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2004-05



UNIVERSITY OF PITTSBURGH

School of Pharmacy

THE ART *and* SCIENCE OF EXCELLENCE

Established 1878

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Valuing Our Partners

The University of Pittsburgh School of Pharmacy values our partnerships with the University of Pittsburgh Medical Center, and the VA Healthcare System. It is through these partnerships that the Residency program has grown in national reputation.

University of Pittsburgh Medical Center (UPMC) is ranked among the top sixteen of the “America’s Best Hospitals” according to the 2004 US News and World Report rankings and is one of the leading integrated health care delivery systems in western Pennsylvania.

The VA Pittsburgh Healthcare System (VAMC) has a 128 bed tertiary care facility that serves as the referral center for other VA hospital in Pennsylvania and West Virginia, and provides a wide range of inpatient and outpatient services.

School Mission and Vision

The School of Pharmacy is dedicated to maximizing human health and well-being by preparing pharmacists to be life-long learners, by providing pharmaceutical care, by developing innovative practice models, and by advancing science through cutting-edge research.

The School of Pharmacy is committed to achieving and maintaining national recognition for excellence in education, in research, and in promoting the safe, effective and science-based use of medicines and other interventions to mitigate disease and enhance the vitality and quality of human life.

Message from the Dean

Patricia D. Kroboth, PhD

Dear Members of the Resident Class of 2004,

I extend my sincere congratulations to each of you. As individuals, you have distinguished yourselves among pharmacy practitioners by choosing residency training. 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 elements of teaching and research that have prepared you for your careers. You have had the best of two worlds because the school’s partners -- UPMC, The VA Healthcare System, and Eckerd -- have provided the environments that have enriched your residency experiences and learning.

You are distinguished for other reasons. As the school’s 14th class of residents, you are our largest class to date with the greatest geographic diversity: your class of 14 residents entered our program from 6 states and 10 schools of pharmacy.

Finally, you have another distinction, the impact of which you have not yet begun to realize. Your commitment to those evening research sessions was an investment that I believe will eventually bring you distinction. During your career, you will be faced routinely with clinically important questions. You have the foundation upon which to build answers --- and to become tomorrow’s leaders.

Each of you has just become an alumnus of our school of pharmacy and forever a part of our community. Congratulations, good luck, and keep in touch!

Research and the Pharmacy Residency Program

Dennis Swanson, MS
Robert J. Weber, MS, FASHP

This publication describes the results of the Pharmacy Practice Specialty Residents' research for 2004-2005. Importantly, their work represents countless hours of commitment to learning, reading, writing and analyzing their research. The School of Pharmacy resident research program consists of a comprehensive course that combines didactic and group learning to teach the fundamentals of research. During this series, the residents were certified in research fundamentals through the University of Pittsburgh, developed skills in clarifying their research idea, presented their ideas and methods as a group learning process, presented their project in abstract form at various professional meetings, and prepared their project for peer-review publication.

We would like to take this opportunity to publicly recognize Dr. Randy Smith for his commitment to this year's Residency Research Program. He showed patience and respect for the residents, and was always there to lend a helping hand. We would be remiss not to mention the fine secretarial support of Cheri Hill and Kathleen Woodburn. The data management skills and effort of Melissa Saul were invaluable and we thank her for her efforts. Finally, we have the best residents because we have the best faculty, and I would like to thank them for their ongoing commitment to the success of the residency program.

2004-05 School of Pharmacy Residents

Neal Benedict	Critical Care Resident	UPMC Presbyterian University Hospital
Gemilee Bustamante	Pharmacy Practice Resident	VA Pittsburgh Healthcare System
Molly Englert	Pharmacy Practice Resident	VA Pittsburgh Healthcare System
Bonnie Falcione	Infectious Diseases Resident	UPMC Presbyterian University Hospital
Timothy George	Pharmacy Practice Resident	UPMC Presbyterian University Hospital
Suzanna Gim	Drug Information Resident	University of Pittsburgh School of Pharmacy Drug Information Center
Heather Kudis	Family Practice Resident	UPMC St. Margaret's
Brian Miller	Pharmacy Practice Resident	UPMC Presbyterian University Hospital
Cory Murray	Pharmacy Practice Resident	UPMC Presbyterian University Hospital
Kristen Zerumsky	Cardiology Resident	UPMC Presbyterian University Hospital

Neal Benedict, PharmD

Critical Care Resident
UPMC Presbyterian University Hospital



Neal grew up in a small town outside of New Castle, PA and is the oldest of four children. He graduated from Mohawk High School as a three-year varsity basketball letterman and had a top ten grade point average in his class. He received his Doctor of Pharmacy degree in 2002 from Duquesne University

Mylan School of Pharmacy. After graduation, he began a pharmacy practice residency with Kaleida Health in Buffalo, NY. Following this residency, Neal took a position with the Anticoagulation Service at UPMC Presbyterian where he worked as an anticoagulation clinical pharmacist for one year. In 2004, he started a Critical Care specialty residency at UPMC. Upon completion of his specialty residency, he had hoped to pursue a career in critical care medicine and academia. Most recently, he has accepted a position as an assistant professor at the University of Pittsburgh School of Pharmacy and will specialize in critical care. His non-pharmacy interests include weight training, golfing, his pet cat, and playing guitar.

Faculty Mentor:
Amy Seybert, PharmD

Effect of a Computerized Adverse Event Alerting System on Patients at High Risk for Heparin Induced Thrombocytopenia

AUTHORS:

Benedict N, Seybert A, Rea R, Saul M, Kane-Gill S.

CLINICAL RELEVANCE:

Heparin-induced thrombocytopenia (HIT) is a serious consequence of heparin therapy. Fifty percent of untreated patients will develop life-and/or limb-threatening thromboembolic complications. Early recognition and treatment are vital to patient safety. In an effort to assist with early detection, we developed a computerized adverse event monitoring system in May 2004 to detect patients at high risk for HIT. High risk patients are those with an active heparin order and a 50% decrease in platelet count or a platelet count $<100,000 \times 10^9/L$. For patients identified as high risk, a HIT alert is generated and delivered via e-mail to the attending physician and a clinical pharmacist. The purpose of this project is to describe the impact of the HIT detection system.

