

Resident Research

2010–11



University of Pittsburgh
School of Pharmacy

Table of Contents

Message from the Dean	1
Valuing Our Partners	2
School Mission and Vision	2
Pharmacy Residency Research Program	3
2010–11 School of Pharmacy Residents	4–36
Amanda S. Agnew	4
Scott V. Anderson	5
Michael J. Armahizer	6
Johanna Bezjak	7
Anthony M. Casapao	8
Brandon C. Conforti	9
Nicole N. D’Antonio	10
Sandeep Devabhakthuni	11
Anthony M. DiCriscio	12
Hany S. Edward	13
Garrett Eggers	14
Christine Eisenhower	15
Matthew J. Felbinger	16
Christine L. Fisher	17
Jorge J. Garcia	18
Elizabeth H. Ghebreselassie	19
Lauren E. Goldberg	20
Angelo J. Greco	21
Matthew T. Jenkins	22
Meredith G. Jernigan	23
David Johnson	24
Yardlee S. Kauffman	25
Jenny J. Kim	26
Gretchen M Kipp	27
Brian R. Lohr	28
Leyner Martinez	29
Elaine R. Mebel	30
Nicholas Owens	31
Theodore E. Pikoulas	32
Giavanna Russo-Alvarez	33
Ibrahim A. Sales	34
Sarah J. Steinhardt	35
Ted J. Turner	36
Pharmacy Residency Programs	Inside Back Cover
Contact Information	Inside Back Cover

Message from the Dean

Patricia D. Kroboth, PhD

Dear Members of the Resident Class of 2011,

Congratulations! As individuals, you have distinguished yourselves among pharmacy practitioners by choosing residency training...and completing it. Further, you have placed yourselves among an elite few who have completed a school of pharmacy-based residency program. You have learned not only the basics of practice but also elements of teaching and research to prepare you for your careers. You have had the best of the academic and practice worlds because the School and its partners—UPMC Presbyterian Shadyside, UPMC St. Margaret, UPMC Mercy, UMPC Health Plan, Rite Aid, and CVS Caremark—have provided the rich environments for your residency experiences and learning. You have enriched each other with your pharmacy backgrounds from Alabama, Florida, Georgia, Illinois, Indiana, Maryland, Michigan, Nevada, North Carolina, Pennsylvania, Rhode Island, South Carolina, and Wisconsin.

You also have another distinction: as a class of residents, you made a commitment to learning clinical research skills through the Pharmacy Residency Research Program. The commitment is an investment that has already reaped benefits for you and that will continue to bring you distinction. During your career, you will be faced again and again with clinically important questions. The skills you learned created a foundation on which to build answers—and to become tomorrow's leaders in pharmacy.

Your final distinction? You each have just become an alumnus of our University of Pittsburgh School of Pharmacy Residency Program and will forever be a part of our community.

Congratulations, good luck, and keep in touch!

A handwritten signature in black ink that reads "Patricia Kroboth". The signature is written in a cursive, flowing style.

Patricia D. Kroboth, PhD

Valuing Our Partners

The University Pittsburgh School of Pharmacy values our partnerships with the University of Pittsburgh Medical Center (UPMC), the UPMC Health Plan, Rite Aid, and CVS Caremark. It is through these partnerships that the residency program has grown in national reputation.

The University of Pittsburgh Medical Center is ranked among the top thirteen of “America’s Best Hospitals” according to the 2010 *U.S. News & World Report* rankings and is one of the leading integrated health care delivery systems in Western Pennsylvania. UPMC Presbyterian Shadyside, UPMC Mercy, and UPMC St. Margaret hospitals participate in our residency programs.

UPMC Health Plan is the second largest insurer in Western Pennsylvania and in 2009 was ranked as the best in customer service in the region by J.D. Power and Associates. *U.S. News & World Report* ranked UPMC Health Plan in the top 10 percent of all commercial plans across America.

Rite Aid Corporation is one of the nation’s leading drugstore chains with nearly 4,800 stores in 31 states and the District of Columbia, with a strong presence on both the East Coast and West Coast, and 97,000 associates. Rite Aid is the largest drugstore chain on the East Coast and the third largest drugstore chain in the United States.

CVS Caremark is the nation’s premier integrated pharmacy services provider, combining one of the nation’s leading pharmaceutical services companies with the country’s largest pharmacy chain. CVS Caremark drives value for pharmacy services customers by effectively managing pharmaceutical costs and improving health care outcomes through its retail stores, pharmacy benefit management division, and mail service and specialty pharmacy division.

School Mission and Vision

The School of Pharmacy is committed to improving health through excellence, innovation, and leadership in education of pharmacists and pharmaceutical scientists, in research and scholarship, in care of patients, and in service to our communities.

Our vision is to be an outstanding school of pharmacy, renowned for excellence in discovery and advancement of science-based use of medicines and other interventions to enhance the vitality and quality of life.

Pharmacy Residency Research Program

Sandra L. Kane-Gill, PharmD, MSc, FCCM, FCCP Director, Resident Research Series

The Residency Research Program at the University of Pittsburgh School of Pharmacy incorporates a structured educational series with longitudinal research working groups. This approach provides a foundation for performing research, gives appropriate mentorship, fosters interactive discussions, allows peer critiques, and requires individual accountability for each resident project. Within the framework of the Residency Research Program, residents are responsible for the completion of all aspects of their project, from conceptualization to final manuscript preparation, with strict emphasis on personal accountability for the progress of their projects. The projects completed this year were highly patient-centered including topics such as medication safety, education, quality of care, and outcome assessments. Once again, this year's residents responded in outstanding fashion, demonstrating a true sense of personal ownership in their work.

The Residency Research Program requires residents to be certified in research fundamentals through the University of Pittsburgh, participate in valuable lectures geared toward the scientific development and management of their projects, and learn to effectively communicate their project in both verbal and written formats. Overall, our Residency Research Program contributes to the diversity of residency training at UPMC in collaboration with the University of Pittsburgh School of Pharmacy, which ultimately results in well-rounded candidates eligible for a wide range of career opportunities.

The success of this program is a result of the efforts of the working group facilitators and other major contributors: Kim Coley, Shelby Corman, Amy Donihi, Kerry Empey, Philip Empey, Tanya Fabian, Trish Klatt, Jason Markuss, James Natale, Janice Pringle, Robert Simonelli, Susan Skledar, Pamela Smithburger, and Melissa McGivney. Amy Seybert, interim chair of the Department of Pharmacy and Therapeutics, must also be recognized for her dedication to the program. We greatly appreciate the continued support of Dean Patricia Kroboth and Senior Associate Dean Randall Smith. We would like to thank Melissa Saul for her contributions to data management for several of the retrospective database projects. We would be remiss not to mention the fine administrative support of Kathleen Woodburn. Most importantly, this program is successful because of the commitment of our outstanding residents and faculty advisors.

Venous Thromboembolism (VTE) Prophylaxis in Hospitalized Cancer Patients

Agnew AS, Petro DP

PURPOSE

Patients with active cancer have at least a four-fold greater risk of venous thromboembolism (VTE) compared to non-cancer patients. VTE is associated with adverse medical consequences including increased mortality. American College of Chest Physicians practice guidelines recommend routine thromboprophylaxis for cancer patients bedridden with an acute medical illness similar to other high-risk medical patients. However, a prospective U.S. DVT registry found that only 28% of patients with cancer received VTE prophylaxis. This evaluation was conducted to determine if hospitalized cancer patients at our institution with VTE confirmed by venous sonography or radiographic evidence received subcutaneous low molecular weight heparin (LMWH), unfractionated heparin (UFH), or fondaparinux for primary prevention of VTE as recommended by the 2008 Chest guidelines.

METHODS

A retrospective, electronic chart review of cancer patients admitted to UPMC Shadyside between January 1, 2009, and March 31, 2010, was conducted. All data was de-identified by a certified honest broker prior to review by the investigators. Hospitalized patients were included if they were admitted to a hematology/oncology service, had confirmation of VTE by venous sonography or radiographic evidence, and were over the age of 18.

RESULTS

Overall incidence of VTE in this study was 2.3% (82/3528). In this study, 43% (19/44) of patients who developed VTE during hospitalization received VTE prophylaxis. However, 48% (12/25) of patients who developed VTE during hospitalization failed to receive VTE prophylaxis as recommended by the 2008 Chest guidelines.

CONCLUSIONS

Increased adherence to the 2008 Chest guidelines for VTE prophylaxis in hospitalized cancer patients may help prevent development of VTE and associated morbidity and mortality in this patient population.



Amanda S. Agnew, PharmD, BCPS

Amanda received her PharmD degree from the Duquesne University Mylan School of Pharmacy in 2009 and completed a PGY1 pharmacy practice residency at UPMC Mercy in 2010. Upon completion of her PGY2 hematology/oncology pharmacy residency at UPMC Shadyside, Amanda will practice as a hematology/oncology clinical pharmacy specialist at the Hillman Cancer Center in Pittsburgh.

Faculty Mentor: Timothy Brenner, PharmD, BCOP

Outcomes Associated with the Ongoing Optimization of an Automated Pharmacy Carousel System

Anderson SV

PURPOSE

Studies assessing pharmacy automation via an automated pharmacy carousel system (APCS) show the technology as a method to decrease some dispensing errors by 0.1 to 0.46 percent, reduce staffing by 2.6 full-time equivalents, and decrease inventory carrying cost by \$25,059, all while showing a neutral effect on first dose dispensing. Despite these positive outcomes there is no published data reporting development of the pre-implementation mapping and workflow, or post-implementation optimization of these processes, for APCS technology. In addition, there is no published data reporting pharmacy staff satisfaction with an APCS. Ongoing optimization of the layout and operation of an APCS after its implementation may be a method to increase medication fill efficiency and increase pharmacy staff satisfaction.

METHODS

A combination of prospective and retrospective time collection was used for this study. Fill times for requested dose and cart fill manual pick medications were measured on implementation, three weeks post-implementation, and six weeks post-implementation of the APCS. Optimization events involving workload balance and staffing occurred prior to the three- and six-week measurements. At each of the three stages listed above, a five-question, seven-level Likert-scale satisfaction survey was administered to the technicians

with the closest working relationship to the APCS. Data collected from each stage was compared to baseline data to identify trends.

RESULTS

From implementation to six weeks post-optimization, fill times were reduced by 10 seconds for requested dose picks and 6 seconds for cart fill manual picks. All time measurements were higher than baseline measurements. Overall satisfaction with the APCS was unchanged over the six week period.

CONCLUSIONS

Ongoing optimization of the APCS resulted in increased fill time efficiency without changing user satisfaction.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Scott V. Anderson, PharmD

Scott is originally from Minneapolis, Minn., and earned his PharmD degree in 2010 at the University of Illinois in Chicago. Prior to pharmacy, he earned a BA in journalism (strategic communication) at the University of Minnesota–Twin Cities. During his two-year residency, Scott is enrolled in the Master of Science in Pharmacy Administration program and would like to focus on IT, informatics, and operations.

Faculty Mentors: Kelley A. Wasicek, RPh; Scott M. Mark, PharmD, MS, MEd, MPH, MBA, FACHE, FASHP, FABC

Improving Drug-Drug Interaction Identification Software

Armahizer MJ, Kane-Gill SL, Smithburger PL, Seybert AL

PURPOSE

Computerized prescriber order-entry systems utilize clinical decision support software (CDSS) and automated alerts to prevent drug-drug interactions (DDIs). These systems have limitations, such as alert fatigue, which may cause clinicians to inadvertently bypass significant alerts. Additionally, DDI databases may inappropriately categorize DDI severity, whereas clinicians with knowledge of a specific patient population should be able to better assess DDI severity. There is a substantial opportunity to improve the knowledge base of DDI alerts to reduce the noise and generate meaningful alerts. The overarching goal of this project was to assist with the modification of the knowledge base for the institution's DDI CDSS. The objective was to compare DDI severity based on clinician opinion and proprietary database determinations in the context of the patient's clinical status and compare different clinicians' opinions.

