Surveying Health-System Pharmacies in Alabama: What Qualities do Employers Value in a New Hire?*

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Background

Over the past several years pharmacist opportunities for employment in health-systems have changed considerably. This is due to both the expansion of clinical services and competitiveness among graduates. As student pharmacists evaluate the many career options available upon graduation, they must determine if PGY1 residency training would aid in their pursuit of their preferred career. Many clinical positions require residency training as a prerequisite; in recent years, the number of PGY1 residency programs as well as applicants has steadily increased.¹² As the demand for residencies and clinical positions increases, applicants must become more competitive and should strive to possess the knowledge, skills and characteristics which are most valued by prospective employers. The goal of this study is to determine the attributes most valued by employers from Alabama health-systems pharmacies when hiring a pharmacist.

Methods

In order to identify the qualities that employers value when hiring a new pharmacist in Alabama, ALSHP conducted a survey of health-system pharmacists throughout the state of Alabama. The survey was distributed via email to pharmacists that identified themselves with the Alabama State Board of Pharmacy as working at a hospital; follow-up emails were also distributed. Those who chose to participate in the survey were asked to provide demographic information for their institution and their position within their institution. Duplicate entries were not included when analyzing the data. If multiple entries were recorded for the same institution, only the response from the highest ranking respondent was included. The survey respondents were provided with 21 characteristics an employer might value when deciding to hire a new clinical pharmacist. Respondents were asked to rate these characteristics as highly desirable, desirable, no preference or not desirable. In order to identify which characteristics were more or less preferred, respondents were then asked to select the top 3 most important characteristics they look for when hiring. Auburn University’s Institutional Review Board approved this study.

*This research was presented at the 2016 ALSHP Summer Meeting and tied for First Place in the Pharmacist Category for the Poster Presentation Competition.
Results

Survey results were received from 28 pharmacists representing 20 of the 126 institutions throughout the state of Alabama. Only 20 surveys were included in the results due to the exclusion of duplicates or lack of fully completing the survey. Of these, 15 respondents identified themselves as a pharmacy director or manager (75%). Over-half of the institutions employ a clinical coordinator or equivalent position. The majority of institutions included were general acute care (85%), in addition to 2 pediatric institutions and 1 veteran institution. Fifty-five percent of the respondents considered their institution to be located in a rural setting, while 40% were located in the urban setting with the remaining 5% in the suburban setting (1 respondent).

The bed-size of most of the institutions represented was 100-500 bed (65%); 30% reported their institution had < 100 beds and only 1 institution reported a bed size of 501-1000 beds. Of the institutions represented, only 25% offer a PGY1 residency.

With the exception of BCPS and certified parenteral pharmacist, there was generally no preference concerning additional credentials when hiring a new pharmacist (Figure 1). Ninety percent of participants considered critical thinking, dedication and problem solving skills to be highly desirable. Communication and professional behavior were both highly desired by 85% of respondents, while being adaptable was highly desired by 80% of respondents (Figure 2).

When asked to rank the 3 values they consider to be of utmost importance, subtle differences were seen among responses from the pharmacists. The characteristics appearing in the top 3 most frequently were critical thinking (18.3%), communication (16.7%) and professional behavior (16.7%) as shown in Figure 3.

Literature utilization and patience were least likely to appear in the top 3 category (1.7%). Only 10% of respondents included technology adept, punctual, personable or dedication in the top 3 most important attributes when considering a new hire.
Figure 2: Desirability of Characteristics

Figure 3: Most Desirable Characteristics of Applicants
Discussion

This study identified characteristics considered to be the most valuable by practicing Alabama pharmacists in an applicant for a pharmacist position in their health-system practice. Of all the hospitals surveyed, the characteristics that were deemed most valuable were critical thinking, communication and professional behavior. The traits of having good problem solving skills, being knowledgeable and adaptable were considered to be the next most desirable attributes. It is interesting to note the characteristics that did not appear ranked in the top 3 most valued traits. Among these were business sense, efficient, empathetic, imaginative, leadership skills, methodical, constructive feedback and willingness to travel. Some of these less valued traits such as having business sense or being methodical may be more appreciated by pharmacists in the community setting; however, further study would be needed to address this.