METHODS:

We retrospectively identified all patients for whom a HIT alert was generated between May 2004 and January 2005. The impact of the HIT detection system was measured by the frequency of interventions and identification of HIT cases. Interventions were defined as discontinuation of heparin, ordering of HIT diagnostic tests, or ordering hematology consults. Information necessary for the evaluation of HIT was obtained including heparin utilization (dosage, route of administration, and start/stop dates), laboratory results (HIT diagnostic tests, platelet counts over time), other potential drug causes, and other disease related causes. HIT identification occurred with the use of the Warkentin scale and consensus opinion of the clinical pharmacist and hematologist.

Post HIT Alert Intervention	Interventions Implemented (n = 501)
Discontinuation of Heparin	61 (12%)
Hematology Consult	11 (2%)
HIT Panel	36 (7%)

RESULTS:

There were 501 alerts generated for 471 patients during the study period. The average patient age was 63 years and 55% were male. In 59% of the alerts, subcutaneous heparin was used. Of the 501 alerts, 11 patients were found to have clinical HIT. Four of the 11 patients were administered intravenous (IV) heparin while the remaining 7 were on subcutaneous heparin. Minimum platelet counts of the 11 HIT patients ranged from $21-144 \times 10^9/L$ with an average nadir of 64, and the maximum platelet counts ranged from $107-1,068 \times 10^9/L$ with an average of 414. Surprisingly, only 1 of the 11 patients had a positive HIT panel. Two of the patients suffered from thromboembolic complications as a result of HIT. No deaths were reported within this subset of patients.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

Clinicians are able to make frequent interventions and early detection of HIT through the development of a computer-generated HIT alerting system. The specificity of the alerts could be improved with alterations to the computer program. An evaluation of these interventions on patient outcomes is planned to evaluate whether timely identification of HIT improves patient safety.

Presented at University of Pittsburgh Medical Center and University of Pittsburgh School of Pharmacy, Pittsburgh, PA

Gemilee Bustamante, PharmD

Pharmacy Practice Resident
UPMC VA Pittsburgh Healthcare System



Gemilee Bustamante is an alumnus of Midwestern University-Glendale and the University of California-San Diego. She considers 2004 as one of her most rewarding years since she gave birth to her first child, graduated Magna Cum Laude from Midwestern University, and started a pharmacy practice

residency at the VA Pittsburgh. She chose to do a residency to learn new skills and to be exposed to new opportunities in pharmacy.

During her residency, she was fortunate to have the opportunity to improve the health of our Country's veterans. Working alongside some of the best and brightest clinical practitioners was also rewarding. One of her accomplishments as a pharmacy resident was being awarded the 2004 ASHP Medication Safety Grant for her residency project. She enjoyed all of her rotations, particularly infectious disease. After her residency, she hopes to put her clinical skills into practice and is considering an infectious disease residency in the future.

Faculty Mentors:

Chester B. Good, MD, MPH

Francesca Cunningham, PharmD

Is Off-Label Use of Medications Associated with More Frequent or Severe Adverse Drug Reactions?

AUTHORS:

Bustamante G, Longo L, Cunningham F, Good CB.

CLINICAL RELEVANCE:

Off-label drug use is increasing at an exponential rate, however the extent of use is unclear. Although prevalent, off-label drug use becomes a heightened safety concern when no or little evidence supports a drug's use in a population or for a condition. This project examines the incidence and severity of ADRs associated with drugs used for non-FDA approved indications, particularly in the elderly.

METHODS:

Patients who experienced ADRs for fiscal years 2003 and 2004 were identified and matched with a 1:1 control population (similar age, drug, and time frame). Charts were abstracted for age, drug indication, and severity of ADR (for cases). A random sample of 20% of reported ADRs was assessed for causality using the Naranjo Algorithm. Socio-demographic differences between cases and controls were analyzed using Chi-square, and the significance of severity was evaluated using a non-parametric analysis of variance. Finally, a comparison of frequency of off-label use between cases and controls was compared with Chi-square testing.

RESULTS:

Of the 1800 ADRs we estimate to review, 1255 documented ADRs and 100-control population were reviewed. For the study group, 90.6% were ADRs associated with drugs prescribed for an FDA-approved indication and 9.4% were associated with off-label drug use. For the control, 82% of the medications were written for FDA-approved indications and 18% were for off-label use. In terms of ADR severities, for drugs written for FDA-approved indications, there were 44% mild, 33% moderate, and 23% serious ADRs. For drugs used as off-label, there were 37% mild, 37% moderate, and 26% serious ADRs. In terms of ADR severity by age, 47%, 34%, and 20% of ADRs were mild, moderate, and serious, respectively, in patients <65 years. In the elderly, 43%, 33%, and 24% were mild, moderate, and serious ADRs, respectively. In the elderly with serious ADRs, 90% of medications were used for an FDA-approved indication and 10% were for off-label use. For pa-

tients <65 years of age, 88% were FDA-approved indications and 12% were off-label.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

No conclusion can be made since only 100 controls were reviewed at the time of this submission. The interim results provided give the impression that off-label use is less than what is reported, 9% vs. 21%. There appears to be a trend towards more serious ADRs with off-label, 26% vs. 23%. The elderly population is more susceptible to ADRs whether or not it is a result of off-label-use. This will be the first study to compare off-label use with ADRs in a general population, and thus will be an important addition to medication safety literature.

Presented at VISN 4 Pharmacy Conference, State College, PA and The 24th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Baltimore, MD. 2005.

Molly Englert, PharmD

Pharmacy Practice Resident
UPMC VA Pittsburgh Healthcare System



Molly grew up in McKeesport and received her Doctor of Pharmacy degree from West Virginia University (WVU) in 2004. She returned to the Pittsburgh area to complete a pharmacy practice residency at the VA Pittsburgh. She chose this residency because it would allow her to focus in ambulatory

care. During her residency, she helped to establish a drug information database and conducted a VA network-wide drug use evaluation. She enjoyed working with local veterans in the primary care and anticoagulation clinics. After her residency, Molly will be relocating to the eastern part of Pennsylvania, where she plans to pursue her career in primary care focusing in diabetes education. She is engaged to a fellow WVU classmate and will be married in Pittsburgh on October 1, 2005.

