durability analysis. Result of the primary outcome (displayed in a figure), is a decreasing trend in the HbA1C response was seen over the 24-month interval. However, it must be noted that the standard deviation was wide at each interval due to the dwindling number of patients over time.

Secondary outcome: The majority of patients that were started on the DPP-4 inhibitor discontinued the medication and a little less than half required a new anti-diabetic agent over the 2 year interval. Due to the patients either discontinuing the medication or starting a new anti-diabetic agent, they were excluded from the analysis over time. With the exception of the 24-month time point, less than half of the patients included in the analysis were able to meet their target glycemic goal.

Conclusion
This retrospective chart review showed a decreasing trend in HbA1C response over the 24-month interval with patients started on DPP-4 inhibitors. This may have been a contributing factor to the discontinuation of the medications in addition to cost and tolerability. Also noteworthy was over 40% of patients started on the DPP-4 inhibitor were unable to attain a HbA1C decrease of at least 0.5% during the initial 6-month time point, which clinical trials have shown to be when patients have an optimal

continued
response. Since this was study of real world clinic patients where glycemic targets dictate additional interventions or discontinuation of certain medications, there was a high attrition rate of patients included in the analysis over time.

The strength of this study was the inclusion of patients with multiple comorbidities (congestive heart failure, renal insufficiency, and BMI > 40 kg/m²) that are more representative of patient seen in a real clinic population. This study is also unique because adherence of the patient to their medications were taken into account. Additionally, patients were excluded from further analysis if they discontinued their DPP-4 inhibitor or were initiated on a new antidiabetic agent in an attempt to isolate the effect of the DPP-4 inhibitor on HbA1C. These factors are not considered in an intent-to-treat study design utilized in most clinical trials.
Impact of Pharmacist-Driven Transitions of Care: A Pilot Study

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Introduction
Transitioning from hospital to home can be overwhelming for patients and caregivers. Patients often have several medication regimen changes and are expected to recall modifications made to their diets, exercise habits, and self-monitoring practices. Because of these factors, effective transitions from the hospital to home setting are as important as the patient care provided during the hospital stay.

Our healthcare system has identified the need for pharmacist involvement in transitional care across all of its hospitals. Pharmacists’ extensive medication knowledge positions them as valuable patient care providers that can demonstrate benefit in medication therapy optimization, provision of vital patient education, and identification of potential barriers to adherence.

This study aims to measure the effect of pharmacist-driven interventions on improving care transitions and reducing readmissions. The pilot focused on identifying high risk patients, implementing processes for conducting admission/discharge medication review, discharge counseling, and subsequent outpatient follow up.

Methodology
Patients screened for the pilot were adults at least 18 years of age, admitted as an inpatient at St. Joseph’s Medical Center for greater than 24 hours, who had a diagnosis of new or uncontrolled chronic obstructive pulmonary disease, diabetes, heart failure, or acute coronary syndrome. Patients eligible for transition of care follow-up met secondary criteria which included at least one of the following: admitted for preventable adverse drug event, non-compliance, medication acquisition barriers, discharged on newly prescribed high-risk medications, greater than five medication changes to previous home medication regimen or upon request from physician.

Inpatient Phase I follow up included daily patient medication profile reviews and proactive monitoring for patient discharges using reports available in the electronic medical record. Discharge counseling was provided to each patient and interventions were made if medication related concerns were identified.

Outpatient Phase II follow up occurred after hospital discharge and included comprehensive medication regimen review and reinforcement of education received while hospitalized. Medication related concerns identified during this time were relayed to respective physicians for resolution. Patients were followed for 30 days post-discharge and received additional phone calls or clinic visits as deemed necessary.

Results
The pilot study occurred over 4 weeks from January through February 2016. 102 patients were assessed, with 27 patients completing the pilot study with 30-day follow up. There were 76 total pharmacist interventions recorded. One patient was readmitted for chronic obstructive pulmonary disease and one for congestive heart failure within 30-days. There were no readmissions for acute myocardial infarction or diabetes.

Conclusion
The results from the study indicated that pharmacist involvement in transitions of care was able to decrease readmissions for CHF and COPD from 22.7% and 21.8% to 16.7% and 12.5% respectively. Additionally, these reductions in readmissions would save $117,696 annually, potentially justifying a position for a transition of care pharmacist at our medical center.
Introduction

Background
Parenteral nutrition (PN) provides intravenous nutrition support for patients who are unable to tolerate oral or enteral nutrition. It can be life-saving in malnourished patients with a nonfunctional gastrointestinal tract, limited absorptive capacity or problems that prevent enteral feedings. However, parenteral nutrition is considered a high-alert medication because it can also increase the risk of hyperglycemia, bloodstream infections, sepsis, and hepatobiliary disorders, especially when used inappropriately based on American Society for Parenteral and Enteral Nutrition (ASPEN) guidelines. Many studies have shown clinical and financial benefits of parenteral nutrition management by a multidisciplinary nutrition support team (NST). However, there is not currently a standardized process within Kaiser Permanente Orange County to assess if PN ordered in the inpatient setting meets recommended ASPEN criteria. This study analyzed a multidisciplinary process that was implemented to ensure all PN orders for hospitalized patients were evaluated for necessity according to ASPEN guidelines. The impact of a nutrition support team on increasing the percentage of PN orders that provided the minimum recommended caloric and protein goals per day was also evaluated.

Objective
To assess the percentage of potentially avoidable PN orders before and after implementation of a NST and to evaluate the percentage of PN orders that provided the minimum recommended caloric and protein goals using the Mifflin St. Jeor equation.

Methodology
A retrospective chart analysis was conducted on all non-pregnant patients aged 18 years and older who had an order for parenteral nutrition at the Kaiser Permanente Anaheim Medical Center. Baseline population data was collected during a six-month period from October 2014 through March 2015 and was compared to data from October 2015 through March 2016, after implementation of the nutrition support team-managed intervention process. The primary objective was to assess the percentage of potentially avoidable PN orders out of all PN ordered. Statistical analysis of the difference in the percentage of potentially avoidable PN orders and the percentage of PN orders maximized for protein and calories was performed with a chi-squared test to compare the two treatment groups.

Results
The percentage of potentially avoidable PN orders after implementation of the NST decreased to 30% compared to 43% pre-implementation of the NST (p=0.02). In the study group, the percentage of PN orders that provided the minimum recommended calories per day increased from 59% to 71% after implementation of the NST (p=0.04). The percentage of PN orders that provided the minimum recommended grams of protein per day was not significantly different between the study and control groups, at 82.6% versus 80.8% respectively (p=0.8).

Conclusion
A multidisciplinary nutrition support team process improved appropriate utilization of parenteral nutrition according to ASPEN guidelines, as well as increased the percentage of PN orders providing the minimum recommended calories per day.
A Four-year Review of Pharmacist and Physician Patient Rounding and Their Effect on Length of Stay and Throughput

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Introduction
Healthcare finance metrics are important when it comes to the allocation of resources and the justification of professional services. Operating indicator ratios include the average length of stay (ALOS). The shorter the ALOS, the lower the cost of treatment, the greater inpatient profitability and often correlates to improved metrics e.g. efficiency, capacity and cost control when reduced. The case mix index (CMI) measures the average DRG weight of the patient. The higher the CMI, the greater the complexity of services provided. The CMI, when divided by the ALOS creates the data expression of throughput. Throughput is used to benchmark hospital efficiency. Decreasing the CMI-adjusted LOS towards a 2 ratio is correlated with improved efficiency and accounts more precisely for clinical complexity than ALOS alone. The purpose is to determine if a pharmacist rounding with a physician had an effect on a patient’s length of stay and patient throughput.

Methodology
Two community based physicians and their operating indices were reviewed including: total discharges, total days, ALOS, CMI, CMI-adjusted LOS over a four-year period. A residency/BCPS trained pharmacist rounded with community physician A with a general family practice and rounded without a pharmacist. The pre-period was over 1.5 years from Jan 2012 thru May 2013 where there was no pharmacist rounding. The post-period was over 2.5 years from June 2013 thru December 2015 where a pharmacist was with physician A for inpatient bed rounds for approximately 30 minutes daily, Monday through Friday. The two groups were compared against the pre-post period using the CMI-adjusted length of stay metric for throughput.

Results
Physician A had a positive impact on all metrics due to daily rounding: ALOS decreased by 12%, CMI increased by 4.54% indicating greater patient complexity, the CMI-Adjusted LOS decreased by 16% indicating more efficiencies and care coordination or throughput. For physician B, the lack of a pharmacist produced mixed results: though a greater ALOS reduction 16.92%, but the CMI fell by 13.83% indicating less complexity, the throughput was decreased by only 3.8%. The hospital was undergoing clinical process changes e.g. addition of hospitalists program (Aug 2012), pharmacy transitional care program (Oct 2013) and medication reconciliation and affected our study physicians equally. Thus the CMI-Adjusted LOS calculated difference of 12.2% between the two physicians, more likely reflects the effect of pharmacist rounding on increased efficiencies and coordination of care e.g. formulary recommendation, drug optimizing, error reduction, nutrition, antibiotic stewardship and care coordination with other disciplines. In 2015, our direct cost per patient day was $1950 dollars per day and the ALOS was 3.33 days. We estimated a $464,284 reduction over the 2.5-year post-period, with a conservative return on investment (ROI) for a pharmacist was 4.5 to 1 based upon 30 minutes rounds done 5-days a week.

Conclusion
Pharmacist rounding had a positive effect on decreasing ALOS, a 12.2% measurable difference on patient throughput and a 4.5-fold return on resource investment when reviewing operating indicators and healthcare finance data over a 4-year period.
Evaluation of Students' Perceptions of Physical Assessment Videos

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Introduction
Physical assessment (PA) training should be incorporated into PharmD curriculum as part of accreditation standards and to continue advancing pharmacy practice. Since many pharmacy preceptors do not perform physical exams, students on experientials do not always get hands-on training. To help students become proficient in performing physical exams, student-produced videos covering vitals, HEENT (head, eye, ear, neck and throat), cardiac, pulmonary, abdominal, musculoskeletal, and neuromuscular examinations were created to supplement instruction. The purpose of this study was to assess students' perceptions of these videos and their confidence in PA and evaluate if student perceptions correlated to predictors in performance on a PA written exam and practicum.

Methodology
This IRB-approved study included P1 students. Student perceptions were assessed via a post-course survey utilizing a 4-point Likert scale (A = strongly agree; D = strongly disagree). A non-investigator, linked the survey responses to individual student performance (written exam and practicum) via random ID numbers. Statistical analysis included chi square for categorical data and linear regression for continuous data.

Results
Of 112 P1 students, the average score on the written exam was 88% and the average score on the practicum was 81%. Every student completed the survey and 106 students watched at least one PA video. Of the 106, 79% reported they could not have achieved the same results without the PA videos. Over 80% of students agreed/strongly agreed on 10 of 12 survey items assessing increased perceived confidence in PA skills including abdominal, neuromuscular, musculoskeletal, HEENT, and pulmonary exams, in addition to obtaining vitals and using cardinal techniques: inspection, auscultation, and palpitation. The most viewed video was the abdominal examination, viewed by 98 students. Students who use PA skills at work or rotations were more likely to score above average on the written exam (P=0.03). Students who watched the PA videos two or more times were more likely to score above average on the written exam than students who watched the PA videos once or not at all (P=0.005). There were no statistically significant predictors for the practicum scores.