Although the data from this study is difficult to interpret due to the low response rate, it is consistent with a similar study which had a higher response rate. In this study conducted by the University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, 318 pharmacists were surveyed (81 working in the clinical setting), and their findings were similar to ours. When compared to the results of our study, institutional managers and staff ranked communication most frequently (16% compared to 16.9%, respectively) followed by critical thinking (12% compared to 12.7%, respectively) and adaptable (12% compared to 10.1%, respectively).3

Attributes such as critical thinking and knowledge can be taught and tested throughout the pharmacy curriculum. However, other skills such as communication and professional behavior are more difficult to teach in the classroom setting. This study recognizes the importance of developing good communication skills in order to be a competitive applicant after graduation and suggests that incorporating communication skills within the curriculum is appropriate.

In conclusion, this study shows that critical thinking, good communication skills and professional behavior are the traits most valued by health-system pharmacists in Alabama when hiring a new graduate. It is the hope of the investigators that current pharmacy students will reflect on the results of this study and work to further develop these important attributes in order to become more competitive applicants when applying for future clinical positions.

References


Technician-Assisted Medication Reconciliation

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In 2005, Joint Commission made medication reconciliation a national patient safety goal. As a part of this goal, hospitals are required to make a good faith effort to compile a list of medications the patient is currently prescribed or using as an outpatient. Since that time, hospitals have been trying to elucidate the best process for an activity that can be both time consuming and error prone. In fact, potentially harmful medication errors that occur during an admission can be traced back to discrepancies in the patient’s home medication list.

The good news is, the participation of pharmacy personnel has been demonstrated to reduce these error rates. The bad news is, many pharmacy departments struggle to dedicate the time and expense associated with having a pharmacist perform this activity. The U.S. Department of Labor reported the annual mean wage for pharmacists in Alabama as of May, 2015 was $121,550.4 In comparison, the reported annual wage for pharmacy technicians was $27,520.5 Since 2014, Mobile Infirmary has utilized a pharmacy technician, partnering with a pharmacist, to obtain medication histories for patients admitted through the emergency department. Therefore, it makes sense that if a pharmacy technician is properly trained to obtain a medication history, it is cost-effective and can free the pharmacist up to reconcile discrepancies identified and prevent or address medication errors.

Currently, pharmacy staffs the emergency department Monday through Friday with pharmacists and technicians for 12 hours/day and 8 hours/day, respectively. Before being sent to the emergency department, technicians undergo a training pathway, directed by the emergency room pharmacist, to ensure competency. Technicians are responsible for interviewing the patient, family members, or caregivers to gather a list of medications the patient is currently prescribed and taking over the counter. Information gathered includes drug name, dose, route, frequency, indication, and time of last dose taken. The technician is also careful to note how the patient is actually taking the medication, as this is not always the same as how it is prescribed. During the patient encounter, the technician also has the opportunity to update the patient’s allergy list and identify any questions or counseling needs that the pharmacist can address. In 2015, an average of 396 medication histories per month were obtained in the emergency department. The time saved by having a technician perform medication histories, allowed pharmacists to average 192 interventions per month not related to medication reconciliation. Figure 1 shows a breakdown of medication histories and pharmacist interventions by month.

Figure 1: Medication Histories and Pharmacist Interventions
Often times there are discrepancies or large gaps in information provided by the patient or caregiver. The advantage of having a dedicated technician is they have the time to clarify these discrepancies and fill in the gaps. This is often accomplished by making calls to the patient’s pharmacy, physician, or care institution. The unfortunate truth is that workload and time constraints severely limit the ability of nurses, or even the emergency department pharmacist, from producing a thorough medication history for a significant number of patients. Most often, only the “high risk” patients have a more detailed medication history performed. These are patients with > 5 medications, those taking high-risk medications such as insulin, or who present for a reason likely relating to a home medication. Incorporating a pharmacy technician into the workflow allows for a greater number of histories to be performed that in turn increases the number of pharmacist interventions.

Once the medication history is complete, the emergency department pharmacist reviews this list, and further clarifies any discrepancies not identified by the technician. The pharmacist is then able to make recommendations to the physician regarding the continuation of the medications during admission. Also, during this review process, the pharmacist is able to identify medication issues that may relate to why the patient has presented to the hospital. In these cases, this gives the pharmacist an opportunity to make further interventions regarding the patient’s care.

Mobile Infirmary has found that the addition of a technician has improved our good faith effort to gather medication histories and perform medication reconciliation. These technicians help increase the number of medication histories obtained by pharmacy personnel which in turn allows for the opportunity to decrease admission medication errors and increase pharmacist interventions. Facilities interested in incorporating the use of a pharmacy technician into the medication reconciliation process can find a list of resources in the table below.