Faculty Mentors:

Lauren Trilli, PharmD, BCPS
Jeffrey Wagner, RPh

Implementing a Drug Information System at the VA Pittsburgh Healthcare System

AUTHORS:

Englert M, Trilli L, Wagner J.

CLINICAL RELEVANCE:

During a 2001 ASHP residency accreditation, The VA Pittsburgh Healthcare System (VAPHS) was rated as partially compliant with pharmacy services regarding drug information (DI) inquiries and documented responses. Our goal is to implement a DI system that will meet ASHP standards, promote pharmacist's interventions, and unify the three divisions of VAPHS.

METHODS:

Docushare, a web portal used within the VA system, was utilized to develop our DI database. From this innovative use of Docushare, archived inservices, pharmacy recipes, formulary criteria, and documented DI responses can be accessed. Since August of 2004, this pharmacy information site has been developed based on ASHP accreditation standards. Clinical pharmacists helped select initial topics. Pharmacy personnel were educated on how to access and navigate the Pharmacy Information section of Docushare. A follow-up survey was conducted one month after the initial education. Results from the second survey were utilized to make changes to our information page.

RESULTS:

At VAPHS, DI resources including MICROMEDEX and DI Handbook are frequently being used, however Docushare is now being used as a DI resource. For this purpose, Docushare is used once per week. The average time to answer a DI question remained between 5-30 minutes. Our staff were more comfortable using Docushare after the inservice. The response to Docushare by our staff has been quite positive and its use continues to improve. The number of documented pharmacist interventions and DI responses has increased.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

Upon approval from the Drug Utilization Evaluation Committee, additions continue to be made for the pharmacy information page. Docushare is now being used as a DI resource. Documentation of DI responses and interventions by pharmacists continues to increase. With the continued development of a functioning DI page, our goal is to be fully compliant with ASHP DI standard.

Presented at the 24th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Baltimore, MD. 2005.

Bonnie Falcione, PharmD

Infectious Diseases Resident
UPMC Presbyterian University Hospital



Bonnie earned her B.S. in Pharmacy at Duquesne University in 1994. She worked as a staff and consultant pharmacist at UPMC South Side until 1999 when she accepted the position as clinical pharmacist. She returned to Duquesne University and earned her Doctor of Pharmacy degree in 2003. She then completed a

Critical Care Residency at Allegheny General Hospital. During her critical care residency, she decided to pursue a position that would combine her new critical care skills with her love for infectious diseases. Bonnie accepted an Infectious Disease residency at UPMC in 2004 and became the first resident in that program. Most recently, she has accepted a position as an assistant professor at the University of Pittsburgh School of Pharmacy and will specialize in critical care. This position will allow her to practice clinically while fostering the academic needs of students.

Faculty Mentors:

Brian A. Potoski, PharmD
Blair Capitano, PharmD

A Retrospective Study of Vancomycin Dosing in Methicillin-Resistant Staphylococcus Aureus Pneumonia

AUTHORS:

Englert M, Trilli L, Wagner J.

CLINICAL RELEVANCE:

Mortality associated with methicillin-resistant Staphylococcus aureus (MRSA) pneumonia exceeds 50%. Vancomycin, the standard treatment, has limited lung penetration; thus levels may not exceed the MIC of the pathogen at the infection site. In a recent trial superiority of linezolid was documented in this setting, although vancomycin dosing was not reported. A retrospective analysis was conducted at a university teaching hospital in patients receiving vancomycin for MRSA pneumonia. The primary objective was to determine appropriateness of dosing in the treatment of MRSA pneumonia. The secondary objective was to assess outcomes according to dosing appropriateness.

METHODS:

Data from an electronic repository were extracted from April 1997- April 2000. Adult inpatients, with MRSA pneumonia [defined as >10,000 CFU obtained from a bronchoalveolar lavage (BAL)], receiving at least 1 dose of vancomycin within 24 hours of BAL, for at least 5 consecutive days, were included. Demographic and clinical data were evaluated. Vancomycin dosing was categorized as appropriate or inappropriate based on serum concentrations that exceeded or fell below 12 mcg/ml at any time during the treatment period, respectively. Outcome parameters (mortality, length of stay and ventilator days) were compared between groups. Categorical variables were compared by Chi square or Fisher's exact test where appropriate. Continuous data were compared by Student's t-test or ANOVA where appropriate.

RESULTS:

Thirteen patients (35-71 years) met inclusion criteria yielding eight with therapeutic drug monitoring data. At least 62% of patients received inappropriate vancomycin dosing. One patient's first concentration was <12mcg/ml. Four additional patient's regimens were inappropriate relative to the subsequent dose. Available data was inadequate to further assess outcome measures.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

The chosen sample period was inadequate to yield a sufficient sample size. Due to limitations of the sample size, no firm conclusions may be made. A second data extraction has been undertaken to expand the sample size to include eligible patients from the period of April 2000 to present.

Presented at the 24th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Baltimore, MD. 2005.

Timothy George, PharmD

Pharmacy Practice Resident
UPMC Presbyterian University Hospital



Tim is originally from Wheeling, West Virginia and received his Doctor of Pharmacy degree in May 2004 from West Virginia University. To enhance his clinical and academic skills, he decided to leave “Mountaineer Country” to pursue a pharmacy practice residency with the University of Pittsburgh. The UPMC residency

program appealed to him because of its wide variety of opportunities and clinical experiences. Upon completion of his pharmacy practice residency in June 2005, he will stay on to begin a clinical specialty residency position in the field of Hematology and Oncology. He chose the specialty of hematology/oncology because it encompasses his main pharmacy interests of oncology, internal medicine, and infectious disease. In the future, Tim plans on practicing as a clinical hematology/oncology pharmacy specialist in the inpatient hospital setting. His outside interests include golf, running, exercising, playing pool, and reading.

Faculty Mentor:
Denise R. Sokos, PharmD, BCPS

Pharmacists as Immunizers: Assessing Attitudes of Pharmacists in the Independent, Community Pharmacy Setting

AUTHORS:

George TJ, Zimmerman RK, Sokos DR.

CLINICAL RELEVANCE:

Nationally and in Pennsylvania (PA), adult vaccination rates are well below national goals. Recently, the PA Pharmacy Practice Act was revised granting pharmacists the authority to administer vaccines. This study was conducted to determine PA pharmacists' awareness of these regulations, interest and willingness to implement an immunization service, and attitudes regarding the influenza and pneumococcal vaccines.