Conclusion
Student-produced PA videos were well received by students. Students who watched the videos twice or more and students who utilized PA skills outside of the classroom were more likely to score above average on the written examination.
Implementation of an Opioid Overdose Education and Naloxone Distribution (OEND) Program in the Emergency Department

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Introduction
Over the last two decades, the United States (U.S.) has entered an opioid overdose epidemic period, with growing numbers of prescription opioid analgesics sold despite a lack of increase in overall pain among Americans. Public health organizations have recognized this and responded by developing several harm reduction initiatives, one which is the implementation of Opioid Overdose Education and Naloxone Distribution (OEND) programs in different settings, including emergency departments. As of July 2014, there were 188 programs that existed in the U.S., providing opioid overdose education and distributing take-home naloxone kits. Studies evaluating such programs found that communities with OEND programs implemented reported decreased opioid-related death rates compared to communities that did not. With the remarkable success of these programs, this study aimed to bring the same services to the San Joaquin County community through implementation of an OEND program at St. Joseph’s Medical Center emergency department.

Methodology
In the phase 1 of the study, patients at risk for an opioid overdose were identified based on a set of inclusion criteria, counting presence of risk factors and receipt of an intranasal naloxone kit at discharge. Identified patients were provided education by a pharmacist on opioid overdose, particularly how to prevent, recognize, and respond during an overdose situation. Families and friends who were present were encouraged to receive the same intervention. Baseline knowledge and retention of information immediately after the intervention were assessed. In the phase 2, each participant telephoned on Day 15 and Day 30 to reassess retention of knowledge. Knowledge retention was evaluated utilizing a knowledge assessment tool, which focused on subjects including opioid overdose prevention, recognition, and response as well as naloxone administration. The mean knowledge assessment scores were calculated for each assessment point and compared to baseline knowledge assessment score.

Results
During the study period from April 15 through May 30, 2016, 68 patients were screened. Ten patients met the criteria, of which 6 consented to participate while the other 4 were discharged prior to initial contact. All 6 patients completed protocol, through the 30-day follow-up. Mean knowledge assessment scores were 27, 31.2, 32.5, and 32.3 points for baseline, immediately post-intervention, 15-day follow-up, and 30-day follow-up, respectively.

Conclusion
There was an overall increase in the knowledge assessment score of participants in the OEND program implemented in the emergency department, suggesting that such program is effective in improving opioid overdose knowledge among laypersons. Furthermore, results from the 15-day and 30-day follow-ups suggested that laypersons are capable of retaining information provided during the intervention. These results are consistent with previously published results of studies evaluating the impact of OEND programs on layperson knowledge about opioid overdose.
Simplifying your Refills: Using Medication Synchronization with Reminders to Improve Adherence

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Introduction
In the United States, patients prescribed chronic medications adhere to their medication regimens approximately 50% of the time. According to the World Health Organization, medication regimen complexity is one of five categories that contribute to non-adherence. Refill consolidation, a component of regimen complexity, describes the number of medications refillable per pharmacy visit—less consolidation translates to more pharmacy visits. Kaiser Permanente employs many levers to assist patients with adherence and this includes a medication synchronization program, which simplifies regimens by standardizing refill schedules. The goal of this study is to compare the impact of medication synchronization with automated telephone reminders versus synchronization alone on adherence.

Methodology
A retrospective cohort study was conducted to evaluate an ongoing medication synchronization pilot at the Kaiser Permanente Baldwin Park 24 Hour Pharmacy, which began in August 2015. The study period was from August 31, 2015 to March 31, 2016. The study included Baldwin Park Medicare patients who were synchronized between August and September 2015, partially adherent, which was defined as a proportion of days covered (PDC) score of 60-79%, and received at least two dispenses of oral diabetes medications, a renin angiotensin aldosterone inhibitor, or a statin. Exclusion criteria included: commercial or dual Medicare-Medicaid coverage, a PDC outside of 60-79%, or patients were no longer active members. The primary outcome was the proportion of patients achieving the Medicare defined adherence PDC of >80% at 6 months. The secondary outcomes included the difference between the mean changes in PDC scores; average pharmacist time to synchronize each patient and medication; 12-month average PDC at study conclusion; refill patterns, and mean change in A1c% for patients taking oral diabetes medications. To detect a difference of 25% between the proportion of adherent patients in both groups, N=58 per arm was needed to achieve 80% power.

Results
A total of 100 subjects were included, 58 and 42 in the reminder and synchronization only group, respectively. The baseline data were similar in both groups. The proportion of patients with PDC >80% was 74.1% and 52.4% (p-value= 0.02) in the reminder and synchronization only group, respectively. The difference between the mean change in PDC of the reminder versus synchronization only group was 8.1% (95% CI 0.9 to 16; p-value= 0.03). The 12-month PDC improved in both groups; the reminder group average was >80%. Average reported time to synchronize each patient was 15 to 45 minutes; each medication took 4 to 7.5 minutes. More patients in the reminder group picked up subsequent refills. A1c was not assessed due to small follow-up sample size.

Conclusion
This study was limited by not being able to reach power for statistical significance. However, the study showed that a greater proportion of patients in the reminder group had a PDC >80% compared to the synchronization only group. The reminder group also demonstrated a greater increase in the 6-month PDC, and their 12-month PDC exceeded 80%. Future studies are needed to determine the impact of medication synchronization on clinical and financial outcomes.
Early Detection of Insulin Induced Hypoglycemia from Hyperkalemia Treatments via Scheduled Glucose Testing in a Orderset

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Introduction
Hyperkalemia or serum potassium ≥ 5.1 mEq/L is often caused by renal dysfunction. If left untreated, cardiac arrhythmias, severe muscle weakness, or paralysis can manifest. One treatment option is to shift serum potassium intracellularly through insulin administration. A retrospective review of 70 United States hospitals estimated a 20% rate of insulin-induced hypoglycemia and a 7% rate of severe hypoglycemia. We predict this is a falsely low estimate as blood glucose testing within 6 hours of post-insulin administration is not universal protocol. At our hospital, a 12-month baseline review prior to a December 2015 hyperkalemia orderset revision found a 12% prevalence of hypoglycemia amongst those treated with insulin for hyperkalemia. The revised orderset now requires point-of-care testing (POCT) of blood glucose (BG) pre- and post-insulin administration up to 6 hours. In this study, we will assess hypoglycemia incidence in patients receiving insulin using this revised hyperkalemia orderset.

Methodology
A retrospective analysis of our electronic medical record was conducted for all patients using the revised hyperkalemia orderset during January 1, 2016 to July 11, 2016. Patient data collected included: sex, weight, location of insulin-administration, insulin dosage, blood sugar levels, creatinine, diabetes diagnosis, corticosteroid use, and albuterol use. Hypoglycemia was defined as <70 mg/dL and severe hypoglycemia was defined as <40 mg/dL. Our study observed each treatment as an event for statistical analysis. The insulin hyperkalemia orderset defaults point-of-care testing orders at 1, 2, 4 and 6-hours post-insulin administration. Treatments were defined as having a BG level within in each of the three categories: (1) BG within 4 hours prior to insulin administration; (2) BG within >30 minutes to 180 minutes post-insulin administration; (3) BG within >180 minutes to 360 minutes post-insulin administration. For patients treated more than once with insulin for hyperkalemia within 6 hours, the first treatment data was excluded as to prevent duplicate data points.

Results
126 unique insulin treatments for hyperkalemia were identified for 97 patients. 52 treatments were excluded for an omission of blood glucose level(s) in any of the three defined categories. Of the 74 treatments included in the study, 19 (26%) had documented hypoglycemia within 6 hours of insulin administration and 3 (4%) had severe hypoglycemia. Eighteen out of 19 (95%) of the hypoglycemic events occurred within the first 3 hours of insulin treatment of hyperkalemia.

Conclusion
With the implementation of scheduled POCT blood glucose levels post-insulin administration for hyperkalemia, we are identifying and treating more patients for hypoglycemia (26% post-implementation vs. 12% pre-implementation). Despite the revised POCT post-insulin orders, 10% of treatments did not capture a post-insulin blood glucose within the first 3 hours. Furthermore, providers can order insulin regular IV outside of the hyperkalemia orderset, without POCT. To drive further orderset compliance, we would like to limit insulin prescribing only to approved ordersets. To reduce hypoglycemic events, we would like to identify the risk factors for post insulin hypoglycemia. Our next step is a multivariate analysis on the individual risk factors that may increase a patient’s chance to have a post insulin hypoglycemia event.
Evaluation of Long-term Opioid Therapy Reduction at a VA System

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Introduction
The increase in prescribing opioids for managing Chronic Non-Cancer Pain (CNCP) has led to an increase in diversion of prescription opioids, opioid misuse and abuse and fatal overdoses. The Veteran Affairs (VA) launched a nationwide initiative called Opioid Safety Initiative (OSI) to reduce opioid use and amount of morphine equivalents prescribed from VA facilities. A reduction in opioid therapy will benefit patients by decreasing their risk to tolerance, dependence and hyperalgesia. OSI encourages utilizing Numeric Rating Scale (NRS) and Quality of Life Scale to measure pain and functionality. OSI focuses on reducing opioid therapy by alleviating pain by non-prescription methods. The Veteran Affairs Greater Los Angeles Healthcare System (VAGLAHS) has been able to reduce the total amount high dose opioids by 37% but it is unclear how the patients are doing after a decrease in their long-term opioid therapy.

The objective of the retrospective chart review is to evaluate how VAGLAHS patients are doing with pain management after their long-term opioid therapy has been reduced with OSI.

Methodology
A list of VAGLAHS patients that have been targeted for the OSI program from January 1, 2014 to June 30, 2015 was generated. Data was collected for patients who were 1) targeted for OSI between January 1, 2014 to June 30, 2015, 2) prescribed long-term opioid therapy for CNCP by a VA provider and 3) had a reduction in their long-term opioid therapy morphine equivalents. Computer Patient Record System (CPRS) and Veterans Health Information Systems and Technology Architecture (VISTA) was used to collect demographic, clinical and medication data.

Results
The study population consisted of 305 patients who were targeted for OSI, 55 patients met the inclusion criteria and 43 patients were able to maintain long-term OT for 6 months. Only 36 patients (83.7%) had a baseline and follow-up NRS. From the 36 patients, 26 patients (72.2%) had a reduction or no change in NRS. Mean amount of morphine equivalents reduce was 54.1 mg +/- 40.5mg. There was an average of 9 follow-up interactions following OT reduction and only 1 patient had an ED visit documented. There was an increase in ancillary medications (65.5%), adjunctive medications (24.3%), and complementary alternative medicine (52.3%).