METHODS

This project was approved by the UPMC Total Quality Council as a quality improvement evaluation. This was a single-center, prospective evaluation of DDIs at a large, tertiary care academic medical center conducted between October 11, 2010, and November 5, 2010, in a 10-bed cardiac intensive care unit (CCU). Drug-drug interactions were identified by a pharmacist (MJA) using two proprietary databases. The physicians (attending and fellow) and pharmacists (rounding pharmacist and dispensing pharmacist) caring for the patients evaluated the DDIs for severity while incorporating their clinical

knowledge of the patient. Severity was ranked on a scale ranging from A to D and X.

RESULTS

A total of 61 patients were included in the evaluation and experienced 769 DDIs, of which 419 were unique. The most common DDIs included: aspirin/clopidogrel (n=21, 2.7%), aspirin/insulin (n=21, 2.7%), aspirin/furosemide (n=19, 2.5%), aspirin/heparin (n=19, 2.5%), and aspirin/nitroglycerin (n=19, 2.5%). The pharmacists ranked the DDIs identically 73.8% of the time, compared to the physicians who agreed 42.2% of the time. Pharmacists agreed with the more severe proprietary database score for 14.8% of DDIs versus physicians at 7.3%. Among the five DDIs that were considered contraindicated by the proprietary database, two were rated as category B (minor severity/no action needed) and three as category C (moderate severity/monitor therapy) by the majority of the reviewers. Upon review of all DDIs, it was found that clinicians agreed with the proprietary database 20.6% of the time, while 77.3% of the time clinicians ranked the DDIs lower than the database.

CONCLUSIONS

Proprietary DDI databases generally label DDIs with a higher severity rating as compared to clinicians at the bedside who are caring for patients. Developing a DDI knowledge base for CDSS requires careful consideration of the source of the severity information to avoid excessive alerts and create clinically meaningful alerts.



Michael J. Armahizer, PharmD

Michael graduated from the Duquesne University Mylan School of Pharmacy in 2009 and completed a PGY1 pharmacy practice residency at UPMC Presbyterian. After completing a PGY2 critical care pharmacy residency at UPMC, Michael will join UPMC Presbyterian in the Cardiothoracic Intensive Care Unit, while also serving as an adjunct faculty member at the University of Pittsburgh School of Pharmacy.

Faculty Mentors: Sandra Kane-Gill, PharmD, MS, FCCM, FCCP;
Amy L. Seybert, PharmD, FASHP

Impact of Computerized Physician Order Entry on Medication Errors

Bezjak JD, Simonelli RJ

PURPOSE

Prescribing errors are a main source of medication-related errors and adverse drug events. Computerized physician order entry (CPOE) can potentially reduce the number of medication errors by eliminating transcription issues, linking orders to drug interaction software, and facilitating drug monitoring. Comparing the number and nature of medication errors at UPMC Mercy before and after CPOE implementation will help assess the impact of this technology and its effect on patient safety.

METHODS

UPMC Mercy completed implementation of CPOE in April 2010. An observational review of medication event reports before and after CPOE implementation was conducted. Patient safety reports were obtained from the hospital's Risk Management office from January to March of 2010 and 2011 to examine the number of prescriber and pharmacy-related medication error occurrences by month. Additional data were collected from staff pharmacists in an effort to identify specific types of medication errors encountered at order verification.

RESULTS

There was a slight decrease in documented medication errors following CPOE implementation; however, overall the rates were similar. Pharmacists identified 111 total errors from January to March 2011, preventing 98% of these events from reaching the patient.

CONCLUSION

Similar medication error rates were found at UPMC Mercy when assessing three-month time periods before and after CPOE implementation. Although the advantages of CPOE cannot completely eliminate human flaws, errors that are identified represent opportunities for system improvements.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Johanna Bezjak, PharmD

Johanna is from Salisbury, Md., and received her PharmD degree from the Duquesne University Mylan School of Pharmacy in 2010. After completing a pharmacy practice residency at UPMC Mercy, she plans to practice in a clinical setting and eventually pursue a role in academia.

Faculty Mentor: Robert J. Simonelli, PharmD

In Vitro Susceptibilities of Fosfomycin Against Enterobacteriaceae Producing KPC-type Beta-Lactamases

Casapao AM, Potoski BA, Doi Y, Pasculle AW

PURPOSE

Enterobacteriaceae producing *Klebsiella pneumoniae* carbapenemase (EP-KPC) are increasingly recognized as a cause of multidrug-resistant infections. Optimal antimicrobial therapy has not been established and only a limited amount of drugs demonstrate activity. Currently there are no antimicrobials in advanced development for these resistant pathogens. Fosfomycin (FOS) exhibits a broad spectrum of bactericidal activity especially to *Escherichia coli* (ECOL). This study was performed to analyze the *in vitro* activity of FOS against EP-KPC isolates from UPMC Presbyterian Shadyside and compare the interpretation of disk diffusion to agar dilution (gold standard method).

METHODS

This *in vitro* study was designed to test FOS susceptibility against UPMC's EP-KPC clinical isolates collected from a database. FOS susceptibilities were evaluated by minimum inhibitory concentration (MIC) done by agar dilution and compared to disk diffusion method read on the BIOMIC Image Analysis System using Clinical Laboratory Standards Institute's breakpoints for ECOL cystitis.

RESULTS

Among the EP-KPC, 67 were *Klebsiella pneumoniae* (KLPN) and 11 were ECOL. By agar dilution, 87% of EP-KPCs were susceptible to FOS, with MIC_{50/90} of 32/128

mcg/mL, respectively (MIC range: 0.05-256mcg/mL). The ECOL and KLPN isolates presented 91% and 87% susceptibility rates to FOS, respectively. By BIOMIC Image Analysis, 91% of all EP-KPC were susceptible to FOS, with MIC_{50/90} of 27/169 mcg/mL, respectively (MIC range: <0.66 to >512 mcg/mL). Sixty-one isolate BIOMIC MICs (78%) were equal to or within ± 1 dilution of the agar dilution method. Discordant results were: 9 (11.5%) minor errors and 1 (1.28%) very major error; no major errors were found. All discordant results came from KLPN except 1 minor error from ECOL.

CONCLUSIONS

ECOL-KPC MICs were lower compared to KLPN-KPCs, with a MIC₉₀ of 1 mcg/mL. Disc diffusion results may not be reliable when MICs are close to the breakpoint for FOS, especially with KLPN producing KPC strains. FOS may be an appropriate alternative agent for EP-KPC, especially for ECOL producing KPCs. Lower FOS MICs are found with ECOL, and FOS may be an agent of choice with ECOL producing KPC cystitis.



Anthony M. Casapao, PharmD

Anthony grew up in Chicago, Ill., and earned his BS in biomedical science at Midwestern University in 2005 and his PharmD at Wingate University School of Pharmacy in 2009. He then completed a PGY1 pharmacy residency at St. Vincent's Medical Center at Jacksonville, Fla., in 2010. After completing his infectious diseases residency, Anthony will continue his training as an infectious diseases fellow at Wayne State University.

Faculty Mentor: Brian A. Potoski, PharmD, BCPS (AQ-ID)

An Analysis of Antihypertensive Medication Adherence Among Patients Receiving Prescriptions Through a 90-day Maintenance Program at Retail Compared with Mail Order

Conforti BC, Mark SM, Culley CM, Harp F, Hutchins D

OBJECTIVES

Focusing on the cost, quality, and access of health care: to evaluate antihypertensive medication adherence of patients enrolled in a new pharmacy benefit, CVS Caremark's Maintenance Choice, and compare adherence rates based on medication acquisition through retail and mail-order channels. Since prescription therapy is an integral component of hypertension management, an important question arises: does appropriate adherence to antihypertensive medications provide an overall net economic value to health care? CVS Caremark, the largest provider of prescriptions in the nation and major pharmacy benefits manager, is in a unique position to further assess this imperative question as it provides a cost-neutral equivalent to standard mail order that may lead to increased medication adherence and improved health outcomes. Therefore, a study to evaluate a vital health determinant, medication adherence, and discover an economically efficient factor for improvement, anticipated to be Maintenance Choice, will provide value to the health care industry—providers, patients, and payers included. With cost being constant, it is hypothesized that overall adherence will increase from choice, and the retail channel will have greater rates due to higher quality care and increased access.

METHODS

The aims of the study are to (1) calculate and compare the medication possession ratio (MPR) of prescriptions for key antihypertensives based on channel, (2) quantify the number of prescriptions for key antihypertensives changed to another antihypertensive, in non-adherent patients (MPR < 80%), and (3) re-calculate the MPR to determine overall adherence (MPR ≥ 80%) of patients to antihypertensive therapy viewing changes in drug therapy to another antihypertensive as continual adherence. The study period included a 6-month pre-period, a 3-month index window, and a 9- to 12-month evaluation period. The key antihypertensives reflect medications determined to be the most commonly prescribed agents for the treatment of hypertension by combining information from JNC-7 and CVS Caremark's Primary/Preferred Drug List with the primary researcher's clinical judgment. The key antihypertensives include HCTZ, amlodipine, select ACE-Is and ARBs, and their HCTZ combinations.

PRELIMINARY RESULTS

The MPR results for patients indexed on key antihypertensives and for suspected switched therapy in the non-adherent population will be recorded and compared based on channel as well as patient age, sex, geographic region, and automatic refill status.



Brandon C. Conforti, PharmD

Brandon is a graduate of Wilkes University, in Northeastern Pennsylvania. He earned an MS in pharmacy administration and completed a two-year residency at the University of Pittsburgh in partnership with CVS Caremark. He will be taking on the role of pharmacy supervisor in Southeastern Massachusetts.

Faculty Mentor: Scott Mark, PharmD, MS, MEd, MPH, MBA, FACHE, FASHP, FABC

Evaluation of an Electronic Medical Record Warfarin Flowsheet Within a Family Medicine Residency Program

D'Antonio NN, Farrah RM

PURPOSE

The 2009 American Recovery and Reinvestment Act may accelerate the pace of Electronic Health Record (EHR) adoption by providers because it includes funding to promote implementation of electronic systems. Among the many functions of EHRs, providers use these systems to document and manage patients on warfarin therapy. However, in practice, accurate electronic warfarin documentation is a challenge due to issues such as multiple users, irregular use, limited training, and many data entry points. Consequently, necessary information that guides anticoagulation decision-making can be absent, misinterpreted, and incompatible with office visit notes. This two-year research project aims to provide an analysis of the accuracy of an existing and alternative electronic warfarin documentation system and to determine a workflow that works best for our facilities.

METHODS

A pre-survey was distributed to physicians, nurses, and pharmacists in order to evaluate provider perspectives about documenting anticoagulation information. A retrospective chart review was performed on patients receiving warfarin therapy comparing office visit notes or telephone notes to an existing warfarin flowsheet. An alternative electronic workflow was then developed and implemented, and will be retrospectively reviewed for warfarin documentation. A post-survey will be distributed to the same providers to evaluate the alternative workflow.

RESULTS

Pre-survey results show that 43.6% of providers were uncomfortable with the initial warfarin documentation system. The anticipated date of the chart review of existing and alternative documentation workflows and post-survey is fall 2011. Accuracy rates for flowsheets at the office visit level and the patient level will be calculated for the initial and alternative workflows. Common reasons for inaccuracy, provider comfort, and perception of time and difficulty involved with documentation will also be collected.