METHODS:

Between January and March 2005, a 19-question cross-sectional survey was distributed via postal mail to a stratified, random sample of 700 independent, community pharmacy owners or managers in PA. Initial non-respondents received one additional mailing. The questionnaire addressed sources of practice regulations, attitudes toward immunizations services, personal views of the influenza and pneumococcal vaccines, and demographic data.

RESULTS:

Two mailings yielded a response rate of 45%. The mean age of the respondents was 49 years. Eighty percent were male and they had been in practice for an average of 25 years. Fifty-three percent reported being aware of the legislative change and 26% indicated a strong likelihood of initiating a pharmacist-run vaccination program. Forty-six percent agreed that pharmacists should be providers of vaccinations with a large proportion (39%) neutral. The most important factors identified in pharmacists' decision to initiate vaccination programs were liability, training, and third party reimbursement. Approximately 13% of respondents agreed that the influenza and pneumococcal vaccines were ineffective and nearly 22% agreed that these vaccines frequently cause serious adverse reactions.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

The awareness of the legislative change allowing PA pharmacists to provide immunizations is currently inadequate. Pharmacists practicing in the independent setting have not embraced the role of immunization provider and misconceptions exist regarding the efficacy and safety of the influenza and pneumococcal vaccines. The identified barriers to providing immunization programs are amendable to education and training. We anticipate this pilot study will lead to future research into the development of interventions aimed towards increasing pharmacists' involvement in immunization services.

Presented at the 24th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Baltimore, MD. 2005.

Suzanna Gim, PharmD

Drug Information Resident
UPMC Drug Information Center



Suzanna was born and raised in Baltimore. After earning her bachelor's degree in psychology in 1999 from New York University, she was a senior lab technician at Columbia University and a co-investigator on several research studies. She returned to Baltimore and completed her PharmD at the University of Maryland in

2004. Inspired by her clinical experiential learning rotations and various experiences with drug information and pharmacoeconomics, she pursued further training. She chose the drug information residency at the UPMC because it afforded a variety of opportunities in academia, clinical care, and industry. She is passionate about learning and teaching and feels that drug information is the field that gives her the most opportunity for growth in both of these areas. Suzanna enjoys life to the fullest by traveling, being outdoors, and trying new things. She has accepted a faculty position as a Drug Information Specialist at the Arnold & Marie Schwartz School of Pharmacy at Long Island University in Brooklyn, NY.

Faculty Mentors:

Kim C. Coley, PharmD

Robert J. Weber, MSc, FASHP

Novel Antipsychotic Use and Its Impact on the Cost of Care in a Psychiatric Hospital

AUTHORS:

Gim S, Coley KC, Weber RJ, Ganguli R.

CLINICAL RELEVANCE:

Novel antipsychotic (NA) prescribing has increased over the past few years. Newer NAs have continued to enter the market and the use of this class of drugs has been expanding beyond the FDA-approved indications. The objective of this study was to identify longitudinal prescribing patterns of NAs and determine their impact on pharmacy charges.

METHODS:

Financial and clinical data from the billing and medical records of a psychiatric hospital were collected for the period of July 1, 1999 through June 30, 2004 and grouped by fiscal year (FY). Diagnoses treated (ICD-9 codes) and hospital charges including pharmacy charges were collected. Pharmacy charges as a percent of total hospital charges, NA charges as a percent of total pharmacy charges, and the distribution of NA use by ICD-9 discharge codes were determined for each FY. Changes in percent contribution of pharmacy charges to overall hospital charges (regression model), utilization of NA compared to other drugs and utilization of NA by selected psychiatric diagnosis (Cochran test) were also compared between FY.

RESULTS:

Total hospital charges have increased by \$54.6 million over the past five years. Within the total hospital charges for each FY, the contribution of pharmacy charges has also increased significantly from 8.6% to 13.5%. Within the pharmacy charges, the percentage of NA charges has increased significantly by 8.1%. Out of all visits for each FY, the percentage of visits associated with an NA charge increased significantly from 40.5% to 55.6%. Risperidone remains the most prescribed NA, while only the use of the newer agents quetiapine and aripiprazole is increasing as a percent of the class. Use of NAs has increased across all age groups, with persons less than 18 years of age showing the greatest increase per FY from 25.9% to 46.6%.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

The expanding use of these costly agents, despite limited safety and efficacy data outside of FDA-approved labeling, warrant attention. Substantive evidence is needed to clarify these increasingly common, inadequately researched psychopharmacological practices.

Presented at the 24th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Baltimore, MD. 2005.

Heather Kudis, PharmD

Family Practice Resident
UPMC St. Margaret



Heather is from Pittsburgh, PA where she received her Pharm.D. with a concentration in geriatrics from Duquesne University in May 2004. She enjoys the ambulatory care setting, where she believes there is a strong role for pharmacists as clinical educators. Heather chose UPMC St. Margaret because it provided

a practice setting where she could combine her interests of chronic disease state management and direct patient care, all in an environment with a rich teaching tradition. During her residency, Heather has been an active participant of the Faculty Development Fellowship program at UPMC St. Margaret, and has taught Family Medicine physician residents, medical students and pharmacy students. She has presented at Western Pennsylvania Society of Health Systems Pharmacists, Society of teachers of Family Medicine, and Eastern States conferences, and her work is published in American Family Physician, Pharmacotherapy, and Allegheny County Medical Society Bulletin. The clinical role she fulfills includes direct patient care through medication management visits as well as conducting patient-centered group visits for diabetes and smoking cessation. Heather will be residing in the Pittsburgh area after graduation and pursuing a clinical pharmacy position.

Faculty Mentor:
Patricia Klatt, PharmD

Improving Outcomes in Patients with Dyslipidemia Through Pharmacist Education of Physician Residents

AUTHORS:

Kudis H, Klatt P, D'Amico F, Somma MA.

CLINICAL RELEVANCE:

National data (NHANES III) and historical data from our community-based health center training site demonstrated only 55% of our patients were reaching their target LDL cholesterol goals. We predicted that a pharmacist educational intervention to physician residents about the management of outpatients with dyslipidemia would improve patient outcomes.