Conclusion
Majority of patients who were targeted for a reduction in OT was able to maintain their reduced ME for 6 months. Over 70% of patients were able to keep their NRS the same or decrease their NRS, demonstrating that majority of patients are adequately being managed for their pain.
Appropriateness of Total Parenteral Nutrition Use in Adult Patients at Cedars-Sinai Medical Center

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Introduction
Total parenteral nutrition (TPN) may be clinically indicated but can also be costly and have negative consequences when used inappropriately. Infectious and metabolic complications can occur with TPN, therefore many institutions have metabolic support teams (MST) to initiate and manage patients who require parenteral nutrition. At Cedars-Sinai Medical Center, TPN needs to be screened and approved by MST members prior to its initiation. TPN orders must come from MST attendings or TPN-privileged physicians who have passed the privileging examination at the hospital. Some criteria for TPN initiation at our institution include a non-functioning GI tract, NPO status for >5 days with malnutrition, GI obstruction, and short gut syndrome.

Purpose
To evaluate the appropriateness of TPN use in adult patients based on the hospital’s nutrition support therapy guidelines and criteria.

Methodology
Retrospective chart reviews of 453 non-ICU and ICU adult patients on TPN from February 2014 to March 2015 were conducted at Cedars-Sinai Medical Center. Information was collected from electronic medical records (EMR), which included patient demographics, TPN indication, TPN duration, NPO status, TPN ordering physician, and defined malnutrition markers such as prealbumin <10 mg/dL, albumin <2.7 g/L, percent of weight loss and/or the presence of decubitus ulcers. All adult patients who were at least 17 years old and were administered TPN for at least one day were included in this study.

Results
Of the 453 patients, the median age was 61 years (17-101 years). The median NPO status and TPN duration were 6 days (0-280 days) and 8 days (1-280 days), respectively. Sixty-three percent of patients (N=286) were on TPN for ≥7 days. The two most common TPN indications were enteral route problems for ≥7 days (36%, N=162) and pre-existing malnutrition with documented or expected NPO status >5 days (31%, N=141). Ninety-seven percent of patients (N=440) met criteria for appropriate TPN initiation. The remaining 3% of patients were on TPN indicated for malnutrition but did not actually have any of the hospital-defined malnutrition markers. All TPNs in this study were appropriately ordered from either MST attendings or TPN-privileged physicians.

Conclusion
Overall, the TPN screening and approval process by the MST team is effective in ensuring that TPN is initiated appropriately. Parenteral nutrition met institution defined criteria in the majority of patients. In the 3% of patients who did not meet appropriate TPN initiation for the indication of pre-existing malnutrition, inadequate EMR documentation of malnutrition markers may be a contributing factor. In addition, according to the 2012 A.S.P.E.N. update on adult malnutrition, inflammatory markers such as prealbumin and albumin are no longer used as diagnostic malnutrition markers. Instead, clinical characteristics to support malnutrition include energy intake, weight loss, physical findings, and reduced functional hand grip strength. This new set of diagnostic markers was not applied in the chart reviews of our patients. Results would be different had these other criteria been used, which could also possibly explain for the small percentage of patients we did not find malnutrition markers for during our study. Results will be shared with the MST team.
An Interferon-Free Era, Has Reality Met Expectations?

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Introduction
There are 17,000 new infections and 15,000 deaths due to Hepatitis C virus (HCV) each year. According to the CDC, there is an estimated 2.7-3.9 million people in the United States chronically affected by HCV. Out of every 100 persons infected, 5-20 will develop cirrhosis and 1-5 will die after progression to liver cancer or end stage liver disease.

As a result, it is important to have safe and efficacious treatments available. Prior to 2014, patients were primarily treated with Interferon (IFN) combination therapy. Cure rates were disappointing and significant adverse effects lead to high discontinuation rates. The introduction of oral- IFN-free regimens revolutionized how patients and providers perceived and approached HCV treatment. The promising outlook on these new medications led to anecdotal reports of providers warehousing patients (holding off treatment in expectation of better treatment options). Now, healthcare providers are able to offer patients infected with HCV treatments that are highly efficacious and have minimal side effects.

Objectives: 1) To determine whether the introduction of the new IFN-free agents actually led to an increased number of patients being treated 2) Compare sustained virologic response (SVR) with IFN regimens vs. IFN-free regimens.

Methodology
A prospective observational study including patients referred to Cedars-Sinai Medical Care Foundation’s Chronic Hepatitis C Program for initiation and management of HCV treatment. The role of the pharmacist includes selecting appropriate drug therapy and duration based on current guidelines and genotype, managing side effects, and drawing labs to ensure appropriate response to treatment and resolution of HCV infection.

Cure rates or (SVR) is defined as an undetectable viral load 12 weeks after the completion of therapy. 209 patients were referred from 1993-2013 and 142 (~68%) of those patients were treated primarily with Peg-INF + Ribavirin for 24-48 weeks. Of those treated, 55% of patients were genotype 1, 23% genotype 2, 18% genotype 3, and 2% genotype 4.

The IFN-free group included 156 patients seen in 2014 and 2015 with 135 (~86%) patients being treated. 70% of these patients were treated with Harvoni for 11.5 weeks. 81% of patients seen were genotype 1, 13% genotype 2, 2% genotype 3, and 4% genotype 4.

Results
Of those treated in the Peg-IFN + Ribavirin groups, 62% of patients achieved SVR and those in the IFN-free treatment achieved an SVR of 95%. On average, 13 patients were seen each year during the IFN era and an average of 67 patients were seen each year since the use of the IFN-free agents.

Conclusion
We have seen a substantial increase in the amount of patients treated each year with IFN-free agents compared to IFN combination therapy. High incidences of SVR were also achieved as expected. 2016 is an extraordinary time for newly diagnosed patients with HCV as well as patients who have failed prior IFN therapy. We can now offer safe and efficacious treatments for HCV to prevent long term complications.
Evaluation of Erlotinib Use in Patients with Non-Small Cell Lung Cancer

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Introduction
Lung cancer is the leading cause of cancer death in the United States. In 2016, an estimated 224,390 new cases and 158,080 deaths are expected to occur. Epidermal growth factor receptor (EGFR) is over-expressed in various cancers. Blockade of EGFR has been shown to inhibit proliferation of tumor and therefore a therapeutic role has been established for EGFR inhibitor. In addition to over-expression, activating mutations within the EGFR between exons 18-21 have been identified in non-small cell lung cancer (NSCLC). Presence of these mutations indicates treatment benefit from EGFR tyrosine kinase inhibitor therapy in patients with NSCLC. Erlotinib is an oral agent, which reversibly inhibits the tyrosine kinase activity of epidermal growth factor receptor (EGFR) decreasing tumor cell proliferation. It is indicated for first line, refractory, and maintenance therapy with the intent to delay disease progression and extend survival without adversely affecting patients’ quality of life.

The objective of the study was to evaluate erlotinib use in patients with NSCLC for veterans at the Veteran Affairs Greater Los Angeles Healthcare System (VAGLAHS).

Methodology
A retrospective chart review was conducted to identify patients who had at least one fill of erlotinib from January 1, 2004 to August 31, 2015. Baseline, clinical, medication data were collected for patients who met inclusion criteria. The primary endpoint was median progression-free survival (PFS). Secondary endpoints included median OS, one year and two year PFS and OS, cause of deaths, reasons for temporary and permanent discontinuation, and adverse events.

Results
Between January 1, 2004, and August 31, 2015, 141 patients were prescribed erlotinib. 84 patients met inclusion criteria and were included in the study. At data cutoff on October 31, 2015, median PFS was 3.5 months (IQR 2.1-8.2). Erlotinib was used mainly as refractory therapy (74%), followed by first line (6%), and maintenance (2%). For refractory therapy, median PFS was 3.3 months. 1 year PFS and 2 year PFS were 14%, and 6% respectively. 12% patients required dose adjustment due to intolerable side effects. 12% patients temporary discontinued due to severe skin rash, persistent diarrhea, and interstitial lung disease. Reason for permanent discontinuation was mostly attributed to disease progression (92%). Main adverse reactions were rash (48%), diarrhea (26%), and appetite loss (18%).

Conclusion
Erlotinib was appropriately used in VAGLAHS. It was predominantly used as refractory therapy. The median PFS is 3.5 months. For refractory therapy, the median PFS was 3.2 months, which was longer than 2.2 months in literature. Median PFS showed a trend of improvement over time, likely due to the implementation of EGFR mutation testing at VAGLAHS. Adverse reactions were similar as reported in literature.
Outcomes of Pharmacists In Diabetes Care
a Veterans Affairs Healthcare System

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Introduction
The Department of Veterans Affairs serves 5.3 million patients annually. Close to one in five patients in the VA have diabetes. In many of the VA’s interdisciplinary team models, pharmacists are involved with managing diabetes as mid-level providers under a scope of practice agreement. Their scope of practice includes responsibilities such as developing and managing medication regimens, monitoring and evaluating pharmacotherapeutic effects, ordering and evaluating laboratory tests, requesting referrals to specialists, and providing disease and medication education. The purpose of this study was to evaluate the clinical and economic impact of pharmacists in managing diabetes when incorporated into an interdisciplinary team.

Methodology
This was a retrospective study, which included veterans who were enrolled in a pharmacist-run clinic at the VA Greater Los Angeles Healthcare System between November 1, 2012, and November 1, 2014. Diabetic patients with an A1c greater than 6.5% or on one or more antidiabetic medication(s) at the time were included in the study. Patients were excluded if they had only one visit with a clinical pharmacist, no documented baseline A1c, or no documented A1c at discharge from the clinic. Data between November 1, 2011 and November 1, 2015 was gathered and evaluated. Our primary outcome measured the change in A1c from initial to last pharmacist visit. Secondary outcomes measured the percent of patients who reach their A1c goal, percent of patients maintaining their A1c goal, and differences in clinical outcomes in diabetes-related hospitalizations, Emergency Department (ED) visits, and hypoglycemic episodes. The cost benefit of incorporating pharmacists on interdisciplinary teams was also evaluated.

Results
Of the 576 patients evaluated, a total of 303 patients with diabetes mellitus type I and II met the inclusion criteria. The average reduction in A1c was 1.83% (P<0.0001). The average number of days between the initial and last visit was 11.9 months with an average of 10.23 visits with a pharmacist. Forty nine percent of patients were able to reach their individualized A1c goal before discharge. Of the patients that were able to reach their A1c goal (n=284), 68% of patients maintained their A1c for at least a year. There was an overall reduction in ED visits (P=0.038), while the overall reduction in hospitalizations was not statistically significant (P=0.09). Sub-analysis of four patients referred to a clinical pharmacist solely for hypoglycemia management had hypoglycemic symptoms eliminated in 1 to 2 visits. A net savings of $61,440 – $96,392, or $904 - $1,418 per patient, was estimated for patients with a greater than or equal to 1% drop in A1c at 1 year.

Conclusion
Pharmacists involved with diabetes management trends towards providing a cost-effective service that contributes to reductions in A1c, ED visits, and hypoglycemic frequency.
Utilization of Bevacizumab in Metastatic Cancer at the VA Greater Los Angeles

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Introduction
Bevacizumab is a recombinant humanized monoclonal antibody directed against VEGF-A, an endogenous angiogenesis signal. Since its initial approval for colorectal cancer, bevacizumab has been studied for the treatment of a variety of cancer types, but has not been without controversy. In 2011, the FDA approval for metastatic HER2-negative breast cancer was revoked due to a lack of proven benefit compared to the potential risks of using the medication. As such, careful evaluation is warranted to determine the optimal use of bevacizumab. Thus the purpose of this retrospective chart review was to evaluate the usage of bevacizumab at the VA Greater Los Angeles Healthcare System (VAGLAHS) with a focus on the outcomes of colorectal cancer patients in our veteran population.