<table>
<thead>
<tr>
<th>Figure 2 - Resources for Medication Reconciliation Technician</th>
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<td>American Society of Health-System Pharmacy: Advanced Pharmacy Technician Roles Case Studies <a href="http://www.ashp.org/menu/PracticePolicy/ResourceCenters/Pharmacy-Techicians/Case-Studies.aspx">Link</a></td>
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Clinical services provided by inpatient pharmacies in Alabama*
*Pharmacist Category: Tied for 1st Place

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Purpose/Background: Innovative “non-traditional” clinical pharmacy services are quickly becoming an integral part of inpatient pharmacy nationwide. The objective of this study is to identify clinical services being offered by inpatient pharmacies in the state of Alabama.

Methods: This study will be submitted to the Institutional Review Board for approval. A survey of pharmacy directors, managers, and clinical coordinators will be conducted to identify the non-traditional pharmacy services offered across the state. The survey will be created using an online survey development program and distributed via email to pharmacists that have identified themselves as working at a hospital with the Alabama State Board of Pharmacy. Those who choose to participate in the survey will be asked a series of demographic questions as well as questions regarding services provided in their respective institutions. By obtaining this data, the investigators hope to identify the most common services provided, the characteristics of hospitals with robust clinical service options and the characteristics of hospitals that lack/have limited clinical services. Following closure of the survey, the data will be released to the investigators. The investigators intend to analyze and organize the data and distribute it directly to the participants of the survey as well as to the members of Alabama Society of Health-System Pharmacists via an online quarterly newsletter in order to provide pharmacists with the most up-to-date information regarding the practices of institutions throughout the state.

Results: Only 24 institutions responded to the survey with 52%, 37%, and 11% identifying themselves as rural, urban, or suburban, respectively. The urban institutions were twice as likely to offer clinical pharmacy services when compared to rural institutions. The majority of respondents indicated their institutions provided many traditional clinical services, whereas fewer institutions reported wide adoption of more progressive clinical services.

Conclusions: The low response rate makes it difficult to determine the true scope of clinical pharmacy activities in Alabama. Sharing this data with members in the state will hopefully increase awareness of what services are currently being done and where progress can be made.

An educational review of the signs, symptoms, and primary treatment of anaphylaxis: A continuing education presentation*
*Pharmacist Category: 2nd Place

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Purpose/Background: Food, insect stings, latex, and medications can trigger an anaphylactic reaction leading to a cascade of symptoms including difficulty breathing, airway obstruction, poor circulation, and skin or mucosal changes. The primary treatment of anaphylaxis is intramuscular injection of epinephrine or adrenaline. Epinephrine auto-injectors are devices that are available by prescription only and are indicated in the treatment of anaphylaxis. While many pharmacists are dispensing
auto-injectors, they may not fully understand their proper use and administration. This CE program was designed to educate pharmacists on the signs, symptoms, and primary treatment of anaphylaxis. Two epinephrine auto-injectors, EpiPen and Auvi-Q, were reviewed, properly demonstrated, and practiced by participants during the presentation. The purpose of this study was to determine the potential benefit of a CE presentation on the knowledge of practicing pharmacists for the evaluation and treatment of anaphylaxis.

Methods: There were 146 participants who anonymously completed a pre-survey before the CE presentation to assess their confidence level in several concepts involving anaphylaxis and the proper administration of epinephrine using EpiPen and Auvi-Q. At the conclusion of the presentation, the participants were required to complete a post-survey to assess their knowledge and confidence. The pre- and post-surveys were compared to determine how the pharmacists’ confidence in each concept changed after participating in the CE presentation. A t-test was utilized to compare the results between the pre- and post-survey. The p-value was obtained for each examined concept and all p-values were less than 0.05 suggesting statistical significance for every question presented on the 11-question survey.

Results: Most pharmacists reported that they had previous experience in recognizing the signs and symptoms of anaphylaxis, but were not as comfortable demonstrating the proper use of the devices. About 71% (104/146) of participants reported no previous education on the correct use of Auvi-Q, while 35% (51/146) had no education on using the EpiPen which has been the mainstay of outpatient anaphylaxis treatment. The largest improvements were seen in the participants’ confidence in using the Auvi-Q autoinjector as well as demonstrating its correct administration to patients. The results show that this CE program was beneficial to the pharmacists regardless of their past education and experience in recognizing and treating anaphylaxis.