CONCLUSIONS

As the number of primary care providers using EHR increases, practice-specific workflows will need to be created. The results of this study will describe two electronic warfarin workflows in order to improve accurate warfarin documentation and effective warfarin management.

Presented at the 44th Society of Teachers of Family Medicine Annual Spring Conference, New Orleans, La., 2011, and the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Nicole N. D'Antonio, PharmD

Nicole earned her PharmD at the Duquesne University Mylan School of Pharmacy. After completing a PGY1 pharmacy practice residency at UPMC St. Margaret, she will continue at the same institution for a PGY2 residency in family medicine. Outside of pharmacy, Nicole enjoys good food and wine, playing tennis, outdoor activities, traveling, and spending time with family and friends.

Faculty Mentor: Roberta Farrah, PharmD, BCPS

Reliability and Validity of Performance Assessment in Human Patient Simulation

Devabhakthuni S, Kane-Gill SL, Smithburger P, and Seybert AL

BACKGROUND

For the past decade, health care educators have advocated for curriculum reform that focuses on competency-based objectives including critical thinking, communication, and interdisciplinary skills. To support these reforms, academic organizations in medicine, nursing, and pharmacy have emphasized the need for standardized assessment measures to ensure student learning and achieve professional competencies.

PURPOSE

Individualized standardized assessments often require multiple evaluators due to large class sizes and time constraints. Unfortunately, clinical competence in a simulated setting is often evaluated by assessment measures that have not been subjected to rigorous tests of reliability or validity. The purpose of this study was to evaluate the reliability and validity of a simulation-based performance assessment tool designed to test clinical competence.

METHODS

A prospective evaluation of a performance assessment tool for 16 students enrolled in the Acute Care Simulation course offered by the University of Pittsburgh School of Pharmacy was conducted. In this course, students learn by patient case scenarios programmed into the human patient simulator (HPS), which is a high-fidelity simulator that is capable of physiologic responses. For

summative assessments, each student was required to perform two HPS assessments with different patient case scenarios for each assessment (midterm and final). The investigators evaluated content validity of the assessment tool by examining the core behaviors (e.g., communication, critical thinking, etc.) intended to be addressed in the summative evaluation. Three faculty evaluators formally assessed the students using the performance assessment tool through both live and videotaped sessions. The calculated scores from the assessment tool were then compared using tests for inter-rater and intra-rater reliability.

RESULTS

Videos are currently under review.

CONCLUSIONS

The results will provide insight into the reliability of multiple-evaluator assessments using a standardized tool for human patient simulation cases.



Sandeep Devabhakthuni, PharmD, BCPS

Sandeep received a BE in biomedical engineering and a PharmD degree from the University of Pittsburgh. He then completed his PGY1 training at the University of Maryland Medical Center. After finishing his PGY2 cardiology/critical care pharmacy residency at UPMC, he will join the faculty at the University of Maryland School of Pharmacy as an assistant professor and clinical pharmacist in cardiology and critical care. In his spare time, he likes to engage in outdoor activities including biking, hiking, and tennis.

Faculty Mentors: Sandra L. Kane-Gill, PharmD, MS, FCCM, FCCP;
Amy L. Seybert, PharmD, FASHP

Defining Medication Therapy Management Opportunities for Community Pharmacists: An Analysis of Pennsylvania Medicare Part D Programs

DiCriscio AM, Harriman McGrath S, Pringle JL, Turner TJ, Somma McGivney M

PURPOSE

Multiple medication therapy management (MTM) programs throughout the country have developed and have maintained success by working with key stakeholders to identify and address unmet clinical needs in the community. The intent of this project is to aid the Pennsylvania Pharmaceutical Care Network (PPCN) in identifying such opportunities for Pennsylvania pharmacists to provide MTM services and gain compensation by caring for patients enrolled in Pennsylvania-based Medicare Part D plans.

METHODS

A cross-sectional, qualitative study design was utilized to identify opportunities for community pharmacists in Pennsylvania to implement MTM services within Pennsylvania-based Medicare Sponsor plans. Semi-structured interviews were completed with key-informants from each of the qualifying Medicare advantage plan sponsors. The interviews were based on four domains: (1) unmet MTM-related needs of sponsors, (2) utilization of pharmacists to provide MTM, (3) opportunities to engage community pharmacists, and (4) programmatic requirements or opportunities for the contracting of MTM services. Each interview was recorded and later transcribed. A qualitative analysis is ongoing. Themes will be identified using the principles of grounded theory and analyzed using ATLAS software.

RESULTS

Four of the seven targeted Medicare sponsors responded to our invitation and were subsequently interviewed. Six key informant interviews were completed. Preliminary analysis of those interviews demonstrated that most of the sponsors felt that the utilization of community pharmacists to provide MTM-type services would be beneficial. Representatives identified potential unmet needs as being related to transitions of care, patient education, high medication costs, and access to health care. Systems to address these gaps in care should be collaboratively addressed by both the PPCN and Medicare Sponsors.

CONCLUSION

Opportunities do exist for the PPCN and community pharmacists to provide MTM services specifically in current gaps of care where medication-related errors most commonly occur. The results of this work can be used as the foundation to build the clinical service offerings of the PPCN.

Presented at the American Pharmacists Association Annual Meeting and Exposition, Seattle, Wash., 2011.



Anthony M. DiCriscio, PharmD

Anthony received his PharmD degree from the University of Pittsburgh in 2010. Outside of pharmacy, Anthony enjoys spending time with friends and family, sports, and the great outdoors. Upon completing his PGY1 community pharmacy residency with the University of Pittsburgh School of Pharmacy and the Rite Aid Corporation, Anthony plans to provide clinical services in the community setting and pursue a master's degree in business administration.

Faculty Mentor: Melissa McGivney, PharmD, FCCP

Surveying Industries on Authentication and Anti-counterfeiting Techniques

Edward HS, Mark SM

PURPOSE

Authentication and anti-counterfeiting of medications have become a global safety issue. The United States is an especially attractive market for counterfeiters because 40 percent of worldwide annual prescription drug sales were sold in the United States in 2007. While radiofrequency identification (RFID) has improved current pharmaceutical industry packaging identification, it does not authenticate the physical product or medication. With technology continuing to advance, counterfeiters can easily mimic packaging including RFID. Finding additional ways to authenticate medications, in addition to packaging, would be a synergistic mechanism with RFID to put a stop to global medication counterfeiting.

METHODS

An online survey will be administered to various pharmaceutical and non-pharmaceutical industries to gather information on their existing anti-counterfeit techniques. These findings will be used to determine if pharmaceutical industries could benefit from non-pharmaceutical industry anti-counterfeit techniques.

RESULTS

Survey responses will be summarized, including current anti-counterfeiting practices, average efforts of industry strategies, anti-counterfeit industry perceptions, supply chain steps, and average cost of research and development.

CONCLUSIONS

It is anticipated that the results of a survey of non-pharmaceutical industries affected by counterfeiting will benefit pharmaceutical companies by providing a broad summary of methods to consider for authentication of medications. Information from the survey will be used to improve the authentication of medications.



Hany S. Edward, PharmD

Hany received his PharmD degree with a minor in business administration from Florida A&M University in 2010. Hany enjoys being with friends and family, traveling, and loves college sports. Hany is continuing his two-year health-systems pharmacy administration PGY1/PGY2 residency with UPMC while pursuing an MS in pharmacy administration from the University of Pittsburgh School of Pharmacy.

Faculty Mentor: Scott M. Mark, PharmD, MS, MEd, MPH, MBA, FACHE, FASHP, FABC

Patient Preferences of Outpatient Pharmacy Services at an Underserved Clinic

Eggers GG, Valenti M, Cerussi N, Connor S, Jancel M, Hrinya M, Mark SM

PURPOSE

Clinics that serve indigent and underserved populations face significant economic challenges, including lower reimbursement rates (due to a high proportion of Medicaid patients), defaulted cash payments, and a high volume of charity-care patients. As a result, these clinics must find ways to create new revenue streams and decrease costs in order to remain economically viable. One way underserved clinics can increase revenue and decrease costs is through the 340B drug pricing program. Facilities that qualify for 340B pricing are referred to as “covered entities.” One challenge facing covered entities is maximizing the outpatient prescription capture of insured patients. In a central fill 340B model, a contract pharmacy performs the inventory management, billing, prescription filling, and dispensing for the covered entity that writes the prescriptions. The reimbursement and copayment received for the prescriptions is transferred to the covered entity, and the covered entity then pays the contract pharmacy for the cost of the inventory at the 340B purchase price, as well as a predefined dispensing fee. If a covered entity has a high proportion of uninsured patients receiving their outpatient prescriptions through the contract pharmacy, then it will struggle to make this business profitable. By increasing the share of insured patients receiving outpatient prescriptions, an underserved clinic can increase profitability generated from outpatient prescriptions. A recent study showed that implementing a \$4 generic program at a 340B

pharmacy increased prescription volume, indicating that price has a significant effect on patient pharmacy selection. However, the primary reason patients who are seen at an underserved clinic decide to use a 340B pharmacy versus an external pharmacy is currently unknown.

METHODS

We will develop and administer a survey to patients at an underserved clinic to gather information on patient demographics and patient preferences and needs related to outpatient pharmacy services. We will then use the data from the survey to determine if cost is the main determinant in pharmacy selection. We will also attempt to define what other factors most affect pharmacy selection in various demographic groups.

RESULTS

Patient survey responses indicate that customer service and location are more important than price in determining pharmacy selection. Among the uninsured subgroup, price is the most important determinant.

CONCLUSIONS

Customer service should be the primary focus when attempting to increase prescription capture among an insured subgroup of patients at an underserved clinic.



Garrett Eggers, PharmD, MS

Garrett received his PharmD degree from the University of Wisconsin. After completing his PGY2 in pharmacy administration at UPMC and receiving his MS in pharmacy administration from the University of Pittsburgh, Garrett will join the Cleveland Clinic as a pharmaceutical care manager. In his free time, Garrett enjoys exercising, playing guitar, and spending time with his family.

Faculty Mentors: Susan J. Skledar, RPh, MPH, FASHP; Philip E. Empey, PharmD, PhD, BCPS

Outcomes after Discontinuation of Proton Pump Inhibitor Therapy in Geriatric Outpatients

Eisenhower C, Sakely H, Cox-Vance L, D'Amico F, Rana S

PURPOSE

The indefinite use of proton pump inhibitors (PPIs) in the geriatric population without a clear indication creates opportunities for long-term adverse events and drug interactions. The study was initiated to evaluate geriatric outpatients after discontinuation of inappropriate PPI therapy to determine rate of discontinuation and confirm that the intervention did not worsen gastrointestinal (GI) symptoms or quality of life.

METHODS

From October 2010 to March 2011, charts were reviewed at a geriatric outpatient center prior to routine appointments. Eligible patients were aged 60 years and older, currently taking a PPI, or a new patient potentially taking a PPI. Based on indication, current GI symptoms, and concomitant medications, physicians determined whether PPI use was still appropriate. Telephone follow-up was conducted by the pharmacy resident for three months with each enrolled patient. Patient charts were reviewed and pertinent demographic information analyzed. Rate of discontinuation was calculated with 95% confidence intervals using Poisson Distribution.