Methodology
Patients were included in the study if they were a VAGLAHS patient prescribed intravenous bevacizumab from February 1, 2004 to January 31, 2015. Data was obtained from Computerized Patient Record System and Veterans Health Information Systems and Technology Architecture electronic record systems. A list of patients was generated from prescription data, and patients were reviewed for inclusion and exclusion criteria. Data was collected for patients that met inclusion criteria until October 31, 2015 including progression free survival, overall survival, and demographic information.

Results
Of a total 720 patients prescribed bevacizumab, 146 were included in the study. 78% of these patients had a recorded mortality event by the end of data collection. 83% of the patients studied received bevacizumab for the treatment of colorectal cancer. In colorectal cancer patients, the median progression free survival was 10 months (IQR 4 to 12) and median overall survival was 16 months (IQR 9 to 25). Reasons for discontinuing bevacizumab treatment included 53% of patients with progression or death during treatment and 23% of patients discontinuing treatment due to adverse drug events. Comparison of the patients that discontinued therapy due to adverse drug events as compared to those treated until progression revealed a shorter progression free survival (4 months, IQR 2 to 8 vs. 8 months, IQR 4 to 10) and longer median overall survival (16 months, IQR 8 to 30 vs. 13 months, IQR 7 to 21).

Conclusion
Bevacizumab was predominantly used at VAGLAHS for colorectal cancer. Of these colorectal cancer patients, the median progression free survival was similar to literature (10 vs. 9 months), and the overall survival time comparable (16 vs. 21 months) given our study's lack of mortality events for approximately one quarter of our patients at the end of data collection. Notably, our population had a lower proportion of treatment discontinuations due to adverse drug events as compared to literature and a higher percentage of patients with progression during treatment (23% vs. 30% and 46% vs. 29% respectively). Those patients that discontinued treatment due to adverse drug events had a shorter median progression free survival but a longer median overall survival in our study.
Influence of Antipsychotic Drugs on Alcohol-related Readmission In Concurrent Bipolar and Alcohol Abuse Patients

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Introduction
The rate of alcohol-use disorder (AUD) in the general population is 6.8%, a rate which more than doubles to 16.1% in patients suffering from concurrent bipolar disorder. While the treatment of bipolar disorder and AUD individually is challenging – the treatment of both illnesses concurrently becomes tremendously more daunting. The effect of antipsychotics on alcohol consumption is unclear. The primary objective of this study was to evaluate whether discharging patients with a new prescription for an antipsychotic in patients suffering from both bipolar disorder and AUD will reduce future alcohol-related readmissions compared to patients who did not receive a prescription for an antipsychotic. Secondary objectives were to evaluate whether antipsychotics prolonged the time between admissions and identifying factors that may influence readmission rates, such as gender, smoking history, homelessness, concurrent depression, and inpatient psychiatric evaluations.

Methodology
This retrospective cohort study was conducted at a large, academic county hospital examining patients with bipolar disorder and AUD from 1/1/2005 to 12/31/2015. An initial list of 8,000 patients was identified. Included are: documented bipolar disorder, current alcohol abuse, and no current use of antipsychotics. Excluded are: age<18 and lack of medical record. Included in the study were 108 patients (n=84 discharged with antipsychotics and n=24 discharged without antipsychotics). Data on demographics, patient medical and social history, comorbidities, urinary toxicological screening results, index admission date, date of readmission, medications, and discharge diagnoses will be collected. Unpaired t-tests and Mann-Whitney test will be performed on continuous variables and Chi-squared or Fisher’s Exact tests on categorical variable. Chi-squared or Fisher’s Exact tests will be performed on predictor variables for readmission such as discharge with an antipsychotic medication, gender, smoking history, homelessness, concurrent depression, and inpatient psychiatric evaluation. Statistical significance will be set at p<0.05.

Results
Baseline characteristics (age, gender, social history, comorbidities) were not statistically significant between the two cohorts. For the primary objective, patients discharged with antipsychotics (9%) had significantly lower rates of alcohol-related readmissions compared to those who were discharged without an antipsychotic (42%; p=0.0001; RR=0.21, 95% CI 0.091-0.48; OR=0.13, 95% CI 0.043-0.39). Median days between index admission and alcohol-induced readmissions were 276 days and 125 days for those discharged with an antipsychotic compared to those who were not, respectively (p=0.12). Subgroup analysis for potential factors that may influence readmission revealed statistical significance for smoking history (p=0.03), cocaine abuse (p=0.03), and inpatient psychiatric evaluation (p=0.01). Other factors such as male gender (p=0.78) homelessness (p>0.99), concurrent depression (p=0.73), cocaine and amphetamine abuse (p=0.44) were not statistically significant for readmissions.

Conclusion
Readmission rates were statistically significant between patients discharged on antipsychotics and those who were not. Time between readmission was not significant. This suggests antipsychotics upon discharge may have a positive effect on AUD and reduce future alcohol-related readmissions. Prospective studies are necessary to substantiate these findings.
Impact of a Dedicated Pharmacist on Emergency Department Interventions

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Introduction
Recent literature has demonstrated the benefit of dedicated clinical pharmacy services in the emergency department (ED). Pharmacy services for the ED at San Francisco VA Medical Center (SFVAMC) are typically provided by clinical pharmacists located in the outpatient and inpatient pharmacies. In 2015, the Pharmacy Service detailed one clinical pharmacist to work in the ED on a part-time basis. The purpose of this project is to quantify the impact of a dedicated clinical pharmacist on ED pharmacy services at SFVAMC in regard to interventions, timeliness of orders, staff perceptions and estimated cost avoidance.

Methodology
This project was designed by our facility as quality improvement and was exempt from institutional review board approval. Tools used to measure the impact of the ED clinical pharmacist include tracking pharmacist interventions, reports of medication order verification, and a staff questionnaire. Interventions were self-reported using a standardized monitoring sheet and were collected over 15 days for a 3-month period from August to December 2015. Interventions were collected from both dedicated ED pharmacists and non-dedicated pharmacists providing services to the ED. Impact of a dedicated clinical pharmacist on timeliness of medication order verification was evaluated by reviewing pharmacy reports for inpatient and outpatient prescriptions. A voluntary questionnaire was sent to ED staff to evaluate staff perceptions of the dedicated pharmacist. Average cost avoided per pharmacist recommendation was calculated based on published literature and was adjusted based on 2015 Consumer Price Index.

Results
The ED pharmacist decreased the median time to order verification from 9 min to 3 min for unit dose orders and from 16 min to 9 min for discharge orders. For interventions, non-dedicated inpatient pharmacists interacted primarily with ED nurses (70%), rather than ED attendings (4%) and residents (26%). For interventions, the ED pharmacist had more interactions with ED attendings (35%), residents (8%), medical students (5%) and nurse practitioners (9%) compared to nurses (42%). There were also differences in the types of interventions made as inpatient pharmacists primarily triaged missing dose requests from the ED (58%) and the ED pharmacist primarily intervened by clarifying orders (30%) and making drug recommendations (26%).

Conclusion
The ED pharmacist was not only able to make more interventions compared to non-dedicated pharmacists, but they also provided a greater variety of interventions by having more contact with various ED providers and demonstrated a faster time to order verification. A majority of the ED staff reported having a dedicated pharmacist physically located in the ED was useful in various clinical situations.
Opioid Prescription Abandonment in an Ambulatory Care Setting

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Introduction
Analgesics are one of the most commonly prescribed drug classes in the United States (U.S.). Opioid analgesics comprise a large proportion of this therapeutic class and it has been estimated that 3-4% of the adult U.S. population has been prescribed an opioid for long-term therapy. Although opioid analgesics are effective for short-term pain management, these agents are not considered effective in the long-term and are associated with adverse events, such as addiction, overdose, and death. Opioids are highly prescribed, but little is known about prescription-filling behavior, such as primary non-adherence (PNA), which occurs when a patient fails to fill a new prescription. The purpose of this study is to quantify PNA to Schedule II opioids (including hydrocodone) among patients in a primary care setting and to identify factors that may potentially influence PNA.

Methodology
This study will be a retrospective observational analysis of adult patients (18 years and older) at Sutter Health ambulatory care offices between 2011 and 2014. We will use de-identified electronic health records (EHRs) data to identify patients who received a prescription for an oral or topical patch opioid analgesic including hydrocodone-containing medications. Patients with a medical history in the Sutter EHR of at least one year prior to the prescription index date will be included. We will exclude patients with a cancer diagnosis, a recent surgical procedure requiring post-operative analgesia, and inpatient or palliative care at the time of the prescription. The primary outcome measure will be PNA operationalized as an absence of a pharmacy fill within 30 days after a medication was prescribed. A sensitivity analysis will be performed for pharmacy fills up to 90 days from the index date. Rates of PNA will be compared between different opioid medications stratified by the active ingredient, dose, type of release system, formulation, and morphine-equivalent dose. As a secondary endpoint, we will compare rates of PNA between opioid analgesics and statin cholesterol lowering medications. As a tertiary endpoint, we will describe characteristics of the patient population who exhibit PNA to opioid analgesics.

Results
We hypothesize that rates of PNA will be higher for higher morphine-equivalent doses, topical patches, and extended-release opioids, as well as for opioid analgesics relative to statins. We also hypothesize that this study will identify population characteristics associated with a lower probability of filling opioid prescriptions and give insight into circumstances in which physicians may over prescribe opioids to patients who may not take them. The analysis of the data is currently in process.

Conclusion
The goal of this study is to quantify PNA to various Schedule II opioids including hydrocodone-containing medications among patients in an ambulatory care setting. We will also compare rates of PNA of opioid medications with statins and identify patient characteristics associated with opioid prescription abandonment. The conclusion is pending data analysis.
Analysis of Empiric Vancomycin Overuse in Patients Diagnosed with Pneumonia at Desert Regional Medical Center

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Introduction
The discovery of a more lethal strain of community-acquired methicillin-resistant Staphylococcus aureus (CA-MRSA), which also affects younger, otherwise healthy patients with community-acquired pneumonia (CAP), has led more physicians to add empiric MRSA coverage for CAP since the early 2000s. However, the fears driving providers to include MRSA coverage more often is disproportionate to the actual risk of MRSA infection. According to a recent article published in May 2016 in Clinical Infectious Diseases, among adults hospitalized with CAP, only 0.7% had MRSA, demonstrating an overuse of vancomycin for empiric MRSA coverage in CAP patients. Additionally, the new 2016 hospital-acquired pneumonia (HAP) and ventilator-associated pneumonia (VAP) Infectious Diseases Society of America (IDSA) guidelines now recommend covering for MRSA only in patients with high mortality risk or with increased risk factors for MRSA. By reviewing intravenous vancomycin use for CAP and HAP, we hope to develop better empiric antibiotic selection and limit resistance to and overuse of vancomycin at this hospital. The purpose of this study is to evaluate the appropriateness of intravenous vancomycin use for empiric coverage of MRSA in patients diagnosed with CAP or HAP at Desert Regional Medical Center.