Conclusions: With allergic reactions and anaphylaxis becoming more prevalent, it is important for pharmacists to be educated on the topic. Although pharmacists are expected to counsel patients on anaphylaxis, triggers, and proper use of the auto-injector devices, many were unfamiliar with their proper use prior to the presentation. This continuing education program showed pharmacists confidence in recognizing and treating anaphylaxis was improved after participation. While this CE program focused on one condition and its treatment, it can be expected that similar results would be seen across other educational programs presenting various disease states, medications, and new administration devices. The results also suggest that educational programs are beneficial and can lead to a better understanding of disease processes and improved confidence in being able to counsel patients among practicing pharmacists.

Evaluation of adherence to the American Diabetes Association standards of medical care in HIV-infected patients
*Student Category: 1st Place

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Purpose/Background: The primary objective of this study is to evaluate adherence to American Diabetes Association (ADA) standards of care in an HIV-infected population.

Secondary objectives include incidence of diabetes complications, assessment of control of other cardiovascular (CV) risk factors (high blood pressure and high cholesterol) and control of HIV infection.

Methods: Single-center, retrospective chart review for HIV-infected patients with diabetes in a federally-funded HIV primary care clinic. Patient charts were selected during the study period (June 1, 2014 to June 1, 2015). Electronic medical records were reviewed for demographics, laboratory monitoring (HbA1c, glucose, lipids, viral load, CD4 count) and medical information
(diabetes complications, past medical history including cardiovascular disease, current and past medication use for diabetes and HIV infection, tobacco use, blood pressure readings, diabetes standard of care related vaccines, and screening for diabetes complications).

**Results:** Of the 175 charts reviewed, the mean age was 52, 51% male and predominately African American (80%). The average duration since diabetes mellitus diagnosis was 8.5 years (39% were insulin dependent). The average current A1C value was 7.6% (range 4.6-17%). A1C monitoring occurred biannually in 46%, 7% quarterly, and 53% less frequently. A current A1C goal <7% was achieved in only 48% and 42% were able to maintain an A1C <7% during the study period. In contrast, HIV-infection was controlled in 81% of patients. In this HIV population with diabetes, 87% had hyperlipidemia, 94% had hypertension, and 15% had a history of cardiovascular disease. For CV risk reduction, 51% were on an appropriate intensity statin and 40% were untreated with a statin. Of those indicated for an ACEI or ARB 58% received treatment. Appropriate aspirin therapy was used in 40% of patients. Annual screening or referrals for eye and foot exams occurred in 47% and 42% respectively. Of the 53% evaluated for proteinuria, 33% had evidence of proteinuria. Influenza, hepatitis B and PPSV23 vaccination was received or ordered in 78%, 69%, and 91% of patients respectively.

**Conclusions:** This HIV infected population had fairly advanced diabetes with emerging complications. Adherence to the ADA standards of care was poor and highlights the need to address both glycemic control and monitoring to minimize microvascular disease. Statin therapy, ACEI/ARB, and antiplatelets were significantly underutilized to reduce cardiovascular risk in this HIV population already at high risk for cardiovascular disease. Higher vaccine adherence was likely observed due to HIV infection.

**Evaluating the use of alternative medications for the use of methicillin-resistant Staphylococcus aureus and vancomycin-resistant Enterococcus**

*Student Category: 2nd Place*

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**Purpose/Background:** Antimicrobial resistance among gram-positive organisms, particularly those caused by methicillin-resistant Staphylococcus aureus and vancomycin-resistant Enterococcus, has become a major concern. New agents effective against these organisms are available, however, to preserve their effectiveness, minimize their potential toxicities and provide cost-effective therapy, it is essential to ensure these agents are used appropriately. The purpose of this study is to determine the number of patients for which vancomycin alternatives are appropriately prescribed. The results of this study could assist in providing potential pharmacist led interventions that enhance quality of care for patients while also curbing the potential for resistance.

**Methods:** Permission to begin data collection was granted by the Institutional Human Research Review Board at the study center. A retrospective chart review was conducted from April 1st, 2014 to March 31st, 2015. The retrospective chart review took place at a community medical center and involved reviewing charts of patients who received ceftaroline, daptomycin, or linezolid. Descriptive statistics (e.g. mean, median, mode, and percentage) were used to describe the collected information. Collected data that was included: relevant patient demographics (age, race, BMI), patient allergies, indication, antibiotic therapy received (name, dose, route, and frequency of administration), previous vancomycin use, history of methicillin resistant Staphylococcus aureus, history of vancomycin resistant Enterococcus, and the vancomycin minimum inhibitory concentration, and culture data. The primary outcome measured was the number of patients appropriately prescribed vancomycin alternatives. Appropriate vancomycin indications were based upon the Vancomycin Therapeutic Guidelines: A Summary of Consensus Recommendations from the Infectious Diseases Society
of America, the American Society of Health-System Pharmacists, and the Society of Infectious Diseases Pharmacists. Appropriate vancomycin alternative indications were based on specific Food Drug Administration approved indications for daptomycin, ceftaroline, and linezolid, a history of vancomycin-resistant Enterococci, previous vancomycin treatment, or a vancomycin minimum inhibitory concentration of greater than two.