RESULTS

A total of 175 patients were seen at the geriatric clinic. Nine patients were enrolled by their physician due to inappropriate PPI therapy or therapy of unclear appropriateness. Five did not restart their PPI

therapy at any time after discontinuation. The rate of discontinuation was estimated to be 0.076 (95% CI, 0.033-0.165). For the three patients who did restart therapy, this occurred as early as 2-3 days after discontinuation and as late as two months after. The ninth patient never discontinued therapy. Duration of therapy was estimated for many enrolled patients to be less than 10 years. GI symptoms continued after discontinuation for three patients, began anew for one patient, and resolved for three patients. No strong association was found between demographic characteristics and success of discontinuation. Due to small sample size, a relationship could not be established between PPI therapy and long-term adverse events, although history of osteoporosis, B-12 deficiency, and hypomagnesemia were present in some patients.

CONCLUSIONS

The majority of patients were successfully discontinued from their PPI therapy, and persisting GI symptoms were controlled by alternative treatments. A larger sample size and more information on past medical history and dates of PPI initiation are necessary to support a clear association with long-term adverse events.

Presented at the 44th Society of Teachers of Family Medicine Annual Spring Conference, New Orleans, La., 2011; and the University of Pittsburgh Department of Medicine Ninth Annual Research Day, Pittsburgh, Pa., 2011.



Christine Eisenhower, PharmD

Christine earned her PharmD degree and chemistry minor at the University of Rhode Island. After completion of her PGY1 residency at UPMC St. Margaret, she will join New Hanover Regional Medical Center in North Carolina as the PGY2 ambulatory care/family medicine resident. Afterward she plans to become an adjunct faculty member at a school of pharmacy while maintaining a clinical practice in geriatrics.

Faculty Mentor: Heather Sakely, PharmD, BCPS

Patient Reported Outcomes of Sedation in the Critically Ill

Felbinger MJ, Benedict NJ, Kane-Gill SL

PURPOSE

A universal patient care goal for critical care practitioners is to maintain an “optimal level” of comfort and safety through the use of sedatives. Sedative goals of therapy can be set with subjective sedation scales, but little is known about the patient’s perception of sedation quality. The aim of this study is to determine the correlation between patient perception of sedation quality and recorded subjective assessment scores.

METHODS

Surgical/Trauma and Medical Intensive Care Unit (ICU) patients admitted over the course of fourteen weeks were interviewed using a survey evaluating patient reported outcomes of sedation. The survey used was a modified Hewitt that consists of thirteen questions evaluating patient satisfaction with the quality of sedation and possible factors contributing to anxiety. In addition, five questions using a 10-point Likert scale that describes how the patient felt about their agitation were added. Inclusion criteria consisted of adult mechanically ventilated patients requiring intravenous continuous infusion sedation therapy ≥ 24 hours. Patients were excluded if they are unable to provide informed consent due to a poor mentation. Statistical analysis will include a determination of a correlation coefficient between the subjective assessment scores and several questions in the survey.

RESULTS

Approximately 150 patients were screened over the study period with 15 patients providing informed consent after meeting final inclusion criteria. The study population consisted of eight female and seven male patients, with 10 patients between the ages of 18 and 50, and 13 patients were Surgical/Trauma ICU patients. Top reasons for exclusion include active alcohol withdrawal during ICU stay, patients not alert and oriented at time of interview, and inability to obtain informed consent.

CONCLUSION

Patient reported outcomes needs to be considered by health care practitioners when providing patient-care to critically ill patients in the intensive care unit setting.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Matthew J. Felbinger, PharmD

Matthew is originally from Pittsburgh, Pa., and received his PharmD degree from the University of Pittsburgh in 2010. In his free time, Matthew enjoys running, swimming, camping, and cheering on the Pitt Panthers football and basketball teams. After a PGY1 pharmacy residency at UPMC, he will complete a PGY2 critical care residency at Duke University Medical Center in Durham, N.C. Upon completion of his PGY2 residency, Matthew hopes to pursue a career in academia.

Faculty Mentor: Neal Benedict, PharmD

Description of Medication Administration Alerts after Implementing Bar-Code Medication Administration in a Community Teaching Hospital

Fisher CL, Miske SL, Pieper C, Gingo, L

PURPOSE

Roughly one-third of medication errors occur during the administration stage and are unlikely to be intercepted before reaching the patient. Bar-code medication administration (BCMA) technology has been utilized in health care with the intent of decreasing medication errors and increasing patient safety. BCMA is endorsed by the Agency for Healthcare Research and Quality as well as the Institute of Medicine as a patient safety intervention. However, some hospitals struggle to adapt to this technology due to the complexity of the software, human-computer interaction issues, and limitations in efficiency during initial implementation. UPMC St. Margaret, a community teaching hospital, introduced BCMA in February of 2010. This study provides a description of the types of alerts that have been collected by the BCMA software from March 2010 to October 2010.

METHODS

A retrospective review of all alerts that were captured by the BCMA software across ten nursing units at UPMC St. Margaret, a community teaching hospital within a large health care system in Western Pennsylvania, over an eight-month period from March 1, 2010, until October 31, 2010, was conducted. Information on potential medication errors was collected from data compiled automatically by the BCMA system. Alerts were grouped by the BCMA software into fifteen categories. Data was

collected and compiled into a database program to allow for analysis of the type of alert, medication errors, and scanning compliance. All alerts were categorized as duplicates, system errors, and medication errors.

RESULTS

Pending. Alerts will be analyzed for top five alerts, number of alerts per month, number of duplicate alerts, trend of alerts compared with nursing education, top five medications associated with alerts, number of “noise alerts,” and trend in alerts per month across study period.

CONCLUSIONS

It is anticipated that this project will demonstrate the most common alerts identified by BCMA software, as well as identify areas for improvement in the BCMA process.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Christine L. Fisher, PharmD

Christine earned her PharmD degree at Temple University School of Pharmacy in Philadelphia, Pa. In her spare time, Christine enjoys running, eating Philadelphia soft pretzels, painting, and cheering on the Philadelphia Phillies and Eagles. After residency, Christine will pursue a career in ambulatory care.

Faculty Mentors: Leslie Gingo, PharmD, BCPS; Cathy Pieper, RPh, MBA

Defining the Best Indicator of Utilization of Pharmacy Resources

Garcia J, Corman S, Oriolo V, Eberts M, Empey P, Skledar S, Mark S

PURPOSE

Inpatient census is often used as a predictor of pharmacy workload. A higher census has been correlated with higher number of prescriptions prepared by the pharmacy. Because the number of patient occupied beds does not take into account patient acuity, it is needed to have a more accurate predictor or indicator of pharmacy workload. This predictor could have an impact on pharmacy utilization of resources such as staffing and inventory. This study examined patient days along with a variety of other hospital operating indicators in order to define which is more accurate in predicting pharmacy workload.

METHODS

This study examined census, admissions, Diagnosis-Related Groups (DRG) cost, number of transplants, Average Length of Stay (ALOS), and Case Mix Index (CMI) in order to determine which one better correlated to the total number of pharmacy doses dispensed as a measure of pharmacy workload. The different hospital indicators were compared using regression analysis in order to find the highest correlation to pharmacy total doses dispensed. To account for the greater amount of time required to dispense intravenous (IV) doses, a separate comparison analysis was performed for all IV doses dispensed. This allowed the study to potentially detect a different best indicator for non-IV and IV doses dispensed.

RESULTS

Census ($R^2=0.11$; $p=0.174$), ALOS ($R^2=0.18$; $p=0.067$), and CMI ($R^2=0.11$; $p=0.172$) showed the highest correlation with total number of PO doses dispensed. Admissions ($R^2=0.43$; $p=0.002$), and CMI ($R^2=0.31$; $p=0.014$) showed the highest correlation with total IV doses dispensed.

CONCLUSION

Although ALOS showed higher correlation than census for PO doses, this finding was not statistically significant. However, both admissions and CMI showed statistically significant better correlation to total IV doses dispensed compared to census. Therefore, it can be concluded that admissions and CMI are better indicators of IV doses dispensed or pharmacy workload compared to census. This indicates that IV room staffing and IV drugs inventory can be more accurately planned when based on admissions and/or CMI indicators rather than census.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Jorge Joanh Garcia, PharmD, MBA

Jorge Joanh, from Havana, Cuba, received his PharmD and MBA from Nova Southeastern University in 2010. He is currently a health-system pharmacy administration resident at UPMC and an MS in pharmacy administration candidate at the University of Pittsburgh. His career interests include clinical practice, academia, and management. Jorge's favorite pastime is traveling around the world and getting to know other cultures and traditions.

Faculty Mentors: Susan Skledar, RPh, MPH, FASHP; Scott Mark, PharmD, MS, MEd, MPH, MBA

Evaluation of Ciprofloxacin plus Metronidazole Versus Sulfamethoxazole-Trimethoprim (SMX-TMP) plus Metronidazole for the Treatment of Acute Uncomplicated Diverticulitis

Ghebreselassie EH, Andrzejewski C, Freedy HR, Yassin MH

PURPOSE

Therapeutic management of acute uncomplicated diverticulitis of the colon generally includes antibiotic agents with activity against gram-negative and anaerobic pathogens. There are several single agent and combination regimens, including the use of ciprofloxacin plus metronidazole, which are recommended by the current Surgical Infection Society (SIS) and Infectious Diseases Society of America (IDSA) guidelines for the treatment of complicated intra-abdominal infections. At UPMC Mercy, the regimen of sulfamethoxazole-trimethoprim (SMX-TMP) plus metronidazole has been commonly used in the setting of acute uncomplicated diverticulitis, although not currently recommended by these guidelines. Our primary objective was to review patients with a diagnosis of acute uncomplicated diverticulitis receiving either SMX-TMP plus metronidazole or ciprofloxacin plus metronidazole and compare patient outcomes for each regimen.

METHODS

The study investigator utilized the hospital's information system database to identify patients admitted to UPMC Mercy with ICD-9 code 562.11 (diverticulitis of colon without hemorrhage) and treated with either of the aforementioned regimens. The principal and co-investigator reviewed medical records to determine

whether the patient met inclusion criteria for the study. Efficacy of the antibiotic regimens was assessed by comparing length of stay as the primary outcome and thirty-day readmission rates for the same diagnosis as the secondary outcome.

RESULTS

Average length of stay was reduced in the SMX-TMP plus metronidazole group (n=6) at 2.83 days as compared to 4.59 days for the ciprofloxacin plus metronidazole group (n=14) (p=0.037, CI: 0.03-3.49). In the SMX-TMP plus metronidazole group, 16.7% of patients were readmitted to the hospital within 30 days, compared to 28% for the ciprofloxacin plus metronidazole group (p=1.00).

CONCLUSION

This retrospective cohort study suggests that SMX-TMP plus metronidazole may be considered as an alternative empiric therapy for acute uncomplicated diverticulitis; however, future studies designed on a larger scale are needed as this is a pilot study.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Elizabeth H. Ghebreselassie, PharmD

Elizabeth received a BS in natural and social sciences at Juniata College in Huntingdon, Pa., before receiving her PharmD degree from LECOM School of Pharmacy. In her spare time, she enjoys playing sports and being with family and friends. After completing a PGY1 pharmacy residency at UPMC Mercy, Elizabeth will join their staff as a clinical pharmacist in internal medicine.

Faculty Mentor: Christina Andrzejewski, PharmD, BCPS

Impact of Medication Adherence on Sustained Virological Response in a Chronic Hepatitis C Managed Care Population

Goldberg L, Markuss J, Legal J, Kubilius J, MacGregor V

PURPOSE

Despite the availability of genotype-specific treatment options, only 42%-52% of patients treated for genotype-1 hepatitis C virus (HCV) achieve sustained virological response (SVR). Failure to achieve SVR may be due to primary drug failure, dose reductions, and/or non-adherence. Data collected from previously published clinical trials have shown that patients diagnosed with genotype-1 HCV achieve higher SVR rates when medication adherence is maintained. Findings from these clinical trials may not be applicable to patients managed within a pharmacy benefit manager (PBM). This study was conducted to determine the relationship between medication adherence and SVR, as well as to identify factors contributing to discontinuation from standard medication therapy, in a managed care population.