Methodology
A retrospective chart review was performed using CRIMSON to select our patient population. Inclusion criteria included: patients age ≥ 18 years and patients diagnosed with pneumonia who received intravenous vancomycin. Exclusion criteria included: patients who received vancomycin for disease states other than pneumonia and patients with VAP.

Results
To be presented at a later date.

Conclusion
To be presented at a later date.
Early Detection of Osteoporosis in Asian Populations in San Diego County: Association with Body Mass Index (BMI)

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Introduction
This study intended to assess whether low Body Mass Index (BMI) contributes to a higher risk of osteoporosis in foreign-born Asian Americans living in San Diego County.

Osteoporosis leads to bones becoming less dense and more likely to fracture. Vertebral fractures can result in a loss of height, deformed posture, and long-lasting pain. Hip fractures can limit mobility and lead to a loss of independence with mortality up to 36% within one year. It is often difficult to identify osteoporosis at early stages because patients are unaware of the disease until pain or fracture. Thus, it is essential to identify patients with risk factors and intervene early.

Methodology
1.) BMI was determined from measurements of weight and height. Four BMI categories were used to evaluate patients: low (<18.5), normal (18.5-23.0), pre-obese (23.1-27.5) and obese (>27.5).

2.) Bone density was measured using a GE Achilles bone densitometer. A T-score between +1 and −1 was normal or healthy. T-score between −1 and −2.5 suggested the participant had low bone mass. A T-score of −2.5 or lower suggested the participant had osteoporosis. The more negative the number, the more severe the osteoporosis.

Finally, ANOVA and Bonferroni tests were used to evaluate relationship between average T-scores and BMI categories.

Results
This study is ongoing: 165 participants have been studied to date. Participant ages ranged from 52-82 years. The majority of the participants (52%) had between zero to two and a half hours of exercise in one week (table 1). The studied population was predominately Vietnamese, with smaller numbers of Cambodian, Chinese, and Laotian participants. The pre-obese group (n 47) had a mean T-score of −0.41 (±1.32), (table 3 and figures 1 & 2). The normal BMI group (n 84) had a mean T-score −0.44 (±1.25). Finally, the obese group (n 22) had mean T-score of −0.77(±1.33). The results of this study indicate a relationship (p= 0.04) between BMI and average T-scores.

Conclusion
Overall, this study suggests an association between bone density and BMI in foreign-born Asian Americans living in San Diego County. The results from this study indicate the participants with lower BMI had a higher chance of osteoporotic related diseases, if left un-diagnosed, which may lead bone fractures, patient limitation and immobility.
Characterizing Population Differences in the Use of Dabigatran 150 mg Versus 75 mg in Non-Valvular Atrial Fibrillation

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Introduction
Two dabigatran products (75 mg and 150 mg) are approved by the United States Food and Drug Administration to reduce the risk of stroke in patients with non-valvular atrial fibrillation (NVAF). Dabigatran 150 mg was approved based on the results of a large, randomized controlled trial. Dabigatran 75 mg, however, was approved based on the pharmacokinetic profile of the drug, as it was not tested in clinical trials, and is only indicated for patients with severe renal impairment (creatinine clearance 15-30 mL/min). Based on the RE-LY trial, dabigatran 150 mg is associated with higher gastrointestinal bleeding compared to patient specific therapeutic warfarin dosing. Due to this increased risk, lower dose dabigatran 75 mg may be an option for certain patients with NVAF even with a creatinine clearance >30 mL/min. Unfortunately, the use and efficacy of dabigatran 75 mg has not been widely studied. In this project, we seek to conduct a retrospective study to characterize the population differences in the use of dabigatran 150 mg versus 75 mg in patients with NVAF relative to warfarin, using electronic health records data from a healthcare system setting.

Methodology
A PubMed literature review was conducted to evaluate the frequency of physician prescribing of dabigatran 75 mg versus 150 mg. A set of patient specific parameters has been compiled to extract characteristic data from PAMF electronic medical health records at various locations throughout Northern California; the data extraction process will be managed by a PAMF statistician. Data received from the statistician will then be analyzed by the team and research preceptor, Dr. Romanelli Ph.D, MPH using modern statistical analyses such as a Chi-square test and Cox regression in order to evaluate the difference in occurrence of stroke between the dabigatran 75 mg arm and the dabigatran 150 mg arm.

Results
Pending. Retrospective data is currently being collected and will be analyzed in order to evaluate the potential stroke prevention benefit of oral dabigatran 75 mg twice daily versus 150 mg twice daily given various patient specific characteristics. Results will be presented when available.

Conclusion
Pending. Retrospective data is currently being collected and will be analyzed in order to evaluate the potential stroke prevention benefit of oral dabigatran 75 mg twice daily versus 150 mg twice daily given various patient specific characteristics. Conclusions will be made when all data sets have been analyzed.
**Effect of Discharge Antipsychotics on Substance-Related Readmission in Concurrent Bipolar and Substance Abuse Patients**

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**Introduction**
The National Comorbidity Survey reported a lifetime prevalence of about 4% for bipolar disorder (BD). The inpatient hospitalization rate of BD patients (39.1%) was greater than the 4.5% characterizing all other patients with behavioral health care diagnoses. BD has been noted to be the most expensive behavioral healthcare diagnosis. A majority of the total cost is primarily due to loss of productivity. Amongst mental health diagnoses, BD has the highest rate of comorbid substance use disorder (SUD). Approximately 60% of patients diagnosed with BD have a lifetime diagnosis of SUD. Current evidence suggests that affective symptoms present in BD are associated with an increased risk for substance abuse. The treatment of each disease, BD and SUD, individually is challenging – the treatment of both illnesses concurrently becomes more daunting for patients and health-care providers. Previous studies on the use of antipsychotics in patients suffering from both BD and SUD have been inconclusive for reducing substance use. Thus, further research is warranted to clarify whether antipsychotics may also reduce substance use in this patient population. The objectives for this study are as follows:

1) To determine if discharging patients suffering from concurrent BD and SUD with an antipsychotic medication reduces the proportion of patients readmitted due to substance use, in particular, to cocaine and amphetamines.

2) To determine if discharging patients suffering from concurrent BD and SUD with an antipsychotic medication increases the number of days to future substance-related (cocaine-induced or amphetamine-induced) readmission.

3) To identify any potential factors affecting future SUD-related readmission, such as gender, ethnicity, smoking history, family history, homelessness, and inpatient psychiatric evaluations.

**Methodology**
A retrospective cohort study will be conducted at a large, academic, county hospital. Patients admitted between 1/1/2005 - 12/31/2015 with ICD-9/10 codes for BD and SUD will be identified. Inclusion criteria are patients with documented BD and SUD and not currently treated with an antipsychotic medication. Active SUD is defined as patient self-reported cocaine or amphetamine use within the last 30 days or a positive urine toxicology test for cocaine or amphetamine upon admission. Exclusion criteria are patients age <18 years or unavailable electronic medical record. Data on demographics, patient medical and social history, comorbidities, urinary toxicological screening results, index admission date, date of readmission, medications, and discharge diagnoses will be collected. Index admission date is defined as the first admission with documented BD and active SUD. Unpaired t-tests will be performed on continuous variables and Chi-squared or Fisher’s Exact tests on categorical variables. A multivariate regression analysis will be performed on predictor variables for readmission such as: discharge with an antipsychotic medication, gender, ethnicity, smoking history, homelessness, and inpatient psychiatric evaluation. Statistical significance will be set at p<0.05. A comparison of the results from the analysis between patients discharged with and without an antipsychotic will be conducted to determine if there was a statistical significance between the two groups.

**Results**
Pending

**Conclusion**
Pending

Pending
Tobacco Industry Funding Science on the Neurocognitive Effects of Nicotine: A Systematic Review

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Introduction
While there is a popular belief that nicotine enhances cognition, studies of neurocognitive effects of nicotine report both positive and negative effects. A 1997 analysis (Turner and Spilich) of a 1994 literature review found that funding by tobacco companies was significantly related to study outcome. Another meta-analysis of studies on the reported neurocognitive effects of nicotine was performed in 2010, but this study did not examine the relationship between tobacco industry funding and study outcomes. We performed a systematic review of the primary literature on the neurocognitive effects of nicotine relative to human performance to update the studies included in the 2010 meta-analysis in order to examine the conclusions about nicotine and neurocognitive performance and the relationship between tobacco industry funding and study conclusions.

Methodology
A literature search was conducted using PubMed, EMBASE, PsycINFO, BIOSIS, and Web of Science. Peer reviewed journal articles written in English published between 2009 to 2016 were collected and evaluated according to the following inclusion criteria: 1) randomized double blinded placebo-control trial; 2) investigated the neurological effects of nicotine after administration of nicotine; 3) nicotine was administered to healthy adults (18-59 years) who were either nonsmokers, non-deprived smokers, or minimally deprived smokers (<2 hours of abaining from smoking); 4) route of nicotine was inhaled, oral, injected, or intranasal during a laboratory session; 5) numeric data to calculate an effect size, a statistical test, or p value was reported. Three reviewers further assessed and coded the articles meeting these criteria noting neurocognitive performance domain, study conclusions about the effect of nicotine in each domain, and both disclosed and non-disclosed tobacco industry funding. Article funding disclosures, author affiliations, and lists of tobacco industry funded studies obtained from previously unpublished tobacco industry documents were reviewed to ascertain tobacco industry funding.

Results
One reviewer screened 3771 abstracts and after excluding duplicates, included 54 manuscripts for full text review. Three reviewers will code for participant demographics, study methods, route of nicotine administration, nicotine dose, level of tobacco deprivation, smoking status of participants, study interventions, cognitive performance domain(s), outcomes, potential affiliation with funding by the tobacco industry, and risk of bias. The reviewers will assess the relationship between study conclusions about the neurocognitive effects of nicotine and different levels of disclosure of tobacco industry funding support (e.g., disclosed in the acknowledgements/conflicts of interest, author is listed with an association to a tobacco company, or author affiliation was not disclosed but author or study appears on lists of tobacco industry funded studies). The nature of the reported neurocognitive effect of nicotine (e.g., positive/negative/no effect/mixed effect) will be compared for these tobacco funding/affiliation categories.

Conclusion
We hypothesize that studies with tobacco industry support will be more likely to report nicotine having a positive neurocognitive effect compared with studies that lack tobacco industry support.
Addressing The Opioid Epidemic: A Pharmacist-Run Chronic Pain Management Program in the Primary Care Setting

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Introduction
In early 2016 the Center for Disease Control and Prevention (CDC) brought opioid use into the spotlight by declaring the exponential rise in the rate of deaths from drug overdose during the past few years a drug overdose epidemic. More specifically, the CDC identified that in 2014, 61% of drug overdose deaths involved some type of prescribed opioid. To address this problem and provide guidance to providers, the CDC published a guideline for prescribing opioids for chronic pain in March 2016. The challenge was then left on providers on how to incorporate these guidelines into their current practices. Previous studies have looked at opioid treated patients for non-cancer pain in the primary care setting and have found that a primary care disease management program improved pain compared to baseline. In order to incorporate the guidelines and optimize patient care, a pharmacist run chronic pain medication management clinic was established at Cedars Sinai Medical Group (CSMG). The goals of the program are to help improve the appropriate prescribing of opioids and use the recommended tools to appropriately monitor patients on opioids to reduce side effects, drug interactions, and drug diversion. We aim to provide a description of the pharmacist-run chronic pain program that was developed which incorporates the CDC guidelines, medical and pharmacy board guidance, and optimizes patient care.