METHODS:

Pharmacists provided a 30-minute educational intervention on management of patients with dyslipidemia to 35 physician residents in an individualized or small group forum. Patient cholesterol data was collected one-year prior and three months following the intervention date. The primary endpoint was "improved patient outcomes" defined by more patients achieving their LDL goal and a reduction in mean LDL. Secondary endpoints included changes in physician prescribing practice, evidence of appropriate liver function test (LFT) monitoring, and improved physician perception of their ability to manage patients. Physicians' perceived change in approach to management of dyslipidemia was evaluated through an anonymous survey. Statistical testing to evaluate the primary outcomes included the paired t-test verified with signed-rank test and McNemar's test for paired dichotomous data, respectively.

RESULTS:

A three-month post-intervention medical record data analysis (n = 48) demonstrated that there was a 12% increase in the number of patients achieving their LDL goal compared to baseline (23/48 vs. 29/48). The mean pre-intervention LDL was 128 ± 41 mg/dL (range 58-248) and the post-intervention LDL was 111 ± 35 mg/dL (range, 48-202), representing a mean LDL reduction of 17 mg/dL (p < 0.009). Physician prescribing patterns differed significantly pre- and post- intervention: 57% vs. 80% (p = 0.001) of patients we prescribed a HMG Co-A reductase inhibitor, 4% vs. 15% (p = 0.07) of patients received a dose change of lipid-lowering medication, and 6% vs. 29% (p = 0.008) of patients were initiated on an FDA-approved cholesterol medication. Also, 91.8% of patients had appropriate LFT monitoring post-intervention. Physician residents perceived an improvement in ability to manage patients with dyslipidemia with regard to an increased expertise and skill level,

importance of treating patients to LDL goals, and adherence to schedules of appropriate LFT monitoring and follow-up visits.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

As clinician educators, pharmacists improve patient outcomes through direct patient care and successfully educate residents on medication management of various disease states. Through development and instruction of a pharmacotherapy curriculum for physician residents, we demonstrated that the education pharmacists provide is retained and applied during patient care, resulting in improved patient outcomes.

Presented at the Spring Conference of The Society of Teachers of Family Medicine, Eastern States, UPMC St. Margaret Professor Grand Rounds and Noon Conference.

Brian Miller, PharmD

Pharmacy Practice Resident
UPMC Presbyterian University Hospital



Brian is originally from Wheeling, West Virginia and received his Doctor of Pharmacy degree from Duquesne University in 2004. He came to UPMC in order to hone his clinical, teaching/precepting, and research skills. During his general practice residency, Brian enjoyed exploring the various facets of pharmacy through the

rotational experiences. Upon completion of the residency, Brian will pursue a specialty in Hematology/Oncology at UPMC Shadyside. Brian chose a career in this specialty area due to an interest in pain management and the desire to improve the quality of patients' lives. He plans to pursue a clinical pharmacy position after completing the specialty residency. In his leisure time, Brian enjoys weightlifting/exercising, participating in athletics, watching sports, and spending time with family and friends. He is also engaged and he and his fiancée are planning a wedding on September 10, 2005 at the Duquesne University Chapel.

Faculty Mentor:

Sue Skledar, RPh, MPH,
Ted L. Rice, MS, FASHP, BCPS
Kristine Schonder, PharmD.

Evaluation of Darbepoetin Alfa Dosing in Hospitalized Patients with Chronic Kidney Disease

AUTHORS:

Miller BM, Skledar S, Rice TL, Schonder K.

CLINICAL RELEVANCE:

Guidelines have been published describing assessment of iron stores and erythropoietic agent dosing. The recommended starting dose of darbepoetin alfa in patients with chronic kidney disease (CKD) is approximately 40 mcg (0.45 mcg/kg/week) based upon FDA-approved product labeling. Darbepoetin alfa was selected as the preferred formulary erythropoietic agent at our institution in April 2003. Purchases during the second half of a one-year review showed a two- to three-fold increase in 100 mcg syringes, suggesting physicians began prescribing larger than recommended doses. This study determined whether physicians were prescribing higher initial and/or escalating darbepoetin alfa doses because iron stores are not evaluated.

METHODS:

Medical records of inpatients with CKD that received darbepoetin alfa from January 1 to June 30, 2004 were retrospectively reviewed using an archived electronic data repository. Hemoglobin (Hg) and hematocrit (HCT) values along with pretreatment iron stores were evaluated to determine proper dose initiation. If transferrin saturation (TSAT) was below goal, iron repletion was also analyzed. Proper dose escalation was evaluated according to these data elements along with time since last dose increase. The primary outcome measure was appropriateness of darbepoetin alfa prescribing. The secondary outcome measure compared prescribing patterns by physician service.

RESULTS:

The study evaluated 263 patients, with 88% having a Hg below goal (<11 g/dL) and 54% having appropriate dose initiation. Only 29% had iron stores evaluated prior to initiation and from this group, 69% had a TSAT <20%. Seventy-two percent with low TSAT had iron repleted with oral (45%), intravenous (39%), or oral and intravenous (16%) iron. Admitting services most often initiating darbepoetin alfa inappropriately were Transplant (48%) and Medicine (36%). Percentage of patients with appropriate dose escalation performed will also be presented.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

This study demonstrates the initial dose of darbepoetin alfa is not being prescribed properly to treat anemia of CKD. The results of this study will be used to guide education of prescribers on proper initiation, obtaining and analyzing iron stores, and proper dose escalation. Pharmacists will play an active role in not only education, but also in developing therapeutic guidelines for the management of anemia related to CKD at our institution.

Presented at the 24th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Baltimore, MD. 2005.

Cory Murray, PharmD

Pharmacy Practice Resident
UPMC Presbyterian University Hospital



Cory is originally from Ellwood City, a small town located north of Pittsburgh. He received his Doctor of Pharmacy degree from Duquesne University in May 2004. During his third professional year of the pharmacy curriculum at Duquesne, several clinical mentors helped him realize the positive drug therapy

outcomes a clinical pharmacist can achieve working with physicians, nurses and other health professionals. This experience helped Cory realize that residency training would be important for him to achieve his career goals. Upon completion of his pharmacy practice residency at UPMC, Cory will begin a specialty residency in cardiology at UPMC. In the future, he hopes to pursue a clinical position in a large teaching hospital working closely with physicians and other healthcare professionals. Cory enjoys teaching and one day hopes to instruct and precept pharmacy students as a part of his clinical position.