METHODS

A retrospective study design utilizing pharmacy claims for members with chronic HCV who received at least one fill of an anti-HCV medication between January 1, 2007, and December 31, 2010, was used to evaluate the relationship between medication adherence and SVR. SVR outcomes were collected via physician outreach. Adherence to anti-HCV medication was assessed using medication possession ratio (MPR). Members were classified as optimally adherent if MPR for all anti-HCV agents was $\geq 95\%$ and non-adherent if MPR for any or all anti-HCV agents was $< 95\%$.

RESULTS

For all genotypes, a greater proportion of members with $MPR \geq 95\%$ achieved SVR more frequently than members with $MPR < 95\%$. Fifty-eight percent of members with genotypes 2 or 3 HCV and $MPR \geq 95\%$ achieved SVR compared to 23% of members with $MPR < 95\%$. Similarly, 36% of members with genotypes 1 or 4 HCV and $MPR \geq 95\%$ achieved SVR, whereas only 31% of members with $MPR < 95\%$ achieved SVR. Of the members who discontinued therapy, the most common reasons for discontinuation were lost contact with prior authorization and side effects.

CONCLUSIONS

Members who completed therapy were extremely adherent to their regimens. For all genotypes, a higher percentage of members achieving $MPR > 95\%$ achieved SVR more frequently. Treatment discontinuation data suggests that addressing communication barriers, as well as addressing side effect management, should be the main focus of future updates to specialty processes.

Presented at the Academy of Managed Care Pharmacy 23rd Annual Meeting and Conference, Minneapolis, Minn., 2011.



Lauren E. Goldberg, PharmD

Lauren received her PharmD degree from the Duquesne University Mylan School of Pharmacy in 2010 and completed a managed care residency at CVS Caremark in 2011. Upon completion of her residency, she plans to continue to work as a clinical advisor at CVS Caremark, where she will be supporting clients in an effort to ensure clinical appropriateness for members, as well as managing pharmacy costs.

Faculty Mentor: Shelby L. Corman, PharmD, BCPS

Evaluation of Ceftriaxone and Cefazolin Susceptibility of Methicillin-Susceptible *Staphylococcus aureus* Isolated from Blood and Sterile Body Sites

Greco AJ, Freedy H, Hariri R, Yassin M, Pursglove ML, Czarnecki M

PURPOSE

Ceftriaxone is often used to treat methicillin-susceptible *Staphylococcus aureus* (MSSA) infections due to its ideal pharmacokinetic profile, leading to once daily dosing and a useful option for patients with renal insufficiency. However, ceftriaxone is not routinely tested for MSSA susceptibility at many health care institutions, including UPMC Mercy, and its use in these infections is often supported by susceptibility to oxacillin or cefazolin. Clinical failures have been observed by the UPMC Mercy infectious diseases service in patients receiving ceftriaxone for the treatment of MSSA infections, raising the question of increased resistance. The objective is to evaluate and compare MSSA susceptibility to ceftriaxone and cefazolin at our institution. Results can be used to direct future treatment decisions and improve clinical outcomes.

METHODS

A total of 100 MSSA isolates were collected from blood and sterile body sites at the UPMC Mercy microbiology laboratory. All isolates were cultured on trypticase soy agar and frozen at -80°C until tested. The isolates were then brought to room temperature, sub-cultured, and incubated for 24 hours. An inoculum equivalent to a 0.5 McFarland standard was prepared and a lawn of bacteria inoculated on the surface of Mueller-Hinton Agar. MSSA susceptibility to ceftriaxone was determined by Etest methodology using Etest strips with a concentration

range of 0.002 to 32 micrograms per milliliter. The Kirby-Bauer test, or disc diffusion method, was performed to determine MSSA susceptibility to cefazolin using 30 microgram discs.

RESULTS

All of the MSSA isolates tested in this study were susceptible to cefazolin as determined by the Clinical Laboratory Standards Institute (CLSI). However, only 68 out of the 100 isolates (68%) were susceptible to ceftriaxone. The ceftriaxone MIC range was 4 to 32 mcg/mL, MIC₅₀ 12 mcg/mL, and MIC₉₀ 32 mcg/mL.

CONCLUSION

The use of ceftriaxone as empiric therapy to treat MSSA infections at our institution should be discouraged. MSSA susceptibility to cefazolin should not serve as a marker for susceptibility to ceftriaxone. At a minimum, MSSA susceptibility to ceftriaxone should be confirmed to minimize clinical failures when treating these infections.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Angelo J. Greco, PharmD

A.J. received his PharmD degree from the Duquesne University Mylan School of Pharmacy in 2007. After completing his pharmacy practice residency at UPMC Mercy, he will begin a PGY2 community pharmacy residency with the University of North Carolina at Chapel Hill and Kerr Health. The residency will focus in community pharmacy practice with an emphasis in academia. A.J. plans to pursue a faculty position that includes clinical outpatient management, teaching, and research. Outside of pharmacy, he enjoys playing sports and listening to music.

Faculty Mentors: Henry Freedy, PharmD; Mohamed Yassin, MD, PhD; Rahman Hariri, PhD, MBA, MT (ASCP)

Assessment of Medication Reconciliation as Part of Clinical Pharmacist Workflow

Jenkins MT, Coley KC, Saenz R

PURPOSE

Confusion about a patient's medication regimen during the hospital admission and discharge process accounts for many preventable and serious medication errors. The most common error in the medication use history is omitting a medication that is taken at home. Currently, no time frame has been cited as to when the pharmacist should perform medication reconciliation upon admission. By analyzing workflow involved with medication reconciliation process, the appropriate time frame can be determined to optimize reconciliation.

METHODS

As part of a transition of care pilot, a prospective evaluation was performed to examine the percentage of patients including the times at which patients' home medication histories are documented. Additional outcomes examined include the quantity of omitted medication doses from a patient's home medication regimen. Omission is defined as a medication which a patient was prescribed and should be continued on his or her inpatient stay, but was not previously identified during the admission history assessment. Medication error results were compared to rates currently published in the literature.

RESULTS

Though currently pending, results will include the following: the percentage of patients on which medication reconciliation was performed, the number of interventions performed, the average total time spent per patient performing reconciliation, the average number of medications documented prior to admission, and the average number of omitted doses per patient documented by the pharmacist in relation to the duration of time from the patient's admission.

CONCLUSION

Pending results, the timing of medication reconciliation in a pharmacist's workflow can reduce the number of doses omitted from a patient's medication regimen.



Matthew T. Jenkins, PharmD, MS

Matt received his PharmD from Auburn University in 2009 and completed his MS in health-system pharmacy administration at the University of Pittsburgh in 2011. Prior to residency life, Matt enjoyed fishing, camping, and cheering on the Auburn Tigers. After completing a PGY2 pharmacy practice management residency at UPMC Presbyterian, Matt will join the pharmacy administration team at Shands at the University of Florida as a pharmacy operation specialist.

Faculty Mentor: Susan Skledar, MPH, FASHP

Assessment of Antibiogram Use in Patients with Sepsis Transferred to a Tertiary Care Facility

Jernigan MG, Falcione BA

PURPOSE

Sepsis is a rapidly progressing, life-threatening condition associated with high mortality. Literature demonstrates improved survival rates with the use of appropriate initial antibiotic therapy administered early in the treatment course. Guidelines advocate the use of local antimicrobial susceptibility patterns (antibiograms) for selection of appropriate initial empiric therapy. However, it is unclear if local antibiograms are used in practice, especially when patients are transferred to tertiary care facilities. This study evaluated prescriber-reported frequency of the outside hospital (OSH) antibiogram utilization when treating patients transferred from an OSH that develop sepsis.

METHODS

The study was conducted with an anonymous adaptive electronic survey of physicians at seven community and tertiary hospitals within the UPMC Health System. The 25-question survey included Likert scale, open-ended and multiple-choice formats, and was distributed via an electronic database three times over a four-week period. Respondent demographic information, reported frequency, perceived importance and barriers for antibiogram use were collected. Ability to use an antibiogram was also evaluated. Descriptive statistics were used to analyze demographic data and responses. Comparisons were evaluated with Chi-Square or Fisher's Exact tests.

RESULTS

The survey was distributed to 3397 physicians and completed by 269 (8%). Of these, 167 (62%) reported they provide care for septic patients in a tertiary care center and 113 (68%) of this subset reported they never use the OSH antibiogram to guide antibiotic selection. Use of OSH antibiograms for transferred septic patients was described as moderately-very important by 135 (80%) of these physicians. The most common reported barrier to using OSH antibiograms was information not being available. When tested on the ability to use an antibiogram, 214 (80%) of all respondents used it correctly.

CONCLUSIONS

The majority of surveyed physicians treating patients transferred to tertiary care facilities with sepsis perceive antibiogram use as important and demonstrated correct use of an antibiogram. However, most of these physicians never use the OSH antibiogram, primarily due to lack of availability. This may place septic patients transferred from an OSH at risk for inappropriate initial antibiotic therapy and suggests hospital antibiograms should be publicly available.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.

Presented as ongoing research at the Annual ASHP Midyear Clinical Meeting, Anaheim, Calif., 2010.



Meredith G. Jernigan, PharmD

Meredith received her BS in pharmaceutical sciences at the University of North Carolina at Chapel Hill before receiving her PharmD degree from the University of North Carolina Eshelman School of Pharmacy. Prior to residency life, Meredith enjoyed spending time at the beach and cheering on the Tarheels. After completing her PGY1 residency, Meredith will be staying another year at UPMC Presbyterian to complete a PGY2 infectious diseases residency.

Faculty Mentor: Bonnie Falcione, PharmD, BCPS

Preservation of Renal Function with ACEi/ARB Therapy Early After Heart Transplantation

Johnson D, Teuteberg JJ, Corman SL, Shullo MA

BACKGROUND

Nearly a third of orthotopic heart transplant (OHT) recipients develop renal failure within the first year after transplantation. Post-OHT renal dysfunction secondary to calcineurin inhibitor (CNI) toxicity is a leading cause of renal impairment after solid organ transplantation. Several existing CNI minimization strategies have demonstrated protection against CNI-induced nephrotoxicity; however, few preemptive, non-immune suppressive strategies exist. The aim of our study was to determine if early treatment with angiotensin converting enzyme inhibitor/angiotensin receptor blocker (ACEi/ARB) therapy after OHT is associated with improved renal function in patients receiving CNI.

METHODS

Male and female patients ≥ 18 years old were retrospectively divided into two groups: patients who had initiated ACEi/ARB therapy within 90 days of transplantation or patients who did not receive ACEi/ARB within 90 days of transplantation. Patients not surviving ≥ 90 days after transplantation, receiving a second heart transplant, or who had a glomerular filtration rate (GFR) ≤ 30 ml/min/1.73m² within the first 90 days after transplantation were excluded from the study. The primary endpoint was the time to a $\geq 30\%$ reduction from baseline in GFR. Secondary endpoints included time to a GFR ≤ 30 ml/min/1.73m² and all-cause mortality.

RESULTS

A total of 315 patients were included in the study, 147 in the non-ACEi/ARB group and 168 in the ACEi/ARB group. Both groups were similar and predominately white and male. Additionally, the population was at low risk for rejection, with panel reactive antibodies $\leq 20\%$ in $> 80\%$ of the population; almost half did not receive induction therapy; and the majority of patients received tacrolimus and mycophenolate mofetil for maintenance immunosuppression. There was no difference in the time to $\geq 30\%$ reduction in GFR ($p=0.385$) or time to GFR ≤ 30 ml/min/1.73m² ($p=0.957$) between study groups. However, there was a mortality benefit in patients receiving ACEi/ARB therapy ($p=0.045$).