Methodology
Working closely with a pain specialist physician, medical group leadership and the pharmacy team, a pharmacist-run chronic pain opioid medication management program was developed as a part of a comprehensive pain program. Eligible population for this program includes any patient currently stable on opioids for chronic pain for at least 3 months and who will require therapy for the next 3-6 months. The pharmacist will conduct an initial assessment with the patient, in addition to monthly follow up office visits. The pharmacist will assess the 4 A's; analgesia, activities of daily living, adverse events and aberrant behavior during both the initial visit and at each subsequent follow up visit. The tools that will be used to perform these assessments are the verbal numeric pain intensity scale, Screener and Opioid Assessment for Patients with Pain (SOAPP-5) and the Current Opioid Misuse Measure (COMM). Patients' scores on SOAPP-5 and COMM in addition with patient interviews will guide frequency of urine drug testing, liquid chromatography/mass spectrometry drug testing, and frequency of office visits. The pain management pharmacist's clinical expertise will also be used to provide extensive patient education on pain diagnosis and medication, address significant drug-drug interactions, appropriately provide prescriptions for opioid medications, address adverse events, and make referrals to other providers as appropriate. The program will begin enrolling patients in August 2016 and data will be collected to analyze the effectiveness of the program in meeting the stated goals.

Results
In progress

Conclusion
In progress
Evaluation of Predictors and Prescribing Patterns of Different Doses of High Intensity Statins in Patients with Diabetes

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Introduction
Statin therapy is a widely accepted treatment for lowering blood cholesterol levels in order to prevent cardiovascular events. The ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults recommends four patient groups that would benefit from statin therapy. High intensity statins are recommended in patients whom have clinical atherosclerotic cardiovascular disease (ASCVD) or have a LDL ≥ 190mg/dL. In addition, patients 40-79 years old with diabetes with a pooled cohort equation calculated at a 10-year ASCVD risk ≥ 7.5%, the guidelines recommend a high (over moderate) intensity statin which is currently based on expert opinion. High intensity statin doses are considered to be those that lower LDL by approximately ≥50% such as atorvastatin 40 mg or atorvastatin 80 mg. However, the rationale for choosing a particular high intensity statin dose remains ambiguous amongst providers. The purpose of this study is to evaluate the predictors and prescribing patterns for choosing atorvastatin 40mg versus 80mg in patients with diabetes indicated for a high intensity statin regimen.

The primary objective of this study will be to evaluate predictors of prescribing atorvastatin 40mg verses 80mg such as LDL, total cholesterol, triglycerides, age, gender, race, history of a clinical ASCVD such as a myocardial infarction, unstable angina or stroke, ASCVD 10-year %, ASCVD lifetime %, and comorbidities. A secondary objective will be to assess providers’ perceptions and rationale for choosing a particular statin regimen via a survey which will include case vignettes to accurately assess clinical prescribing patterns.

Methodology
This study will be submitted to the International Review Board for approval. Data will be collected and reviewed retrospectively through patient charts from an electronic health record (EHR). A paper based survey will also be utilized to identify providers’ perceptions on prescribing patterns and rationale for choosing a particular high intensity statin therapy. The study population will include adults ≥ 18 years of age with diabetes who are currently on high intensity statin therapy. Providers will be included who have prescribing authority at Harbor UCLA Family Health Clinic. Statistical analysis will include descriptive statistics through the paper based surveys, chi-squared tests for categorical data and Student’s T-test for continuous variables.

Results
In Progress

Conclusion
In Progress

angina or stroke, ASCVD 10-year %, ASCVD lifetime %, and comorbidities.
Paradigm Shift of Peri-Operative Warfarin Interruption to Improve Patient Care

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Introduction
Warfarin management consists of individualizing the dose of warfarin to target a standardized international normalized ratio (INR) range. While the dosing of warfarin is specific to the individual, peri-operative interruption of warfarin is standardized to holding warfarin for 5 days prior to procedures with moderate to high risk of bleeding. Some clinicians may deviate from the standard holding time; however, these decisions are usually based primarily upon the procedure being performed and not on patient specific parameters such as the patient’s warfarin dose. Our study is designed to investigate whether peri-operative warfarin management can be personalized based upon the warfarin dose of the patient.

Purpose
To evaluate whether there is a difference in the amount of time it takes to hold warfarin in a patient on high, medium, or low average daily dose of warfarin to reach the preferred pre-operative INR.

Methodology
This study is a retrospective chart review that includes Kaiser Permanente members on warfarin who are being monitored by the Kaiser Permanente Fontana Outpatient Anticoagulation Service and are 18 years or older with a surgery scheduled between January 1, 2012 to December 31, 2016. Inclusion criteria include having an INR goal range of 2-3 and an available pre-operative lab. Members that do not have a stable therapeutic INR prior to the procedure are excluded. Members are divided into three groups according to their average daily warfarin dose: low (≤2.5mg daily), medium (>2.5mg to <10mg daily), and high (≥10mg daily). To detect an INR difference of 0.3 with a standard deviation of 0.2 and an α =0.05, 10 patients per group per day is required to reach 82% power.

Results
Data collection is still in progress. An interim chi-square analysis was used to evaluate INRs on days 3 to 6 of the five-day hold. After holding warfarin for 3 days, 83% of high dose warfarin patients had reached a baseline INR of 1.2 or less, while only 10% and 11% of patients in the low and medium dose groups, respectively, had reached an INR of 1.2. This is not currently statistically significant with a p=0.055, however, a sufficient number of patients have not yet been reviewed to obtain the necessary power. After holding warfarin for 5 days, 63% of the low dose patients had reached the baseline INR of 1.2 or less while 100% of both the medium and high dose groups had achieved baseline (p=0.04).

Conclusion
While the study is not yet complete, it appears that there is likely a relationship between warfarin dose and required peri-operative holding duration. Once the study is completed, if a significant difference is found in the number of days required for the INR to drop in accordance with the warfarin dose, this could potentially reduce the holding duration of some patients, thus limiting the risk of unwanted thrombosis. It could also prevent surgeries from having to be rescheduled due to an INR above the desired pre-operative range. All of this can lead to improved patient care and increased cost savings.
Medication Error Rates with a Newly Implemented Integrated Glycemic Management System

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Introduction
Insulin is an essential medication for glycemic control and identified as a high-risk drug by the Institute of Safe Medication Practices. Hypoglycemic and hyperglycemic events have been associated with an increased risk of inpatient mortality and increased length of hospital stay. On March 16, 2016, Kaweah Delta Health Care District, an eight-campus, 581-bed healthcare organization based in Visalia, California, underwent a hospital-wide transition to Glytec’s Glucommander Enterprise Software for improved inpatient glycemic management for its central California patients. At its core, Glucommander is a computer program that individualizes insulin doses and optimizes insulin administration by integrating patient specific factors including height, weight, and previous blood glucose values to recommend anticipated basal/bolus insulin requirements based on its proprietary algorithm that mirrors current best practices per American Diabetes Association. However, with implementation of any new technology within a healthcare setting, the risk for both computer and human error can potentially result in adverse events. The computer software has shown positive outcomes in glycemic control thus far; however, nation-wide use is limited and studies assessing error and initial software implementation are scarce.

PURPOSE: To identify types of errors and report unanticipated implementation issues associated with Glucommander in order to better inform the Kaweah Delta Health Care District organization and other potential institutions considering similar computer software transitions for improved glycemic control.

Methodology
A retrospective chart review of approximately 1270 adult patients that received intravenous (IV) and/or subcutaneous (subQ) insulin therapy under Glucommander software management between March 16, 2016 to June 16, 2016 at Kaweah Delta Health Care District in Visalia, California was conducted. Patients 18 years old or older and continued on insulin therapy for at least 24 hours were included. Major exclusion criteria were expecting mothers, infants, and patients on inpatient insulin therapy for greater than 30 days. The primary endpoint was the rate of transcription errors of written insulin physician orders versus manual nurse inputs into Glucommander for patients that presented with a hypoglycemic or hyperglycemic event. Secondary endpoints were total number of hypoglycemic or hyperglycemic events post Glucommander implementation and comparison of manually captured error rates versus voluntarily reported errors by hospital staff. Hyperglycemia was defined as blood glucose values ≥ 180 mg/dL (10.0 mmol/L) and hypoglycemia was defined as blood glucose values ≤ 70 mg/dL (3.9 mmol/L). Types of errors were classified using taxonomy of error based on the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP). Descriptive statistics were used for analysis.

Results
While data collection and analysis remain ongoing, preliminary chart review (N=14) identify transcription errors as the most common error associated with uncontrolled blood glucose. Reports generated by Glucommander determined 293 and 969 unique incidences of hypoglycemic and hyperglycemic events post 90-day implementation, respectively. Average hypoglycemic blood glucose was 58 mg/dL and average hyperglycemic blood glucose was 255 mg/dL. Comparison of manually captured error rates versus voluntary reported errors by hospital staff has yet to be assessed.

Conclusion
We have initially observed transcription errors as the most common error associated hypoglycemic or hyperglycemic events when using Glucommander. A multitude of factors play a role in the errors identified, most notably the inconsistency in training requirements prior to software launch. Pre Glucommander values have yet to be analyzed to compare with our preliminary findings. Future studies of hospital-wide Glucommander implementation would be helpful in determining if standardization in training requirements can prevent or reduce errors and adverse events.

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A Systematic Review on Substance Abuse Prevention Programs and Reducing Over-the-Counter Medication Abuse in Adolescents

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Introduction
Adolescents are a vulnerable population susceptible to drug abuse including over-the-counter (OTC) medications, prompting adolescent substance abuse prevention programs to be created nationwide. Programs targeting alcohol, tobacco, and prescription drug abuse have demonstrated a decrease in the prevalence of abuse among adolescents. However, studies regarding programs dedicated to preventing adolescents from abusing OTC medications are currently lacking. Understanding key factors of successful prevention programs may provide opportunities for healthcare professionals, such as pharmacists, to play a role in preventing adolescent OTC medication abuse.

Methodology
A systematic search in the PubMed, Medline, National Institute of Health (NIH), and Web of Science databases was conducted on English-language articles concerning adolescent substance abuse prevention, published from January 2006 to July 2016. The studies were selected based on designated inclusion/exclusion criteria. Inclusion criteria for the systematic review included articles focused on adolescent substance abuse treatment and prevention (including direct contact with an educator or health care provider). Exclusion criteria for the systematic review included articles focusing on adolescent substance abuse treatment and prevention (including direct contact with an educator or health care provider). Exclusion criteria for the systematic review included meta-analysis, review articles, and studies where subjects were older than 18 years or conducted in a hospital/rehabilitation clinic. The outcomes of substance abuse prevention and treatment studies were evaluated using the Medical Education Research Study Quality Instrument (MERSQI).