Faculty Mentor:
Blair Capitano, PharmD

A retrospective evaluation of the clinical and microbiological outcomes of ampicillin/sulbactam dosed at 1.5 grams compared to 3 grams.

AUTHORS:

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CLINICAL RELEVANCE:

The suggested dose of ampicillin/sulbactam (A/S) ranges from 1.5 to 3 grams every six hours. It is well documented that the antibacterial activity of β -lactam antibiotics, such as A/S, is time-dependent in nature. The key pharmacodynamic variable linked to the antibacterial activity of β -lactam antibiotics is the percent time in which the drug concentration exceeds the minimal inhibitory concentration of the pathogen (%T>MIC). Similar % T>MIC have been observed in patients receiving A/S 1.5 and 3 grams. It is hypothesized that treatment with A/S 1.5 grams given every six hours will result in a similar rate of positive clinical and microbiological outcomes as observed with A/S 3 grams given every six hours. The objective of this study was to compare the clinical and microbiological outcomes associated with use of A/S 1.5 and 3 grams in the treatment of bacteremia and urinary tract infection (UTI) in immunocompetent patients.

METHODS:

Demographic, microbiological, and infection-related clinical outcomes data were collected using an archived electronic data repository in this single-center, observational, retrospective study. Patients treated with A/S for bacteremia or UTI caused by an A/S susceptible pathogen were included. Clinical and microbiological success and failure rates are being assessed and compared between treatment groups based on subjective and objective infection-related data. Continuous variables will be compared by the Student's t-test, while nominal data were analyzed using a Fisher's exact or Chi-square test where appropriate.

RESULTS:

A total of 933 patients between January 1, 2001 and December 31, 2004 were initially identified. After applying exclusion criteria, 308 patients have been included into the study. Currently, infection-related outcomes are being assessed in order to determine and compare clinical and microbiological success and failure rates between treatment groups.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

Pending final data analysis.

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Kristin Zerumsky, PharmD

Cardiology Resident
UPMC Presbyterian University Hospital



Kristin was born and raised in Philadelphia and knew from a very young age that she wanted to be a pharmacist. She received her Doctor of Pharmacy degree from the Philadelphia College of Pharmacy and Science in May 2003. Kristin has always had an interest in cardiology and chose to pursue this interest through a

cardiology specialty residency at UPMC. She completed her pharmacy practice here at the University of Pittsburgh. She is an active member of American College of Clinical Pharmacists, American Society of Health-System Pharmacists and the Pennsylvania Society of Health-System Pharmacists. Upon completion of her cardiology residency, Kristin will begin her career as a non-tenure assistant clinical professor of Cardiology/Pharmacotherapy at the University of Maryland School of Pharmacy. Outside of work, she enjoys football and reading. Kristin is engaged and planning to be married next June.

Faculty Mentor:
Amy Seybert, PharmD

Evaluation of Cost and Clinical Outcomes of Anticoagulation during Percutaneous Coronary Intervention

AUTHORS:

Zerumsky K, Seybert A, Kane-Gill S, Saul MI, Lee JS.

CLINICAL RELEVANCE:

The Randomized Evaluation of PCI Linking Angiomax to Reduced Clinical Events (REPLACE-2) trial demonstrated that bivalirudin with provisional glycoprotein IIb/IIIa (Gp) inhibitors is not inferior to unfractionated heparin (UFH) plus planned Gp inhibitors during percutaneous coronary intervention (PCI) in preventing ischemic complications in non-high risk patients. This trial also showed a decreased utilization of Gp inhibitors, incidence of bleeding, and total costs. The purpose of this study is to compare Gp inhibitor use, costs and clinical outcomes of REPLACE-2 in a naturalistic setting between PCI patients who received bivalirudin or UFH.

METHODS:

Patients were identified retrospectively from April 2003 - April 2004 through an electronic medical record repository using PCI ICD-9 codes. Patients ≥ 21 years with PCI as their primary procedure were included. Patient demographics, co-morbidities, laboratory values, radiology reports, cardiac catheterization laboratory reports, pharmacy discharge summary, charged transactions and total hospital costs were obtained. Clinical outcomes evaluated include MI, bleeding, revascularization, mortality and length of stay; defined according to published criteria in REPLACE-2.

RESULTS:

There were 1075 patients included with an average age of 64.2 ± 12.1 years. Seven hundred and twenty three (67.3%) patients were male. There were 536 patients identified who received bivalirudin and 539 who received UFH. Gp IIb/IIIa inhibitors were used in 62.5% of patients in the UFH and in 26.7% of the bivalirudin group ($p < 0.001$). Mortality in the UFH group was 3.7% ($n=20$) and 1.3% ($n=7$) in the bivalirudin group ($p=0.01$). Length of stay was longer in the UFH group (3.49 ± 4.13 days) compared to the bivalirudin group (2.77 ± 2.95 days, $p < 0.001$). One retroperitoneal bleed was identified in the bivalirudin group (0.2%) and in 3 the UFH group (0.6%). Future directions of the project include clinical outcomes analysis and cost-effectiveness analysis.

CONCLUSIONS AND CLINICAL IMPLICATIONS:

Preliminary data demonstrates that bivalirudin may improve clinical outcomes by decreasing mortality and length of stay. Analysis including MI, bleeding and the need for revascularization will be evaluated. The results of the REPLACE-2 trial are applicable to a naturalistic setting.

School of Pharmacy Residency Programs

Children's Hospital of Pittsburgh: Pediatric Pharmacy Practice Residency

The Children's Hospital of Pittsburgh (CHP), in conjunction with the University of Pittsburgh offers a residency program specializing in pediatric pharmacy practice. This residency is designed to develop and enhance the knowledge, skills, and attitudes necessary for providing quality clinical pharmacy services to pediatric patients. Rotation opportunities include general pediatrics, neonatal intensive care, pediatric intensive care, cardiology, hematology/oncology, transplantation, ambulatory care (longitudinal), infectious disease and drug information. Elective rotations may be designed based on availability and resident interest. The resident will be responsible for providing clinical services in addition to clinical and didactic teaching, completion of a research project, participation in the clinical on-call therapeutic drug monitoring (TDM) service, and other departmental activities. Children's Hospital of Pittsburgh is dedicated to improving the health and wellbeing of all children through excellence in patient care, teaching and research. CHP is the only hospital in western Pennsylvania devoted solely to the care of infants, children and young adults.