CONCLUSION

Early initiation of ACEi/ARB therapy did not demonstrate a renal benefit in OHT patients receiving CNI after transplantation. However, ACEi/ARB therapy initiated within 90 days of heart transplant was associated with a significant reduction in mortality.



David Johnson, PharmD

David, originally from Sumter, S.C., received his bachelor's degree in the biological basis of behavior from the University of Pennsylvania in 2005 and his PharmD degree from the University of Michigan in 2009. After completing a PGY1 pharmacy residency and PGY2 transplant residency at UPMC Presbyterian, David will be joining the Temple University Hospital as an adjunct professor and abdominal organ transplant pharmacist. David enjoys poetry, political commentary, and neo-soul and jazz music.

Faculty Mentors: Heather Johnson, PharmD, BCPS; Michael Shullo, PharmD

Identifying Medication-Related Needs of HIV Patients: Foundation for Community Pharmacist-Based Services

Kauffman Y, McGivney M, Cerussi N, Pringle J

PURPOSE

The role of a community pharmacist managing HIV patients has not been well studied, nor have these patients' perspectives about community pharmacist-based services. The purpose of this qualitative study was to identify medication-related needs of HIV-infected individuals who receive prescriptions from a community pharmacy and assess their perspectives of community pharmacist-based services.

METHODS

Individual, semi-structured interviews were conducted over a three-month period with participants living in both urban and rural areas. Participants were recruited from the Pittsburgh AIDS Center for Treatment (PACT) in Pittsburgh, Pa., and the Ryan White Clinic in Johnstown, Pa. Inclusion criteria included: HIV+ males and females at least 18 years old who currently take medications and use a community pharmacy for prescription fills. Interview questions were based on: (1) medication-related needs, (2) perceptions of the role of the pharmacist in their care, (3) perceived value of pharmacist services, and (4) preference for implementation of pharmacist-based services. All interviews were conducted by the principal investigator and continued until model saturation occurred.

RESULTS

Twenty-nine interviews were conducted: 15 participants from the PACT clinic and 14 from the Ryan White Clinic. Themes will be identified using the principles of Grounded Theory and analyzed using ATLAS software. Upon initial review, several themes emerged. Participants who have been on a medication regimen for several years state to be "self sufficient" and do not feel this service would be beneficial to them. Yet, they do feel that it may be valuable for patients who are starting new medications or changing medications. For those new start patients, they have emphasized patient confidentiality as a key component of the service to increase their comfort with a pharmacist.

CONCLUSIONS

Results will better inform pharmacists in urban and rural settings about the needs of HIV/AIDS patients in their community and may guide the implementation or enhancement of community pharmacist-based services for HIV/AIDS patients. Ultimately, these services may help to improve medication adherence, minimize drug therapy problems, and improve retention in care.

Presented at the 2011 American Pharmacists Association Annual Meeting and Exposition in Seattle, Wash.

Presented at the 2011 Dean's Day Student Research Competition at the University of Pittsburgh Graduate School of Public Health.



Yardlee S. Kauffman, PharmD

Yardlee received a PharmD degree from the University of Pittsburgh in May 2010. After completing a PGY1 community practice residency with the School of Pharmacy and UPMC Falk Pharmacy, she will complete a PGY2 residency with an emphasis in global health and underserved care. She is also a 2012 MS in public health candidate at the Graduate School of Public Health.

Faculty Mentor: Melissa McGivney, PharmD, FCCP

Evaluation of an iPad to Provide Warfarin Video Education in the Inpatient Setting

Kim JK, Mohammad RA, Coley KC, Donihi AC

PURPOSE

Traditionally, hospitalized patients receive medication education immediately before discharge by written and/or verbal communication. Improving patient education about warfarin therapy is important because warfarin is among the top 10 medications with the largest number of reported adverse events. The purpose of this quality improvement project was to evaluate the use of an iPad to provide video education to improve patient education regarding warfarin therapy.

METHODS

This project was prospectively conducted to include adult (≥ 18 years of age) hospitalized patients who were prescribed warfarin. Patients completed a pre-test knowledge questionnaire prior to viewing the warfarin educational video. Immediately after watching the video, patients completed a post-test knowledge questionnaire and patient satisfaction survey. Patients completed all the questionnaires on the iPad. The primary objective was to evaluate the use of an educational video as an effective tool on an iPad to provide education about warfarin. The secondary objective was to evaluate patients' satisfaction with using an iPad to view the warfarin video and complete the questionnaires.

RESULTS

A total of 40 patients were educated about warfarin therapy by video on an iPad and included for evaluation.

Most patients were new to warfarin therapy (65%). For the primary outcome of warfarin knowledge test scores, 42.5% of patients passed the pre-test and 90% of patients passed the post-test, $p < 0.001$. There were no significant differences observed among test scores when comparing by age, gender, level of education, and use of CNS depressant drugs. Overall, 82.5% of patients reported that they liked using the iPad and that it was easy to use. A greater percent of younger patients (< 65 years) and females liked using the iPad compared to older patients ($p=0.01$) and males ($p=0.02$), respectively. Also, more patients < 65 years reported the iPad was easy to use compared to older patients, $p=0.01$.

CONCLUSIONS

Providing warfarin video education to hospitalized patients by using an iPad was effective. The knowledge questionnaire identified concepts patients may not understand and often prompted further discussion. The method of educating patients by video using an iPad may be an alternative to traditional education.

Funded in part through a grant from the Jewish Healthcare Foundation.

Submitted to American College of Clinical Pharmacy for the 2011 Fall Meeting, Pittsburgh, Pa., 2011.



Jenny J. Kim, PharmD

Jenny received her PharmD degree from the University of North Carolina Eshelman School of Pharmacy in 2009. She completed a PGY1 pharmacy residency at Virginia Commonwealth University Health System. After a PGY2 internal medicine residency, she will join the Bernard J. Dunn School of Pharmacy at Shenandoah University as an assistant professor in acute care. Her non-pharmacy interests include trying different restaurants, spending time with family and friends, snowboarding, and Carolina basketball.

Faculty Mentor: Rima A. Mohammad, PharmD, BCPS

Tacrolimus Trough Concentrations in Heart Transplant Recipients During Episodes of Acute Cellular Rejection

Kipp GM, Venkataramanan R, Shullo M, Johnson HJ

PURPOSE

Approximately 20-40% of heart transplant recipients experience an episode of acute cellular rejection (ACR) within their first year after transplant. Pro-inflammatory cytokines involved in ACR are thought to down regulate the metabolism and transport of tacrolimus which could potentially cause clinically significant fluctuations in tacrolimus levels. Therefore, the primary aim of this research study was to describe tacrolimus whole blood trough concentrations during episodes of ACR in orthotopic heart transplant (OHT) recipients. The secondary aim was to determine whether elevated tacrolimus trough concentrations during ACR are associated with surrogate markers of tacrolimus toxicity.

METHODS

This retrospective cohort study was designed to describe tacrolimus trough concentrations before, during, and after episodes of ACR. The first part of the study used an A-B-A study design to compare the mean dose-normalized tacrolimus trough concentrations in each patient before, during, and after resolution of an episode of ACR. The second part of the study compared serum creatinine, blood urea nitrogen, and potassium concentrations at the same time points.

RESULTS

A total of 129 heart transplant recipients experienced at least one episode of ACR within their first year post-transplant, but only 34 patients had complete dose-normalized tacrolimus concentrations available for the primary analysis. The dose-normalized concentrations were 0.793, 0.875, and 0.890 (ng/mL)/mg before, during, and after episodes of ACR, respectively ($p=0.383$). In addition, surrogate markers of tacrolimus toxicity did not differ between the time points. Potassium concentrations were 4.41, 4.41, and 4.38 mEq/L for the respective time points ($p=0.59$). Serum creatinine concentrations were 1.60, 1.57, and 1.61 mg/dL ($p=0.71$) and BUN concentrations were 32.4, 31.1, and 33.4 mg/dL before, during, and after ACR, respectively ($p=0.25$).

CONCLUSIONS

The results suggest that tacrolimus metabolism is not significantly altered during episodes of ACR in OHT recipients. Further research is required to determine the significance of drug-cytokine interactions in solid organ transplant recipients during episodes of ACR.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Gretchen M. Kipp, PharmD

Gretchen received her PharmD degree from the University of Pittsburgh School of Pharmacy. In addition to residency life, Gretchen enjoys spending time with her family and reading. After the completion of the PGY1 pharmacy residency, Gretchen will remain at UPMC to complete a PGY2 solid organ transplantation residency.

Faculty Mentors: Raman Venkataramanan, PhD; Michael Shullo, PharmD; Heather Johnson, PharmD, BCPS

Assessment of Fluoroquinolone-Resistant Urinary Pathogens in Patients Admitted to UPMC Mercy from Nursing Homes

Lohr BR, Freedy HR

PURPOSE

Fluoroquinolones are a popular antibiotic choice for urinary tract infections (UTIs) due to their excellent oral bioavailability, wide spectrum of activity, and manageable side effects. However, recent data suggests that UTIs in nursing home patients are often caused by antibiotic-resistant bacterial pathogens. Certain organisms, such as *Escherichia coli* (*E.coli*), have shown increasing resistance rates to fluoroquinolones. This study was conducted to measure rates of bacterial resistance in nursing home patients and to determine a corresponding delay in appropriate empiric antibiotic therapy. Initiating appropriate antibiotic treatment for nursing home patients is essential to improve patient outcomes.

METHODS

Medical records of 105 nursing home patients admitted through the emergency department at UPMC Mercy were retrospectively reviewed from April 2009 to December 2009. Diagnostic codes were used to determine the presence of UTIs during their hospitalizations. Urine cultures with corresponding susceptibilities to ciprofloxacin were evaluated and data was collected for 159 total urinary isolates. Susceptibility results were recorded as susceptible, intermediate, or resistant. Choice of empiric antibiotic therapy was also recorded for fluoroquinolone-resistant pathogens.

RESULTS

Of the 159 urinary pathogens reported, 60% were susceptible, 1% were intermediate, and 39% were resistant to ciprofloxacin. *E.coli* susceptibility to ciprofloxacin was 54.1% in this study. In contrast, *E.coli* susceptibility to ciprofloxacin for all patients at our institution was 73%, as documented by an antibiogram during a similar time period. Appropriate antibiotic therapy was delayed an average of 47.3 hours in nine nursing home patients; these patients were initiated on a fluoroquinolone while infected with a fluoroquinolone-resistant urinary pathogen.

CONCLUSION

Due to the resistance rates observed in this study, antibiotics other than fluoroquinolones, such as cephalosporins and sulfamethoxazole-trimethoprim, should be considered for the empiric treatment of UTIs in nursing home patients. Clinical judgment and local susceptibility rates should also play a role when initiating antibiotic therapy for these patients.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Brian R. Lohr, PharmD

Brian received his PharmD degree from the Duquesne University Mylan School of Pharmacy in 2010. Prior to residency life, Brian enjoyed spending time outdoors and playing basketball. After completing a PGY1 residency at UPMC Mercy, Brian will join UPMC Presbyterian as a PGY2 resident in critical care.