Results
Of the 18 included studies, 11 studies were successful in decreasing the amount of substance abuse by a statistically significant margin. Fifteen studies (83%) reported the adolescent abuse rates and 17 (94%) provided objective outcome measures including assessment of knowledge or skills (15; 83%), and/or likelihood of abuse (6; 18%). Eight (44%) programs were community-based programs, whereas the remainder were school-based prevention programs. Two (11%) programs combined the two types. Some studies reported using techniques, such as motivational interviewing or cognitive behavioral therapy to improve social and behavioral attitudes (13; 72%), or involved parents (5; 28%) to help reduce substance abuse. Only 3 studies (16%) utilized health experts to help achieve program goals. Certain components that showed minimal effect on decreasing adolescent abuse rates were: lack of specialized substance abuse educators and adolescents with low/moderate risk behaviors. The mean MERSQI score was 12.44 (SD 1.60).

Conclusion
This systematic review identified several factors in deterring adolescent substance abuse. Programs utilizing multiple education sessions, social and behavioral therapy, and school-based interventions showed success in preventing substance abuse. Although many programs were effective, few utilized health experts, such as behavioral therapists, doctors, or pharmacists. This underutilization of health professionals should be explored in future studies. Overall, these essential characteristics should be considered when developing OTC medication abuse prevention programs aimed at the adolescent population.

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Evaluation of Attitudes Towards the Advancement of Community and Hospital Pharmacy Technician Roles

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Introduction
Pharmacists’ roles in California are advancing with the passage of Senate Bill 493 where pharmacists are now recognized as providers. With these advanced responsibilities, the roles of pharmacy technicians may need to follow suit to assist pharmacists with specific job functions. Currently in California, certified pharmacy technicians must pass a licensure exam from the Pharmacy Technician Certification Board (PTCB); however, their training is not standardized and their responsibilities vary significantly. Data is insufficient to determine if additional training needs to be incorporated into pharmacy technician curricula and/or licensure examinations and whether pharmacists and/or technicians are comfortable with an advanced technician scope of practice. From a 2011 survey of 12,000 pharmacists and technicians, 84% agreed that the PTCB should establish an advanced designation for technicians, and in addition 81% agreed that technicians do assist in performing tasks that help pharmacists become more available for patient-oriented services. The purpose of this study is to evaluate the attitudes of pharmacists and pharmacy technicians, in either outpatient or inpatient settings, about potential advancements to the responsibilities undertaken by pharmacy technicians.

Methodology
This study has been approved by the Western University of Health Sciences Institutional Review Board. Four surveys were created, one each for community pharmacists, community pharmacy technicians, hospital pharmacists, and hospital pharmacy technicians. Registered pharmacists or certified pharmacy technicians licensed working in either an outpatient/community or inpatient/hospital pharmacy within the state of California will be included to participate in a voluntary survey. Pharmacy student interns will be excluded. Paper surveys will be collected from the four target groups in the Southern California region. Survey items include demographics, general job satisfaction from the technicians, comfortability in specific advanced roles for technicians in the respective outpatient and inpatient settings, and a free-response section pertaining to opinions about what should be included in pharmacy technicians training. Perception questions will utilize a four-point Likert scale. All survey responses will be de-identified. Data analysis will include descriptive statistics of survey responses and chi-squared test to analyze categorical data.

Results
Our current research is in progress. Results will be submitted after data collection.

Conclusion
Research is in progress.
A Bachelor's Life for Me? The Necessity of an Undergraduate Degree for Post-Graduate Success in Pharmacy

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Introduction
Out of 132 accredited pharmacy schools in the United States, a majority do not require a bachelor's degree as a prerequisite. Various studies have been conducted on the success of pharmacy students during their pharmacy education, yet there is limited data on the success of practicing pharmacists after graduation. The purpose of this study is to evaluate the success of pharmacy graduates with and without a bachelor's degree. Success was defined through three factors: leadership, job satisfaction, and communication competency. This study is especially relevant to University of the Pacific, as it is currently the longest standing institution to offer an accredited, accelerated pre-pharmacy program. Attendees of Thomas J. Long School of Pharmacy and Health Sciences may enter the program directly from high school and complete their pre-pharmacy prerequisites in 2 or 3 years without receiving a bachelor's degree. Historically, about half of each entering pharmacy class consists of pre-pharmacy students from University of the Pacific; the other half is comprised of students who have either received a bachelor's degree, associate's degree, or have completed their prerequisites solely at a community college.

Methodology
A 28 question survey was developed and sent to approximately 1,600 Pacific alumni through e-mail lists and social media via Facebook and a biweekly alumni newsletter called the Tiger Times. Survey elements included sociodemographic information, past educational history, job satisfaction, leadership, and communication skills. The three latter factors were chosen to define success because these components are not necessarily acquired through didactic education; this may help better delineate bachelor's degree holders from non-bachelor's degree holders. Exclusion criteria to this cross-sectional study included not graduating with a Doctor of Pharmacy or equivalent degree from the University of the Pacific.

Results
107 survey responses were received. These responses were categorized into two groups: alumni who received a bachelor's degree prior to pharmacy school and alumni who did not. There was no significant differences in job satisfaction, leadership, or communication scores between these two groups (p > 0.05).

Conclusion
Results suggest that receiving a bachelor's degree prior to pharmacy school is not a factor of post-graduate success. Due to the increasing number of pharmacy schools being established in the United States, it is pertinent to evaluate the necessity, or lack thereof, of holding a bachelor's degree before entering the program. Future research would benefit from performing a qualitative analysis through focus groups in order to further explore the effects of a bachelor's degree on post-graduate success.
Factors Impacting Acceptance into Pharmacy Postgraduate Training Programs

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Introduction
With post-graduate training (i.e. residencies and fellowships) becoming more competitive to obtain, understanding the process by which student pharmacists prepare themselves for these trainings is crucial. The importance of the self-perceived readiness for residency training and the selection criteria used by pharmacy residency programs has been reported (PMID 24674909 and 22722586), but additional work is needed to understand the correlation between student preparations and acceptances into post-graduate trainings. The purpose of this study was to identify trends that resulted in higher match rates among the applicants with residencies and/or fellowships and to compare these factors to the selection criteria delineated by the resident and fellowship directors.

Methodology
A prospective survey study was completed to identify factors impacting acceptance into pharmacy postgraduate training programs. An online questionnaire was distributed to all graduating pharmacy students in California Schools of Pharmacy. The student survey collected information about student preparations for postgraduate training application including work history, roles in the workplace, leadership engagements, academics, professional practice experiences, research, involvement in policy, as well as success in obtaining any postgraduate training. In addition, a similar online survey was distributed to residency and fellowship directors that assessed their considerations of the most influential factors in choosing potential candidates for their respective programs. The surveys consisted of multiple choice, select all that apply, 5-point Likert scale and open-ended format questions. The primary endpoint of the study was to identify the factors that led to higher match rates for obtaining a residency or fellowship. The secondary endpoint was to determine if these factors correlate with the factors that residency and fellowship directors prioritize in selecting their residents and fellows, respectively.

Results
To be determined

Conclusion
To be determined
Will the Advance Practice Pharmacist (APP) Component of the Passage of SB 493 Divide the Pharmacy Profession?

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Introduction
Background
The passage of California’s Senate Bill 493 in 2013 was a monumental event for pharmacists practicing in the state. In addition to expanding pharmacists’ abilities to furnish certain medications, it created the “Advanced Practice Pharmacist” (APP) role, which would be regulated by the state’s Board of Pharmacy. These APPs can perform patient assessments, order and interpret tests, refer patients to other health providers, collaborate with other medical professionals in the management of patient diseases, and initiate, adjust, and discontinue drug therapies. Certain qualifications and training must be met and a separate licensure granted. Although the benefits of APPs is yet to be determined, we believe the current pharmacists’ beliefs and perceptions pertaining to APP status is greatly lacking in California.

Significance
This research may create a better understanding of the potential challenges and opportunities as this new licensure class of pharmacists goes into effect. GOAL: This research seeks to better understand the perceptions of pharmacists regarding the advanced practice pharmacist licensure in California. RESEARCH AIMS: 1. To characterize perceptions of key opinion leader pharmacists in California regarding the positive and negative aspects of implementation of APP licensure. 2. To determine potential communication strategies with pharmacists to better explain the role of the APP in California.

Methodology
A qualitative semi-structured key informant in-depth interview. We plan to recruit 30 key informant pharmacists geographically representative of California and representative of community and institutional practice. Participants will include regional chapter presidents of the California Pharmacists Association (CPhA), the California Society of Health System Pharmacists (CSHP) and California Pharmacy Student Leadership (CAPSLEAD) faculty advisors. The interview will include 16 open-ended questions related to the Advance Practice Pharmacist (APP). The questions will explore the knowledge, attitude, and overall perception of the key informants regarding the APP status and future implementation, which will take approximately 15–20 minutes to complete. The study period is anticipated to take place from October 2016 till December 2016.

Data Analysis
Responses will be collected by the study investigators and input directly into a secure online survey system (Qualtrics). At the conclusion of the study, data will be extracted from qualtrics and analyzed for trends and for descriptive statistics. The study investigators will be reviewing all responses and themes for agreement, and any discrepancies will be resolved via discussion. Qualitative data analysis will be done after notes were compiled.
A Survey Assessing the Acceptance of the Pay-for-Performance Model in a Segment of California Pharmacists

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Introduction
Pay-for-Performance (P4P) is a payment system in which providers are rewarded financially for the outcome of patient care. By relating monetary incentives to the value of care, P4P aims to enhance quality of provided services and work efficiency. Previously, most P4P studies focused on the effects on patient outcomes and economics, but did not look at the attitudes and general understanding of P4P among pharmacists. In this study, we surveyed pharmacists to gain an overall understanding of their knowledge, experience, and attitudes towards P4P. We investigated if having prior experience with P4P influences one’s attitude and acceptance towards this payment model.

Methodology
A cross-sectional study was performed where a 21-question survey was sent to pharmacists affiliated with the UCSD School of Pharmacy, including faculty, alumni, and volunteer faculty from all aspects of the pharmacy community in San Diego County. Data was collected over a two week period. Chi-square and Odds-ratio (OR) tests were used to assess an association between payment preference and the following factors: management experience, experience with P4P, years of practice, and familiarity with P4P. Six benefits and six problems relating to P4P were evaluated. Participants were asked to choose: strongly disagree, disagree, neutral, agree, or strongly agree with an assigned value of -2, -1, 0, +1, and +2, respectively; the summed value per question was used to assess the magnitude of the benefit and problem.

Results
Eighty-seven pharmacists participated in our survey. Fifty preferred traditional pay and thirty-seven preferred P4P. Twenty-two of them have been in practices involving P4P.

The OR analysis suggests the following will make participants more likely to prefer P4P:
1) Pharmacists with P4P experience are 50% more likely to prefer P4P
2) Pharmacists with management experience are 39% more likely to prefer P4P
3) Pharmacists with less than five years of working experience are 12% more likely to prefer P4P

The top two perceived benefits of P4P were increased collaboration among healthcare providers and the presence of a standardized approach for providing patient care. The two main challenges associated with P4P were cumbersome billing processes and increased work related stress. We also found that pharmacists with P4P experience were 40% more likely to believe P4P will be implemented in the future.