Results: A total number of 85 patient charts were reviewed. Vancomycin alternatives prescribed included: daptomycin (n=46), linezolid (n=34), and ceftaroline (n=5). Based on the primary endpoint, appropriate vancomycin alternatives were discovered to be prescribed: daptomycin (80.4%), linezolid (64.7%), and ceftaroline (100%). Vancomycin allergies were noted in 10 charts. Previous vancomycin therapy were reported in 65.9% of patients, a history of methicillin resistant Staphylococcus aureus in 22.3% of patients, and 10.6% of patients had a history of vancomycin resistant Enterococcus. Only 5.9% of the charts indicated a minimum inhibitory concentration of greater than two.

Conclusions: Based on this study, 24.7% of the patients were inappropriately prescribed ceftaroline, daptomycin, or linezolid. Results of the study help to conclude that a more strict protocol should be put into place for prescribing these three medications. Interventions that help to ensure proper use of vancomycin alternative medications will help to prevent resistance and will preserve these agents’ role in the antimicrobial armamentarium against bacterial infections.

Timing of anticoagulation in atrial fibrillation status post-acute cardioembolic stroke

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Purpose/Background: Anticoagulation is an important aspect of secondary stroke prevention in patients with atrial fibrillation who have already experienced a cardioembolic stroke. However, the risk of recurrent stroke must be weighed against the risk of hemorrhagic conversion when deciding on when to initiate anticoagulation. Studies have reported rates of hemorrhagic conversion between 2 and 4% in the first 2 weeks following an acute stroke. Two different consensus guidelines provide some guidance on initiating anticoagulation following a cardioembolic stroke, but only provide a general range of 7-14 days, with caveats for starting earlier or later depending on patient characteristics. The purpose of this study was to describe the prescribing practices at Princeton Baptist Medical Center for anticoagulation therapy in patients with atrial fibrillation status post-ACUTE cardioembolic stroke.

Methods: Our study was a single-center, retrospective study conducted by review of the electronic medical record. It was approved by the institutions human research review board. We reviewed all patients who were admitted to our institution with an acute ischemic stroke between May 2013 and September 2015. Patients were included if they were at least 18 years old, had new onset or a known history of atrial fibrillation, and were deemed to have had an ACUTE cardioembolic stroke. Patients were excluded if they had a hemorrhagic stroke or were deemed not to be a candidate for anticoagulation for any other reason. The primary outcome was time to initiation of anticoagulation from the time of last known well.

Results: A total of 106 patients were included in the study. The median time to anticoagulation in this study was 59.5 hours, or approximately 2.5 days, which is significantly sooner than the current guideline recommendations. Time to initiation ranged from 11 hours to 336 hours (or about 2 weeks). Only 8% of patients were initiated on anticoagulation within the guideline recommended time period of 7 to 14 days after an acute cardioembolic stroke. Compared to published data, our population had fewer recurrent
strokes and similar rates of hemorrhagic conversion during the hospitalization.

**Conclusions:** Initiation of anticoagulation following a cardioembolic stroke at our institution is initiated sooner than recommended by the guidelines. However, the results of this study suggest that earlier anticoagulation may provide increased efficacy in preventing recurrent strokes without significantly increasing the risk of hemorrhagic conversion.

**Assessment of the use of dual antiplatelet therapy in acute ischemic stroke and transient ischemic attack**

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**Purpose/Background:** Use of dual antiplatelet therapy (DAPT) following ischemic stroke or TIA has recently increased due to the publication of the CHANCE trial, and the update of the consensus guidelines for secondary prevention of stroke that advocate its use. We have observed a wide variety in the timing of initiation and duration of DAPT at our institution. Therefore, we sought to study the proportion of patients that received DAPT regimens consistent with the CHANCE trial.