Faculty Mentor: Henry R. Freedy, PharmD

Effects of Automated Dispensing Cabinets Scan-on-Restock Feature on Medication Stocking Errors

Martinez L, Bates M, Schilling D, Corman S, Eberts M, Kowiatek J, Skledar S, Mark S

PURPOSE

Scan-on-restock is a new safety feature of some automatic dispensing cabinets (ADCs). This feature enables a medication and ADC storage pocket to be scanned before restocking occurs, to prevent error. At our 520-bed teaching facility, the pharmacy department uses ADC devices on the patient care units and in hospital departments, such as the Emergency Department. The new scan-on-restock technology of the automatic dispensing cabinets verifies the correct medication is being stored and/or replaced into the assigned pocket. Pharmacy technicians scan the base of the scanner, scan the label with the medication name generated by the pharmacy computer system, scan the medication bar code, and then scan the bar-code label on the ADC pocket location to confirm the match. The implementation of the scan-on-restock functionality on the automated dispensing cabinets aims to eliminate medication errors associated with the medication stocking process.

METHODS

The scan-on-restock feature on the automated dispensing cabinets was implemented during the month of February 2011. A two-month before and after observation period was completed to assess the impact from the scan-on-restock implementation. Pharmacy technicians conducted inspections on 64 ADCs during each month in which data was collected. The number of medication

restocking errors during the pre-implementation period was collected from November 1, 2010, to December 31, 2010. The number of restocking errors during the post-implementation period was obtained from March 1, 2011, to April 30, 2011. The primary outcome was the proportion of ADC inspections revealed at least one restocking error. The secondary outcome was the mean number of error per inspections.

RESULTS

In the pre-implementation period, there were seven medication restocking errors found over a total of 128 inspections done (5.5%). In the post-implementation period there were two medication restocking errors found over a total of 128 inspections done (1.6%). None of these errors reached the patient.

CONCLUSION

The implementation of a scan-on-restock process is expected to reduce medication errors associated with the stocking of the ADCs.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Leyner Martinez, PharmD

Leyner, originally from Cuba, earned a BS in family, child, and consumer sciences at Florida State University in 2005 and a PharmD degree at LECOM School of Pharmacy in 2009. He is currently a health-system pharmacy administration resident and is pursuing a Master of Science with emphasis in pharmacy administration at the University of Pittsburgh. Outside of pharmacy, Leyner enjoys traveling, outdoor activities, spending time with friends and family, and warm weather.

Faculty Mentors: Madalyn Bates, RPh; Susan J. Skledar, RPh, MPH, FASHP; Philip E. Empey, PharmD, PhD, BCPS

Impact of a Risk Evaluation and Mitigation Strategy (REMS) Program for Erythropoietin Stimulating Agents (ESAs) on Physician Prescribing Practices and Patient Care

Mebel E, Eberts M, Corman S, Skledar S, Mark S

PURPOSE

Since 2007, two regulatory changes occurred related to the use of ESAs in the treatment of chemotherapy induced anemia (CIA). In March 2007, the Centers for Medicare and Medicaid Services tightened reimbursement guidelines on the use of ESAs based on emerging literature indicating increased mortality and tumor progression in patients receiving ESAs. Reimbursement was denied in patients with CIA if ESA treatment was initiated at Hgb \geq 10 g/dL. The second regulatory change occurred in February 2010, when the Food and Drug Administration implemented a REMS program. While the program was intended to promote the safe use of ESAs, significant physician administrative requirements may result in decreased physician ESA prescribing and potential increased adverse events in the oncology patient population. Patients who initiated ESA therapy at hemoglobin levels $<$ 10 g/dL have been shown to require an increased number of transfusions. Prior to this study, the exact impact of REMS on physician prescribing practices and patient care remained unknown and deemed further investigation. This study evaluated changes in physician prescribing practices from the release of the ESA REMS program and quantified the impact on patient hemoglobin level at time of therapy start and number of transfusions required.

METHODS

A retrospective review of inpatient and outpatient oncology patient medical records evaluated patients receiving ESAs for CIA from February 2009 to December 2010. ICD9 codes were used to identify oncology patients. Patients receiving ESAs for renal indications, identified by ICD9 codes, were excluded. Hemoglobin at the time of ESA initiation and transfusion events during the study period were collected. Additional demographic information was collected including date of birth, gender, ethnicity, and type of cancer.

RESULTS

Physician prescribing practices, hemoglobin level, and number of transfusions were recorded, and results were presented.

CONCLUSION

This project demonstrated the impact of REMS on physician prescribing practices and patient care.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors and the ASHP 2011 Summer Meeting.



Elaine R. Mebel, PharmD

Elaine, originally from Marietta, Ga., received her PharmD degree in 2010 from the University of Georgia. Elaine is currently enrolled in the Master of Science in pharmacy administration program at the University of Pittsburgh. In her free time, Elaine enjoys running, cooking, shopping, and attending concerts. After completing her PGY1, Elaine will continue her training at UPMC Presbyterian in her second year of the pharmacy practice management residency.

Faculty Mentors: Matt W. Eberts, PharmD, MBA; Susan J. Skledar, RPh, MPH, FASHP; Philip E. Empey, PharmD, PhD, BCPS

Teaching Through Collaboration: Measuring Medical Resident Education on a Medication Management Rotation Experience

Owens NW, Farrah RM

PURPOSE

Pharmacist-directed medication management services in an outpatient setting represent a potential advancement toward the concept of the patient-centered medical home whose impact on medical resident education has not been fully explored. UPMC St. Margaret's pharmacist-led medication management service has been integrated into the medical resident education program for more than seven years, providing a unique setting for collaborative learning. The specific value of this interprofessional learning experience has not been previously described or quantified.

METHODS

Second-year family medicine residents participating in a one-month rotation with UPMC St. Margaret's family health center-based medication management service were enrolled as the subjects of this study. Primary outcome: change in residents' scores on a medication management skills assessment tool from the start of rotation on the medication management service and at the end of one month with the service. Following an introductory session at the beginning of the rotation, medical residents were videotaped while conducting a complete medication history. After completing one month with the collaborative medication management service, the residents were again videotaped while conducting a medication history. Two separate standardized patient cases were utilized. The tapes are being reviewed and rated by reviewers utilizing a

medication management skills assessment tool developed for this project. The reviewers are blinded to when the tapes were filmed relative to the residents' participation in the medication management curriculum. Secondary outcome: change in residents' perceptions, knowledge, and skills as measured through a survey. Residents were surveyed before and after their one month rotation with the service. Questions were focused on residents' confidence conducting medication management visits, the value of their experience, and their ability to communicate with pharmacists.

RESULTS

Pending. Video review is currently in process with final results expected in June 2011.

CONCLUSION

The results of this study will represent a measurement of the educational impact of a unique interprofessional teaching service and will provide insight into the educational value of a collaborative medication management rotation for family medicine residents.

Presented at the 43rd Society of Teachers of Family Medicine Annual Spring Conference, Vancouver, BC, Canada, April 2010.

Presented at the 44th Society of Teachers of Family Medicine Annual Spring Conference, New Orleans, La., April 2011.



Nicholas Owens, PharmD, BCPS

Nick is from York, Pa., and earned his PharmD degree at the University of Pittsburgh in 2009. He completed a PGY1 pharmacy residency at UPMC St. Margaret in 2010. Upon completion of a PGY2 residency in family medicine, he plans to pursue a position in ambulatory care/family medicine.

Faculty Mentor: Roberta Farrah, PharmD, BCPS

Evaluation of Clinical Outcomes in Patients Receiving Vancomycin Therapy When Dosing Is Managed by the Pharmacy Pharmacokinetic Service Versus Physician Management

Pikoulas TE, Ganchuk S

PURPOSE

At UPMC Mercy, physicians have the option to consult a pharmacy pharmacokinetic (PK) service to manage the dosing of vancomycin therapy for a given patient. The pharmacy service hopes to improve clinical outcomes for patients by optimizing vancomycin dosing utilizing pharmacokinetic methods and targeting vancomycin serum levels based on recommendations from the American Society of Health-System Pharmacists, the Infectious Diseases Society of America, and the Society of Infectious Diseases Pharmacists. The purpose of this study is to determine if patients who received vancomycin therapy, when dosing was managed by the PK service, had an improvement in length of stay as compared to physician management of dosing.

METHODS

The study investigator utilized the health system's information system database to identify patients admitted to UPMC Mercy who received intravenous vancomycin therapy over a six-month period. Data collection via retrospective chart review was conducted on a randomly chosen cohort of physician-managed patients as well as a cohort of pharmacy PK service-managed patients. Data collected included the patient's length of stay (defined as start of vancomycin therapy to discharge date), which served as the primary outcome. Secondary outcomes included examining the percent of

patients who achieved a therapeutic trough while in the hospital and the number of doses until that therapeutic trough was achieved.

RESULTS

Although not statistically significant, there was a trend toward a shorter length of stay for PK service-managed patients [$p=0.196$, CI (-0.596 - 2.876)]. There was an 18% increase in the percent of patients who achieved a therapeutic trough in the PK service-managed patients ($p=0.05$). The number of doses before a therapeutic trough was achieved was 7.2 for the physician-managed group compared to 6.5 doses for the PK service-managed group [$p=0.623$, CI (-2.281 - 3.745)].

CONCLUSIONS

The pharmacy PK service significantly increased the percent of patients who achieved a therapeutic trough concentration compared to physician-managed patients. There was no significant difference in the length of stay and the number of doses before a therapeutic trough was achieved between groups.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Theodore E. Pikoulas, PharmD

Theodore received his PharmD degree from the Duquesne University Mylan School of Pharmacy in 2010 and is completing a pharmacy practice residency at UPMC Mercy. Next year, he plans to complete a PGY2 residency in psychiatric pharmacy at Louis Stokes Cleveland VA Medical Center. Outside of the residency, Theo enjoys playing soccer, writing music on his guitar, and watching Pittsburgh sports teams.

Faculty Mentor: Steven Ganchuk, PharmD

Evaluation of Compliance to American College of Chest Physicians Guidelines for Warfarin Reversal with Vitamin K

Russo-Alvarez G, Miske S, Gingo L

PURPOSE

Measuring the international normalized ratio (INR) is the standard of care for assessing the effectiveness of warfarin. When the INR is ≥ 4.5 , the bleeding risk significantly increases and patients may require vitamin K to reverse the anticoagulant effect of warfarin. Since no studies reporting compliance to the 2008 American College of Chest Physicians (ACCP) guidelines have been reported, a retrospective study was conducted to evaluate the vitamin K administrations for excessive anticoagulation. Furthermore, the study evaluated the incidence of thromboembolism and major and minor bleeding after vitamin K administration and within 30 days post-discharge, warfarin overcorrection, and warfarin resistance.

METHODS

This study was a retrospective electronic chart review of 118 medical inpatients conducted at UPMC St. Margaret. Patient data was collected from January 2010 to September 2010 and patients were included if greater than 18 years and were receiving both warfarin and vitamin K. Patients were excluded if vitamin K was used for INR reversal prior to surgery or invasive procedures or if patients had received vitamin K for reasons other than to reverse the anticoagulant effect of warfarin.

RESULTS

Physician compliance to the 2008 ACCP guidelines was 30.5%. The most common reasons for noncompliance included administering vitamin K when the INR was < 5.0 and no significant bleeding (30%); subcutaneous administration of vitamin K (21%); and intravenous administration of vitamin K when oral route recommended (14%). When patients were administered multiple doses of vitamin K during a single admission, physicians were less likely to be compliant. Of the 118 patient charts reviewed, 43% (n=51) experienced warfarin overcorrection and 6% (n=8) developed warfarin resistance. Three patients were readmitted within 30 days post-discharge with major bleeding while zero patients were readmitted with a thromboembolism or minor bleeding.