Conclusion
This study surveyed the knowledge and general attitudes of P4P in a small segment of California pharmacists. Pharmacists with P4P experience held more positive views of the system. Pharmacists without experience in the program were less supportive. Pharmacists with more than five years of experience were less accepting of the P4P model than pharmacists who possessed less than five years of practice experience. With only 87 participants, no statistical significance was reached as the study was underpowered. However, the positive responses towards P4P from those with P4P experience suggest that employers may receive more buy-in from their staff by educating them about the benefits of the model.
California Pharmacists Knowledge and Perceptions about Electronic Nicotine Delivery Systems

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Introduction
Use and awareness of Electronic Nicotine Delivery Systems (ENDS), such as electronic cigarettes (e-cigarettes), have increased considerably within the past 5 years. While the health risks of traditional cigarettes are well known and often addressed, the safety of long-term ENDS usage and their effects on public health are not yet established. Despite this fact, ENDS are marketed as safer alternatives to conventional cigarettes and have been considered as a smoking cessation tool. Because pharmacists are certified smoking cessation counselors, it is important for pharmacists to be informed about ENDS and their safety. However, information regarding pharmacists’ knowledge and perceptions of the safety of ENDS is not known.

PURPOSE: To assess pharmacists’ knowledge and perceptions about ENDS, their safety, and their use as a cessation tool in order to gain insight into what information is being given to patients and if there is a need for continuing education about ENDS for pharmacists.

Methodology
A 10 question survey was created by adapting validated questions from the Population Assessment of Tobacco and Health (2011), the National Youth Smoking Cessation Survey (2014), the Health Information National Trends Survey (2014), the Journal of the American Board of Family Medicine, the California Health Care Foundation, the Centers for Addiction and Mental Health Nicotine Dependence Survey, and Nicotine & Tobacco Research, Volume 12 (2010). The survey was disseminated via email between June 22, 2016 and August 6, 2016 to licensed pharmacists affiliated with CAPSLEAD, California pharmacy schools, or California pharmacy organizations. August 6, 2016 was chosen as the study end date because a deeming provision allowing the FDA to regulate ENDS goes into effect on August 8, 2016.

Results
Data collection is ongoing. We received 302 surveys as of July 19th, 2016; 239 of survey responses were complete. Our analysis will evaluate pharmacists’ knowledge regarding the use, safety, and regulation of ENDS prior to August 8, 2016. We will assess whether respondents’ age, years practiced, or work setting correlate with perceptions of ENDS. We expect that most pharmacists will not be familiar with ENDS regulation. We also anticipate that pharmacists between ages 18-44 will be more informed on the safety of ENDS. Lastly, we predict that pharmacists in community settings will be more likely to view ENDS as smoking cessation aids.

Conclusion
Although data collection is ongoing and conclusions cannot yet be made, the results of our study may have implications on smoking cessation training and continuing education for pharmacists. If our findings indicate that pharmacists do not know facts about ENDS safety and regulation, this may be a reason for CSHP to create a webinar that awards continuing education credits. These webinars can target practice settings or regions of California with the lowest knowledge about ENDS. Lastly, depending on how informed respondents are, it may be valuable to include information about ENDS safety and regulation in smoking cessation training material for student pharmacists. Once data collection and analysis is complete, we look forward to determining further implications and applying our results to future research.
The Impact of Telepharmacy Relating to Medication Safety in Rural Areas of California

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Introduction
Telepharmacy is the process of providing pharmaceutical care at a distance via information and communication technology. A recent decline in the number of rural community pharmacies has led to an increased demand to provide rural patients with professional health care using technology such as telepharmacy. A research study was conducted focused on patient use of telepharmacy in rural areas. The study was narrowed to a specific county in California, Yolo County, whereas 7% of the resident population is rural. The analysis of the data is aimed at determining the benefits and barriers of telepharmacy.

Purpose
To conduct an initial evaluate of rural patient and pharmacy provider telepharmacy use results to improve public health care outcomes in rural settings with limited pharmacy access.

Methodology
The research study was conducted through a database literature search (PubMed, ScienceDirect, and Ovid) concerning the implementation and use of telepharmacy in the pharmacy setting within a rural area of California. The research team analyzed database articles related to (1) the capability of telepharmacy to reach patients in rural California (2) the potential services provided by telepharmacy, and (3) the quality of care provided by telepharmacy.

Results
Quality: A study done by the UC Davis involving 6 rural hospitals across California showed that 19.2% of the patients enrolled in the telepharmacy project experienced one or more medication errors that were successfully prevented. The 2 most common sources of error were found to be lack of knowledge and unclear orders. These numbers suggest that a significant impact can be made if telepharmacy were to be implemented on a larger scale in rural areas where around the clock pharmacy access is not available. With more medication errors detected and prevented, the quality of healthcare can be greatly improved.

Cost: A study done in California after the use of telepharmacy estimated that it avoided $15,064 per week by preventing medication-related problems between three hospitals. In one year, an average of $261,109 in total cost can be avoided by one hospital with the implementation of telepharmacy. Although the installation of telehealth systems are expensive, a comprehensive study by UC Davis shows that there is a saving of $4,662 per use.

Access: Telepharmacy has the potential to be accessed virtually anywhere. With each available healthcare facility that participates in the program, even more patients living in rural areas can be reached. As shown in the North Dakota Telepharmacy Project, the increase in the quality of healthcare has the power to expand communities and create new jobs, which in turn will help develop telepharmacy and extend its reach even farther.

Conclusion
It is concluded from this study that the implementation of telepharmacy in rural areas of California, such as Yolo County, will increase patient access to care, improve medication safety, but also on the cost and access of health care. The limitations of this review include the small number of studies conducted on the use of telepharmacy in rural areas, including the state of California. The future of telepharmacy potential and growth requires additional research in multiple geographic rural areas and a broad analysis of benefits associated with improving patient access and public health outcomes.
Examining the Attitudes and Beliefs of California Pharmacists Toward Dispensing Medications Intended to be Lethal

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Introduction
California became the 5th state in the United States to legalize physician aid-in-dying, effective on June 9, 2016. The End of Life Option Act allows California physicians to prescribe a medication intended for aid-in-dying for self-administration by a terminally ill patient who are diagnosed with less than six months to live. If the aspects specified in the law are followed, the medication can be prescribed, and then dispensed by a pharmacist. This Californian law protects any health care provider involved with this process from facing civil or criminal liability as long as they are not involved in the administration of the drug. Little is known about California pharmacists’ attitudes toward the End of Life Option Act’s provisions. This study examined California pharmacists’ attitudes and beliefs toward dispensing medications intended to be lethal.

Methodology
A two-paged survey instrument was administered to California-licensed pharmacists in June and July 2016. The paper surveys were distributed person and by mail. The survey collected information on demographic characteristics (n=6 items), pharmacists’ attitude towards their role in End of Life Option Act (n=17 items), knowledge of the Act (n=4 items) and one comment section. Pharmacists rated their attitudes and beliefs on a 5-point bipolar Likert scale ranging from strongly disagree (1) to strongly agree (5). Data were entered in Microsoft Excel ® 2010 and uploaded to SPSS for analysis. Descriptive statistics were computed for all study variables. Independent t-test, and Analysis of Variance were run. A p-value of ≤ 0.05 was considered statistically significant.

Results
A total of 63 pharmacists responded, most of whom were male (n=32, 51%), considered themselves religious or spiritual (n=41, 65.1%), and practiced in an outpatient setting (n=35, 55.6%), and with an average age of 40.1 (SD=13.0) years old. Only 47.6% (n=30) of respondents agreed/strongly agreed that they were willing to personally dispense a lethal dose of medication requested by a terminally ill patient with a valid prescription, while most agreed they had the right to refuse to dispense a prescription intended to be lethal (n=56, 88.9%). Only 25.4% (n=16) of pharmacists agreed/strongly agreed that they had adequate knowledge to dispense and counsel on an End of Life Option Act drug, while most agreed that there should be more training on how to dispense and counsel these lethal medications (n=54, 85.7%). Most pharmacists agreed that they should have full access to the patient’s diagnosis and care plan when filling these prescriptions (n=53, 84.2%). Pharmacists who were not religious had higher mean attitude scores than those who were religious on six of the 11 attitude items (p<0.05). Male pharmacists had higher mean attitude scores than female pharmacists on 3 of the 11 items (p<0.05)

Conclusion
Less than half of the pharmacists were willing to personally dispense a lethal dose of medication requested by a terminally ill patient with a valid prescription. California pharmacists do not have adequate knowledge concerning the End of Life Act. More research on the main predictors of pharmacists’ willingness to dispense these medications is needed.
Introduction
Developing a culture of professionalism is one of the fundamental values advocated by professional graduate programs, including pharmacy, in order to ensure that their graduates uphold both technical and ethical standards of the profession. Despite the consensus that fostering professionalism is important, the concept is inherently abstract, and often difficult to incorporate into a pharmacy curriculum. Differences in individual perceptions influence how professionalism is defined. Individual background, age, and work experience are among the variables that may influence how one perceives professional behavior. Identifying the differences in these variables can be helpful in improving pharmacy school curricula to better integrate professionalism. The aim of this study was to evaluate which, if any, characteristics affect perceptions of professionalism within the graduate pharmacy program at Touro University California.

Methodology
A Qualtrics survey was administered to first- and second-year pharmacy students as well as faculty and staff of Touro University California College of Pharmacy to evaluate how personal traits and experiences influence perception of pharmacy student behavior with regards to professionalism. The first portion of the survey queried demographic attributes such as age, gender, work experience, and cultural background, among others. In the second portion of the survey, participants evaluated a series of scenarios and judged whether or not the behavior constituted professional conduct. Answers choices were based on a 4-point Likert scale, where the participant could describe the behavior in each question as unacceptable, somewhat unacceptable, somewhat acceptable, or acceptable. All analyses were performed using STATA, version 12. Logistic regression analyses examined factors associated with students and faculty who recognized the professional behavior in the scenario questions. An alpha value was set at 0.05.

Results
Data included 181 student responses and 40 faculty and staff responses. Of the student participants, the average age was 26.8 ± 4.3 years, with the majority being female (62%) and of Asian descent (68.7%). Of the scenarios, the question “A student skips a mandatory class session to attend a pharmacy intern job interview” resulted in responses with the greatest spread in perception of professionalism. The answers for this question were divided into 2 sets: answers indicating the behavior in this question was somewhat unacceptable or unacceptable were considered the professional response, and the remaining answers, the unprofessional response. For this question, the following variables were associated with students who gave the more professional response: no additional degrees after undergraduate studies, work experience, and high attendance at pharmacy school lectures. Students with work experience, specifically full-time positions during undergraduate education, were associated with higher expectations of professionalism (p = 0.003). Additionally, students who missed fewer than 2 lectures per month also gave the more professional answers to the aforementioned question (p = 0.016).

Conclusion
Overall, the results of this study indicate that work experience and high attendance of classes are associated with students who appropriately identified professional conduct. Considering these findings, Touro University may benefit from altering the curriculum to include more work experience simulations and enforce class attendance in an effort to imbue more professionalism in the student population.
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