**Methods:** This study was an IRB-approved, single-center, retrospective trial reviewing electronic medical records from August 1, 2013 to January 31, 2016 and utilized descriptive and inferential statistics. Patients were included if admitted during the previously defined time period and had an acute ischemic stroke or TIA and received DAPT during their admission. Patients were excluded if admitted with an embolic or hemorrhagic stroke or received DAPT prior to admission. The primary outcome of this study is to determine the percentage of patients with acute ischemic stroke or TIA initiated on DAPT within 24 hours and continued for 21 days.

**Results:** During the study period 260 patients received DAPT. No patients met the primary outcome of receiving DAPT within 24 hours and having it continued for 21 days. There were 104 (40%) patients that received DAPT within 24 hours, and only 1 (0.5%) patient that received exactly 21 days of DAPT. The median duration of DAPT was 30 days. When compared to patients that did not receive DAPT there were more episodes of bleeding in the DAPT group (3 vs 1), and more repeat strokes in the non-DAPT group (2 vs 0), but these were not statistically significant.

**Conclusions:** Early adoption of DAPT is evident at our institution, but education regarding the use of a more evidence-based DAPT regimen is needed.

**Pharmacist and Physician Collaboration on Diabetes Management in an Internal Medicine Clinic**

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**Purpose/Background:** To evaluate the impact of pharmacist collaboration on diabetes management in an Internal Medicine resident clinic.

**Methods:** The UAB Huntsville Internal Medicine Clinic serves as a continuity clinic for Internal Medicine Residents on the UAB Huntsville campus. Pharmacotherapy services for diabetes management are completed upon referral from the primary care physician and include collaborative drug therapy management. This case-control study identified patients referred to the pharmacotherapy clinic from July 2013- March 2015. Patients 18-65 with an initial A1c greater than 6.5% were included and patients with no followup A1c or further referral to endocrinology were excluded. Control patients were matched based on age from the same time period. Outcomes included patients at A1c goal and change in A1c.

**Results:** Thirty-five patients were included in the pharmacotherapy intervention group with 46 in the
control group. Baseline A1c was 9.4% and 8.1% in the case and control groups respectively. Average decrease in A1c was 1.2% and 0.7% in case and control groups respectively and the number of patients achieving A1c goals was higher in the pharmacy intervention group.

Conclusions: This small study demonstrates the benefit of pharmacist physician collaboration in the management of diabetes patients in the state of Alabama.

Efficacy of a voluntary addiction sensitivity training course on student pharmacists’ knowledge, skills, and empathy towards addiction.

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Purpose/Background: Study objective was to determine the efficacy an addiction and substance abuse education program on student pharmacists’ knowledge, skills, and empathy towards patients with addiction. The programming was designed to prepare student pharmacists to provide appropriate assistance and support for patients affected by drug dependencies, and to learn their role in legal and ethical decision-making in regards to addiction.

Methods: 66 students volunteered to participate in the Addiction Sensitivity Training and Certification Workshop seminar and a local 12-step meeting. All students who attending the seminar were provided a training program that contained with seminar materials and questionnaires. The booklet included a pre-and post-seminar survey and a pre-and post-12-step meeting survey. Survey domains were categorized into knowledge, skills, empathy, and professional ethics. Student surveys will be assigned a de-identified patient number and data will be recorded anonymously on a data collection sheet. Descriptive statistics will be used to analyze the results of the surveys. Statistical methods including mean, median, and others to be determined will be used to analyze the data.

Results: In-progress

Conclusions: In-progress

Utilization of a new, proprietary molecular testing panel to guide anti-infective therapy at local wound care centers—research in process

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Purpose/Background: The purpose of this clinical research project is to establish a pharmacy consulting service and improve accuracy and timeliness of anti-infective recommendations provided through the use of TEM-PCR results. Additionally, this research seeks to evaluate the impact of the TEM-PCR panel in treatment of wound infections by comparing it to the standard phenotypic culture, timeliness of culture results for treatment guidance, anti-infective therapy changes due to TEM-PCR findings, clinical interventions resulting from the consulting service, and outcomes of therapy.

Methods: Patients will undergo culture collection during admission or follow-up services at a wound care center between October 2015 and October 2016. A total of 25 TEM-PCR infectious disease panels will be utilized for this study and the program and data evaluated, retrospectively. All patients with wounds deemed clinically necessary to culture by the physician will be included, and those who are not candidates will be excluded. A standard phenotypic culture and sensitivity test and TEM-PCR panel will be conducted for each wound cultured. Upon return of the results, a pharmacist will utilize the results in conjunction with available medical records to provide clinical recommendations for anti-infective therapy. Clinicians will compare TEM-PCR panel and phenotypic culture and sensitivity results and adjust therapy when warranted. Patient charts will be reviewed to evaluate patient wound healing and clinical resolution.
Results: Currently, 13 TEM-PCR panels have been utilized on 12 patients. Clinical consultations resulted in 21 clinical interventions and a 92.3% acceptance rate. TEM-PCR returned 1.69 days sooner and identified more microorganisms than the phenotypic method. Both the TEM-PCR and phenotypic culture and sensitivity identified at least one of the same microorganisms 38.46% of the time.