CONCLUSION

Despite wide acceptance of the 2008 ACCP guidelines, physician compliance is still suboptimal (30.5%). Academic detailing involving face-to-face sessions may increase compliance at institutions. The clinical significance of noncompliance with the ACCP guidelines for vitamin K administrations warrants further study.

Presented at the 44th Society of Teachers of Family Medicine Annual Spring Conference, New Orleans, La., 2011.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Giavanna Russo-Alvarez, PharmD

Giavanna received her PharmD degree from the Duquesne University Mylan School of Pharmacy in 2010. After completing a PGY1 pharmacy residency at UPMC St. Margaret, Giavanna will begin a PGY2 family medicine residency at the same institution. During her free time, Giavanna enjoys singing, salsa dancing, learning foreign languages, and spending time with family and friends.

Faculty Mentors: Roberta Farrah, PharmD, BCPS; Leslie Gingo, PharmD, BCPS

Teaching Emphasis within Pharmacy Residency Programs

Sales I, Meyer S, Kane-Gill S, Howrie Schiff D

OBJECTIVE

American Society of Health System Pharmacy (ASHP) standards for required teaching experiences do not provide guidance on implementation. Identified components of existing residency teaching programs are: (1) structured seminars on teaching, (2) practical teaching experiences, (3) teaching portfolio development, and (4) teaching mentorship. The purpose of this study is to determine whether these four components contribute to the development of residents' confidence in teaching.

METHODS

A 54-question survey was designed to determine the extent to which the four components are integrated into teaching programs and their relationship to a resident's confidence in his or her teaching abilities. An email was sent to the directors of all ASHP-accredited Pharmacy Practice residencies (n=546) requesting the survey link to be forwarded to the 2009–2010 residents (n=667). The four components were assessed for the likelihood of an association with the resident's perception of his or her confidence for teaching skills/abilities using a univariate logistic regression analysis.

RESULTS

A 41% (276/667) response rate was obtained representing 23% of Pharmacy Practice programs. Residents who participated in a structured seminar on teaching had more skills significantly associated with their confidence. Residents were more likely to feel confident at developing instructional objectives (OR 5.69; 95% CI 1.50 – 21.58),

assessing classroom learning (OR 3.77; 95% CI 1.48 – 9.60), having the skills for classroom management (OR 3.19; 95% CI 1.09 – 9.30), and developing a teaching portfolio (OR 2.49; 95% CI 1.05 – 5.89). Participants exposed to practical teaching experiences who gave lectures were more likely to feel confident in their presentation skills (OR 6.86; 95% CI 1.36 – 34.58), their ability to implement active learning strategies (OR 3.44; 95% CI 1.02 – 11.66), assess classroom learning (OR 3.72; 95% CI 1.44 – 9.60), precept APPE students (OR 16.00; 95% CI 2.70 – 94.68), and provide feedback to students (OR 11.52; 95% CI 2.28 – 58.26). Residents who compiled a teaching portfolio were more likely to feel confident in their ability to compile a teaching portfolio (OR 89.24; 95% CI 11.26 – 707.28), and to develop a statement of teaching philosophy (OR 10.73; 95% CI 4.36 – 26.40). Residents were more likely to feel confident in their ability to manage the classroom (OR 3.78; 95% CI 1.52 – 9.40) if they had a teaching mentor.

CONCLUSION

Participants appear confident in their teaching skills and abilities. A structured seminar on teaching and practical teaching experiences are important components of teaching programs for pharmacy residents to enhance valuable skills. A teaching portfolio and teaching mentor may only be more applicable to those residents who intend to pursue an academic career.



Ibrahim A. Sales, PharmD

Ibrahim received his PharmD degree from the University of South Carolina. He enjoys spending time with his family and friends. After completing his PGY1 pharmacy practice residency, Ibrahim will remain at UPMC to complete his PGY2 ambulatory care specialty residency.

Faculty Mentor: Susan Meyer, PhD

Assessing the Type and Severity of Alerts in a CDSS at the Order Verification Phase

Steinhardt SJ, Kowiatek JG, Kane-Gill SL

PURPOSE

Alert fatigue, the phenomenon where clinicians bypass important alerts due to a high signal-to-noise ratio in clinical decision support systems (CDSS), has been evaluated during prescribing for physicians. Little data exist evaluating the effects of alert fatigue on pharmacists during order verification. This evaluation was conducted to determine the frequency, severity, and types of alerts that occur for a CDSS in a large academic medical center. Also, the drug-drug interaction alerts were assessed for validity using an independent drug interaction database.

METHODS

A retrospective review of alert data for a 24-hour period was analyzed to determine the severity ratings (major, moderate, and minor) and the types (DDI, drug-duplicate, drug allergies, drug-food) of alerts. Further, minor DDI alerts were examined with the drug interaction checking tool in an independent drug interaction database to determine their presence and rating in the corresponding system.

RESULTS

A total of 6854 alerts were evaluated. DDI and drug-food interaction alerts were the only alerts that contained a severity rating in the institution's CDSS. As a result, alerts with no severity rating were the most common (n=2993) with 76% of these being drug duplicate alerts. Of the alerts with a severity rating, minor interactions

occurred 571 times, moderate alerts fired 2665 times and major alerts fired 625 times. When minor alerts were validated using an independent drug interaction database, 94.5% of the minor alerts were not listed as interacting. Complete elimination of the minor interaction category would result in an 8% reduction of total alerts.

CONCLUSIONS

The majority of alerts fired did not have a severity rating and were drug duplicate alerts probably requiring further investigation for significance. Of the DDI and drug-food alerts, the majority were a severity rating of moderate or greater. The minor interaction alerts were not supported by an independent drug interaction checking database.

Presented at the 30th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.



Sarah J. Steinhardt, PharmD, JD, MS

Sarah received her PharmD degree from Purdue University and her JD from Indiana University School of Law Indianapolis before receiving her MS in pharmacy administration from the University of Pittsburgh. After completing a PGY2 pharmacy management/administration residency at UPMC, Sarah will work as the 2011-2012 Congressional Healthcare Policy fellow sponsored by the Virginia Commonwealth University School of Pharmacy in conjunction with ASHP and ACCP.

Faculty Mentors: Joanne Kowiatek, RPh, MPM, FASHP;
Sandra L. Kane-Gill, PharmD, MS, FCCM

Determining Rates of Metabolic Monitoring in Clozapine-Treated Outpatients: Evaluating the Need for a Collaborative Metabolic Monitoring Service

Turner TJ, Montgomery JL, McGivney MS, Coley KC, Fabian TJ

PURPOSE

The risk of metabolic syndrome, diabetes, cardiovascular disease, and premature mortality is increased in patients with serious mental illness. Treatment with atypical antipsychotics has been associated with weight gain, hyperglycemia, and unfavorable lipid profiles. Among the available atypical antipsychotics, clozapine is associated with causing the greatest risk of metabolic syndrome. In 2004, the American Diabetes Association published a consensus statement regarding metabolic management for patients treated with atypical antipsychotics. The statement recommended that patients be monitored for signs and symptoms of metabolic disturbances (e.g. weight, waist circumference, blood pressure, serum glucose, and lipid testing) at defined chronological time intervals upon initiation and during treatment. The purpose of the present study was to determine rates of adherence to the recommended monitoring guidelines in an outpatient clozapine clinic.

METHODS

A total of 135 patients who were currently enrolled in an outpatient clozapine management clinic were included in this study. A retrospective review of electronic medical records from January 2005 to December 2010 was conducted and the following data elements were extracted: (1) date of clozapine initiation, (2) date and value of metabolic parameters including blood pressure, weight, waist circumference, fasting lipid panel, and fasting glucose level, (3) diagnosis and pharmacological

treatment of hypertension, diabetes, obesity, or dyslipidemia.

RESULTS: (PRELIMINARY)

Thirty-four patients initiated clozapine treatment between January 2005 and December 2010. Baseline evaluations (± 14 days from initiation date) for the following parameters were: weight 67.6% (23/34), waist circumference 0% (0/34), blood pressure 47.1% (16/34), fasting lipid and glucose levels 14.3% (5/34). Within three months of initiating clozapine (15-98 days), blood pressure was reevaluated in 82.3% (28/34) of patients, while fasting lipids and glucose levels had been reassessed in 26.5% (9/34) of patients. Yearly follow-up data for all 135 patients prescribed clozapine is currently being evaluated.

CONCLUSIONS

Despite routine monitoring of hematologic parameters through the clozapine management clinic, monitoring of clozapine-induced metabolic disturbances was suboptimal. Additional effort is needed to improve metabolic monitoring in this high-risk population. Pharmacists who oversee hematologic monitoring in this patient population are well positioned to establish a metabolic monitoring clinic in collaboration with the clinical treatment team.

Presented at the American Pharmacists Association Annual Meeting and Exposition, Seattle, Wash., 2011.



Ted J. Turner, PharmD

Ted received his PharmD degree from the University of Southern Nevada College of Pharmacy in 2010. After completing a PGY1 community pharmacy residency at Forbes Pharmacy in 2011, Ted will complete a PGY2 psychiatry residency at the Veteran Affairs Medical Center in Salt Lake City, Utah.

Faculty Mentor: Tanya Fabian PharmD, PhD, BCPP

Pharmacy Residency Programs

Post Graduate Year 1 (PGY1)

Pharmacy at UPMC Presbyterian Shadyside

Director: Heather Johnson, PharmD, BCPS

Pharmacy at UPMC Mercy

Director: Robert Simonelli, PharmD

Pharmacy at UPMC St. Margaret

Director: Patricia Klatt, PharmD, BCPS
Asst. Director: Roberta Farrah, PharmD, BCPS

Managed Care at UPMC Health Plan

Director: Jessica Daw, PharmD

Community Pharmacy

Rite Aid Corporation, Falk Pharmacy,
Forbes Pharmacy
Director: Melissa Somma McGivney,
PharmD, FCCP

Managed Care at CVS Caremark

Director: Julie Legal, PharmD

Post Graduate Year 2 (PGY2)

Ambulatory Care at UPMC

Presbyterian Shadyside
Director: Deanne Hall, PharmD, CDE

Cardiology at UPMC Presbyterian Shadyside

Director: Amy Seybert, PharmD

Critical Care at UPMC Presbyterian Shadyside

Director: Amy Seybert, PharmD

Internal Medicine at UPMC

Presbyterian Shadyside
Director: Rima Mohammad, PharmD, BCPS

Drug Information at UPMC

Presbyterian Shadyside
Director: Shelby Corman, PharmD, BCPS

Family Medicine at UPMC St. Margaret

Director: Patricia Klatt, PharmD, BCPS
Asst. Director: Roberta Farrah, PharmD, BCPS

Oncology at UPMC Cancer Centers

Director: James Natale, PharmD, BCOP

Infectious Diseases at UPMC

Presbyterian Shadyside
Director: Brian Potoski, PharmD, BCPS-AQ(ID)

Pharmacy Management at UPMC

Presbyterian Shadyside
Director: Bryan Yourich, PharmD

Transplantation at UPMC Presbyterian Shadyside

Director: Heather Johnson, PharmD, BCPS
Asst. Director: Michael Shullo, PharmD

Residency Program Contact Information

University of Pittsburgh School of Pharmacy
Department of Pharmacy and Therapeutics
Pharmacy Residency Program

Kathleen Woodburn
Department of Pharmacy and Therapeutics
200 Lothrop Street
PFG 01-01-01
Pittsburgh, PA 15213

www.pharmacy.pitt.edu/programs/rxresidency
woodburnkm@upmc.edu

© University of Pittsburgh, School of Pharmacy, 2011.
The University of Pittsburgh is an affirmative action, equal opportunity institution.