Children's Hospital of Pittsburgh will be opening a new state of the art facility in 2007. It will be one of the first hospitals in the nation incorporating environmentally "green" technology. Plans for this 1.45 million square foot facility call for three parking garages, two helipads, 14 operating rooms, 41 ER exam rooms, 235 inpatient beds including 28 NICU and 48 critical care. As the only hospital in western Pennsylvania devoted solely to the care of infants, children and young adults, the hospital has been named consistently to several elite lists of pediatric health care facilities, including ranking seventh among children's hospitals (FY 2002) in funding provided by the National Institutes of Health. The hospital also is renowned for cardiology, cardiothoracic surgery, critical care medicine, diabetes, hematology/oncology, neurosurgery, organ and tissue transplantation, orthopaedics, otolaryngology (ENT) and pediatric surgery. Children's Hospital is also the only accredited Level 1 Regional Resource Pediatric Trauma Center in western Pennsylvania and one of only three in the state.

Program Director: Amy Potts, PharmD

School of Pharmacy Residency Programs

EHS: Pharmacy Benefits Management Residency

The University of Pittsburgh and EHS, one of the nation's largest pharmacy chain-based prescription benefit management firms, offers an opportunity to practice in a dynamic PBM environment and gain a clinical and administrative perspective in managing pharmacy benefit plans for a wide variety of clients. The resident will be involved in multiple aspects of the PBM including Drug Utilization Review (DUR) criteria development, clinical intervention activities, Pharmacy and Therapeutics committee activities and clinical information systems development. In addition, the resident will also have an opportunity to obtain valuable insight about new business development, client service and marketing support.

The training site for this residency is the Clinical Department of EHS located in Pittsburgh, PA. EHS is a pharmacy chain-based prescription benefits management firm that provides superior prescription benefit services, along with cost-effective plan management. The company's mission is to provide healthcare services that exceed our clients' expectations for improved patient outcomes, cost containment, quality assurance and member satisfaction through advanced and flexible technologies and innovative management strategies. EHS is committed to the highest level of integrity, ethical standards, quality and customer service.

In addition to being involved in the clinical activities of EHS, the resident will also have the opportunity to participate in the professional activities of Express Pharmacy Services, a pioneer in the mail service pharmacy industry with advanced robotics and radio frequency dispensing technology.

Program Director: Teddi A. Gianangeli, PharmD

School of Pharmacy Residency Programs

UPMC Health System: Cardiology Specialty Residency

The cardiology residency provides opportunities for a resident to enhance his/her clinical skills while becoming exposed to the functions of health system and academic institutions. In addition, the resident will experience both didactic and experiential teaching opportunities as an Adjunct Instructor and preceptor within the University of Pittsburgh School of Pharmacy. The resident will concentrate on cardiovascular patients and projects and will be involved in ongoing department and independent research projects. The resident will have the opportunity to develop and present a research project and a formal seminar, and will participate in discussion series and formal department programs. At the conclusion of the program the resident will have developed into an accomplished clinical practitioner, with an emphasis in cardiology, who has gained valuable insight into the elements necessary to professionally grow and develop.

Program Director: Amy L. Seybert, PharmD

UPMC Health System: Critical Care Specialty Residency

The critical care residency at the UPMC's Presbyterian hospital is designed for the individual interested in developing specialized clinical expertise in pharmaceutical care for critically ill patients. The critical care resident will gain expertise in interpretation of hemodynamic monitoring, pathophysiology of acute illness and resulting sequela, nutritional support, therapeutic drug monitoring, infusion therapy, support devices, and pharmacy practice issues of the intensive care unit.

The resident will be integrally involved in research opportunities and education of students and other health care professionals. Formal seminars, patient cases, journal clubs, and inservice education for UPMC-P staff are mandated throughout the year. Through affiliation with the University of Pittsburgh, the resident holds an Adjunct Instructor position with didactic and experiential teaching responsibilities to PharmD candidates during their clinical clerkships.

Program Director: Amy L. Seybert, PharmD

School of Pharmacy Residency Programs

UPMC St. Margaret's: Family Practice Residency

UPMC St. Margaret is a community teaching hospital with a medical Family Practice Residency and Fellowship Program. In addition to the listed opportunities, the pharmacy Family Practice Resident will be able, schedule permitting, to participate in any of the teaching conferences available to the medical residents. Our goal is to provide enough flexibility in the curriculum to allow the resident to develop his or her own career interests in addition to participating in the longitudinal experiences of the residency.

Director: Trish Klatt, PharmD, BCPS
Assistant Director: Bobbie Farrah, PharmD, BCPS

UPMC Health System: Infectious Diseases Pharmacy Residency

The infectious diseases specialty residency at the University of Pittsburgh Medical Center (UPMC) is designed for the individual who is interested in developing specialized clinical skills in the area of infectious diseases pharmacotherapy. The infectious diseases specialty resident will gain expertise in many aspects of pharmaceutical care including, but not limited to, the interpretation of microbiological culture and susceptibility data, antimicrobial pharmacokinetics/pharmacodynamics, antimicrobial therapy in the general as well as specialized patient populations and research.

The resident will be integrally involved in research opportunities and the education of students and other health care professionals. The resident will work in close collaboration with not only Pharmacist practitioners, but Physicians of the Division of Infectious Diseases. Through affiliation with the University of Pittsburgh, the resident will hold didactic and experiential teaching responsibilities to Doctor of Pharmacy candidates. The resident will also complete an infectious diseases focused research project through participation in a mentored residency research training program.