Conclusions: Thus far, TEM-PCR has allowed identification of microorganisms in the presence of antimicrobials and returned on average greater than one day faster than phenotypic culture and sensitivity. These components were useful in the treatment of long-term wounds and establishment of a pharmacy antimicrobial consultation program with wound care clinics. The consultation program aided quicker guidance of antimicrobials, aided antimicrobial stewardship, and resulted in numerous clinical interventions. Acceptance of the clinical program was better than expected due to speed of identification and consistent follow up by clinicians.

Evaluation of Nebulized Heparin and N-Acetylcysteine for Burn Inhalation Injury

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Purpose/Background: Smoke inhalation lung injury is a leading cause of morbidity and mortality among burn victims due to the pulmonary damage that results from exposure to harmful chemicals. Injuries secondary to smoke inhalation stem from inflammation and direct cellular toxicity in the leading to bronchial obstruction, atelectasis and perfusion mismatch. Nebulized heparin has been utilized to reduce obstruction in patients with inhalation injuries. Current data on the use of heparin in this population are limited to small, single center evaluations that have produced conflicting results. The primary aim of this study is to evaluate the efficacy of nebulized heparin reducing the duration of mechanical ventilation burn patients with smoke inhalation injury.

Methods: This study is approved by the institutional review board. This is a retrospective, observational study which evaluated patients with evident or suspected closed space inhalation burn injury. Patients greater than 18 years old, with positive larygyscope findings for inhalation injury or known closed space injury highly suspicious for inhalation injury will be included in this analysis. Patients had to be admitted within 24 hours of injury and be mechanical ventilated for at least 24 hours. Patients will be excluded if they were pregnant, had a known hypersensitivity to heparin or acetyl-cysteine, or had care withdrawn within 24 hours of injury. The primary outcome of this study will be duration of mechanical ventilation. Secondary outcomes included will be intensive care unit (ICU) and hospital length of stay (LOS), and reintubation rates. Patients will be matched by total body surface area of burn (TBSA) within 10% as an indicator of burn severity. Continuous data will be reported as a mean or median and compared using the Student’s T-Test. Apriori α was defined as p < 0.05.

Results: In-progress.
Conclusions: In-progress

Safety and tolerability of efavirenz-based therapy in a veteran population

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Purpose/Background: Efavirenz, a non-nucleoside reverse transcriptase inhibitor (NNRTI), has been a cornerstone of human immunodeficiency virus (HIV) treatment for many years. Despite its clear efficacy, efavirenz is commonly associated with neuropsychiatric adverse effects, including nightmares, dizziness, insomnia, nervousness, lack of concentration, depression, and suicidal ideation, and was recently relegated to “alternative” status in the HIV treatment guidelines. Veterans may be at an increased risk of these adverse effects due to a high incidence of post-traumatic stress disorder (PTSD). The purpose of this study was to determine the incidence of
Efavirenz associated neuropsychiatric adverse effects in a veteran population.

**Methods:** This retrospective chart review was approved by the institutional review board. Efavirenz is most commonly used as part of the first “one pill, once daily” medication combination for HIV infection, which also includes the medications emtricitabine and tenofovir. Because this combination is the preferred formulary agent in the veteran’s health system, only the combination product was included in this study. All veterans who received at least one outpatient prescription for efavirenz/emtricitabine/tenofovir between January 1, 2006, and December 31, 2014 were included. A total of one hundred and five patients were assessed. Baseline patient demographic characteristics were obtained, including baseline psychiatric diagnoses. The primary outcome was the percentage of patients who experienced neuropsychiatric adverse effects of efavirenz that resulted in discontinuation of the drug. Frequency of discontinuation due to other causes, such as non-psychiatric adverse effects or viral resistance, was also assessed.

**Results:** Six patients originally identified for inclusion were lost to follow up and were not included in the final analysis. The majority of patients were male (95 percent) and African-American (75 percent). Forty-six percent had a documented mental health diagnosis prior to initiation of efavirenz. A total of fifty-two patients discontinued the efavirenz-based regimen for any reason (52.5 percent). Forty-one patients (41 percent) reported experiencing some form of neuropsychiatric disturbance while on efavirenz, including abnormal dreams, depression, dizziness, memory loss, and auditory hallucinations. Of these patients, twenty-two (22 percent) had to discontinue the drug due to the neuropsychiatric effects. Thirteen of the twenty-two had a baseline diagnosis of depression prior to initiation of efavirenz. Although neuropsychiatric disturbances were the most common reason for discontinuation of the efavirenz regimen, other reasons included the development of viral resistance to efavirenz (13 percent), hepatic and renal dysfunction (8 percent), and dyslipidemia (1 percent).

**Conclusions:** In this veteran population, more than half of the patients had to discontinue use of the efavirenz-based treatment regimen. The primary reason for discontinuation was neuropsychiatric adverse effects. This is consistent with what other studies have reported in the general population. Due to the high incidence of these neuropsychiatric adverse effects, as well as the overall high discontinuation rate from all adverse effects, efavirenz containing treatment regimens should be used with caution in the veteran population. Based on the results of this study, efforts are currently underway at the study site to restrict the use of efavirenz-based regimens.

**Emergency department utilization of ceftriaxone at a Veterans healthcare system**

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**Purpose/Background:** Ceftriaxone is a third-generation cephalosporin commonly utilized as an empiric treatment option in both the outpatient and inpatient settings due to its broad spectrum of activity against gram-positive and gram-negative bacteria. Although ceftriaxone remains highly susceptible to the majority of pathogens it has activity against, overuse can lead to decreased susceptibility and emergence of multidrug resistant pathogens. Furthermore, overutilization can lead to increased costs and unnecessary adverse effects. The purpose of this study was to determine the appropriateness of ceftriaxone usage in the emergency department (ED) of a veterans healthcare system.

**Methods:** This retrospective chart review was approved by the institutional review board. All veterans who received at least one dose of ceftriaxone in the ED between June 1, 2014 and June 1, 2015 were included. Three hundred and twelve patients were assessed, including patients who were admitted to inpatient care, discharged at the emergency department, or transferred to another facility. The primary outcome measured was the percentage of appropriate ceftriaxone use. Ceftriaxone usage appropriateness was determined on a case-by-case basis by examining current published guidelines and local recommendations based on the 2014 institutional antibiogram. In addition, discharge medications and medications given in combination with
Ceftriaxone were taken into account when determining appropriateness.

**Results:** The veteran patient population assessed was predominantly male (86 percent), African American (54 percent), and over the age of 50 (72 percent). Ceftriaxone was prescribed for a wide variety of indications, with upper respiratory tract infections being the most common (35 percent), followed by urinary tract infections (14 percent), skin and soft tissue infections (12 percent), lower respiratory tract infections (8 percent), chronic obstructive pulmonary disease exacerbations (6 percent), sexually transmitted diseases (4 percent), and a variety of other infections (21 percent). Ceftriaxone was judged to be inappropriately prescribed in 164 patients (53 percent). The most common reason for inappropriate prescribing was because other antimicrobials were considered first-line therapy for the indications (64 percent). Twenty-five patients (8 percent) likely did not require antibiotic treatment as patients exhibited no sign or symptoms of infection or were probably infected by a viral pathogen. Only 119 patients (38 percent) exhibited systemic signs of infection based on laboratory parameters, including temperature over 100.4 degrees Fahrenheit or a white blood count of greater than 10,000 cells/microliter.

**Conclusions:** In the ED, ceftriaxone was used inappropriately in more than half of the patients who received the drug. The literature on the prescribing habits for ceftriaxone is limited in the United States, but these results are similar to studies conducted in other countries. Attempts should be made to educate prescribers on appropriate indications for the use of ceftriaxone. Based on the results of this study, efforts are currently underway at the study site to restrict the use of ceftriaxone in the ED.
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The InPharmative Quarterly Clinical e-Journal publication provides a forum for communication of relevant information for the practice of pharmacy. The publication encourages manuscripts from pharmacists, non-pharmacist in a pharmacy setting or academia, residents, and students. Types of contributions including original research papers, reviews, program descriptions, and short descriptions of clinical controversies or patient cases. The journal encourages new authors to submit manuscripts, and foster engagement in sharing of expertise.

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Acknowledgements: We would like to thank Rachel Slaton, PharmD, for her service as a reviewer for InPhamative Quarterly. If you would like to serve as a reviewer, please email Allison at amm0085@auburn.edu.