Program Co-Director: Blair Capitano, PharmD
Program Co-Director: Brian Potoski, PharmD

School of Pharmacy Residency Programs

UPMC Health System: Oncology Specialty Residency

The University of Pittsburgh Cancer Institute (UPCI) and the University of Pittsburgh Cancer Centers are part of the University of Pittsburgh Medical Center (UPMC) Health System that serves patients with hematologic and oncologic diseases. Within the UPCI are disease-focused centers which include a world-renowned melanoma center, as well as centers devoted to brain tumors, breast cancer, colon and gastrointestinal cancer, head and neck cancer, leukemia and lymphoma, liver cancer, lung cancer, oral cancer, and ovarian and gynecologic cancers, prostate and urologic cancers, and stem cell transplantation.

The oncology residency at the UPCI is designed for clinical pharmacists interested in specializing in the pharmaceutical care of patients with cancer. The oncology resident will gain expertise in the management of various malignant solid tumors, lymphomas, leukemias, as well as the management of patients receiving autologous and allogeneic stem cell transplants. The resident will also be involved in the provision of supportive care to patients with cancer including, but not limited to, pain management, nutrition, and hospice care. A wide variety of teaching opportunities are available; including one-on-one teaching of students in the University of Pittsburgh Doctor of Pharmacy Program, formal large and small group teaching in courses at the University of Pittsburgh School of Pharmacy and the UPMC Cancer Centers courses, and informal in-services throughout the UPMC.

Program Director: Rowena Schwartz, PharmD

School of Pharmacy Residency Programs

UPMC Health System: Pharmacy Practice Residency

University of Pittsburgh Medical Center (UPMC) is ranked among the top sixteen of the “America’s Best Hospitals” according to the 2001 US News and World Report rankings and is one of the leading integrated health care delivery systems in western Pennsylvania. The health system consists of tertiary, specialty and community hospitals, physician offices, and rehabilitation facilities. By integrating the resources of the University of Pittsburgh School of Pharmacy and UPMC Presbyterian Shadyside, this residency program offers a challenging yet flexible environment where highly motivated pharmacy residents may ensure the application of safe and effective, evidenced-based medicine practices to individual patients and in populations throughout the Health System.

Residents are actively involved in the design and participation of a residency project suitable for publication and the development and implementation of drug use initiatives. Residents are members of multidisciplinary hospital committees, participate in resident journal clubs, and present seminars. A unique aspect of this program is that each resident holds an Adjunct Instructor position with opportunities to prepare lectures for pharmacy and allied health students, lead student group discussions, and precept PharmD students during their clerkship rotations. Flexibility is provided to meet the individual resident’s goals and objectives. Each resident will be eligible for a financial stipend to attend professional meetings. The ultimate goal of the program is to enable residents to become competent in the knowledge, skills, and attitudes they require to optimize pharmacotherapy outcomes and provide a high level of patient care to diverse populations.

Program Director: Sheel Patel, PharmD, BCPS

School of Pharmacy Residency Programs

UPMC Health System: Pharmacy Practice Management Residency

The pharmacy practice management residency at the University of Pittsburgh Medical Center (UPMC) provides opportunities for the resident to develop leadership and expert pharmacy management skills in an academic medical center. Specific rotations and competencies include departmental administration (including P&T Committee and drug information services), Health-system and hospital operations management, pharmacoinformatics and outcomes research, drug use and disease state management, pharmacy automation, finance and information services.

The resident will be integrally involved in research opportunities and education of students and other health care professionals. Formal seminars, patient cases, journal clubs, and education for UPMC pharmacy staff are mandated throughout the year. Through affiliation with the University of Pittsburgh, the resident will have didactic and experiential teaching responsibilities to PharmD candidates during their clinical clerkships. One pharmacy practice management focused research project suitable for publication or presentation at a national meeting is required.

Program Director: Scott Mark, PharmD

School of Pharmacy Residency Programs

UPMC Health System: Primary Care Specialty Residency

University of Pittsburgh Medical Center (UPMC) is ranked among the top sixteen of the “America’s Best Hospitals” according to the US News and World Report rankings and is one of the leading integrated health care delivery systems in western Pennsylvania. The health system consists of tertiary, specialty and community hospitals, physician offices, and rehabilitation facilities. By integrating the resources of the University of Pittsburgh School of Pharmacy and UPMC, this residency program offers a challenging yet flexible environment where highly motivated Primary Care Specialty Residents may ensure the application of safe and effective, evidenced-based medicine practices to individual patients and in populations throughout Western Pennsylvania.

In addition, residents are actively involved in the design and participation of a residency project suitable for publication, development and implementation of drug use initiatives, as members on multidisciplinary hospital committees, participate in resident journal clubs, and seminar. Unique to this program, each resident holds an Adjunct Instructor position with opportunities to prepare lectures for pharmacy and allied health students, lead student group discussions, and directly preceptor PharmD students during their clerkship rotations. Flexibility is provided to meet the individual resident’s goals and objectives. Each resident will be eligible for a financial stipend to attend professional meetings. The ultimate goal of the program is to enable Primary Care Specialty Residents to become competent in the knowledge, skills, and attitudes required to optimize pharmacotherapy outcomes and produce proficient practitioners providing patient care to diverse populations.

Program Director: Michael Shullo, PharmD

School of Pharmacy Residency Programs

University of Pittsburgh School of Pharmacy: Drug Information Center Residency

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Program Director: Lauren Trilli, PharmD

School of Pharmacy Residency Programs

VA Pittsburgh Healthcare System: Pharmacy Practice Residency

The VA Pittsburgh Healthcare System, in conjunction with the University of Pittsburgh, offers a residency program in pharmacy practice. The VA Pittsburgh Healthcare System has a 128 bed tertiary care facility that serves as the referral center for other VA hospitals in Pennsylvania and West Virginia, and provides a wide range of inpatient and outpatient services.

The residency provides an integrated experience in acute care, ambulatory care, drug information and practice management with an emphasis on primary care. The program is tailored to address the needs of the individual resident, while providing the basic foundation necessary for a high level of clinical pharmacy practice. Under the guidance of clinical faculty members at the VA, each resident gains invaluable experience in balancing their schedules to provide a “real-life” approach to the residency. Each resident is involved in the drug use evaluation committee, pharmacy and therapeutics committee functions, and didactic and experiential education. Residents participate in journal club, prepare pharmacy newsletters, and provide staff and patient education. Residents are also required to complete a research project of publishable quality and to present two seminars of interview quality to peers, faculty, students, and staff.

Program Director: Lauren Trilli, PharmD

Residency Program Contact Information

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