Clinical Pharmacist Spotlight:
Clinical Assistant Professor and Ambulatory Care
By: Alyssa K. Elrod, Pharm.D. Candidate

Michael L. Thiman, Pharm.D., BCPS

What steps did you take to become a Clinical Assistant Professor at UGA?

During my 4th year of pharmacy school at UGA, I discovered an interest in ambulatory care in the Veterans Affairs (VA) practice setting, and knew that I wanted exposure to teaching during my PGY-1 training. I completed my PGY-1 at the Durham VA Medical Center in North Carolina with electives focused on ambulatory care. I also completed a teaching certificate program at the University of North Carolina, and it was through this that I decided to pursue a clinical faculty role. For my PGY-2, I matched with the ambulatory care program at UGA and was able to maintain the VA as a practice site. The academic focus of my PGY-2 was crucial in preparing me for a clinical faculty role.

In what ways did your PGY-1 and PGY-2 residency training help prepare you for your position?

During my PGY-1 year, I was able to develop a level of comfort interacting with patients in the ambulatory care setting. My PGY-2 year allowed me to build upon my experiences and grow into a more independent clinical practitioner.

I was able to see patients throughout the year and evaluate the impact of the interventions I made. My PGY-2 also helped me understand the requirements of maintaining a clinical service with an administrative perspective.

What was the transition like going from student to resident to faculty member?

Everything is a progressive step, and at each step there is increased independence and increased demand on your time. As a student, in the 4th year, you have a clinical practice role with the guidance of a preceptor. As a PGY-1, you are a licensed pharmacist and the decisions you make are yours; however, you still have preceptors there to guide you. As a PGY-2, there is an expectation for greater independence with clinical decision-making regarding higher level concepts.

In terms of becoming a faculty member, completing my PGY-1 gave me a different perspective affording the ability to bring ideas from another institution and practice site back to UGA. I was also able to continue teaching some of the clinical topics I taught during my PGY-2 year. As a faculty member, you have to find a balance between research, practice, service to the college, and providing students with didactic and experiential instruction. I am lucky to have the opportunity to be a faculty member where I was a student and resident. I work with great people, and having great mentors makes the various transitions in your career much easier.

(continued on page 2)
Continued from page 1:

What are your current academic and research interests?

My current academic and teaching interests include developing an interprofessional education initiative and coordinating a new Essentials of Pharmacy Practice course. I am very lucky as a young faculty member to be involved in the accreditation and curriculum revision process for the College of Pharmacy. My current research interests include an epigenetic and sleep apnea project that the UGA PGY-2 resident began last year and collecting data from my residency project at Mercy Health Center. I also hope to develop clinical research within the VA.

How did you decide to pursue a career in ambulatory care?

When I started my APPE rotations, I was set on pursuing a PGY2 in cardiology. Throughout my different APPE experiences I was exposed to providing care in clinic settings and ambulatory care. My APPE ambulatory care rotation at the VA sealed the deal because I enjoyed every aspect of it.

Patient interaction, continuity of care, and the clinic interdisciplinary model are the biggest driving factors for me in ambulatory care. I like to educate my patients about their options and encourage them that we are making decisions together. Seeing patients become invested in their care and meeting their goals of therapy is definitely rewarding.

Where is your current practice site and what is your role there?

Dr. Beth Phillips and I work as clinical faculty pharmacists at the Charlie Norwood VA Medical Center Athens Community Based Outpatient Clinic (CBOC). We work in the pharmacotherapy clinic primarily with patients regarding cardiovascular risk reduction. Primary care providers (PCPs) refer patients to our clinic for diabetes, hypertension, hyperlipidemia, or a combination of disease states. Our patients typically are those who require more intense monitoring, are having trouble getting to goal outcomes, or those who require a lot of medication education on top of therapy adjustments. We will see patients for an initial visit and then every 2-3 months after that. Our practice site also serves as a location for residency training and APPE rotations for 4th year students.

What is your current involvement in professional organizations and how has it helped you further develop as a pharmacist?

At the national level, I am most involved with the American College of Clinical Pharmacy (ACCP), particularly through the Ambulatory Care Practice Research Network (PRN). I served on the ambulatory care PRN membership committee last year and will be on the committee again this year. PRNs are great opportunities to get involved in larger professional organizations. Through ACCP, I have had the opportunity to network and exchange ideas with other ambulatory care providers and leaders in the profession.

If you could be any drug, what would you be and why?

Aspirin. It is an old school drug that is often overlooked because it is so commonplace; however, in reality, it has a very beneficial effect in patient care and carries a lot of potential significance overall.

Note: The content above has been lightly edited from the interview for clarity.

Use of Olanzapine Versus Aprepitant in Chemotherapy-induced Nausea and Vomiting

By Sendy Tran, Pharm.D. Candidate

Chemotherapy-induced nausea and vomiting (CINV) is a common side effect of chemotherapy due to its nature of adding toxins to the body to attack malignant cells. Nausea and vomiting are protective reflex mechanisms to rid the body of the toxins. In the past several years, updated uses of older and newer agents have broadened the antiemetic options for CINV, including olanzapine and aprepitant. Although aprepitant has FDA approval for the prevention of CINV, olanzapine has been shown to be effective in preventing and treating CINV.

Aprepitant is a neurokinin receptor antagonist that blocks the emetic effects of substance P, whereas olanzapine’s mechanism features a blockage of multiple neurotransmitter receptors. Due to olanzapine’s non-specificity for receptor blockade, it may cause sedation and weight gain. Olanzapine is also associated with metabolic disturbances, but the risk is low due to short term use for CINV. Aprepitant has a minimal effect on nausea while olanzapine is effective in the improvement of both emesis and nausea.

Despite the differences, olanzapine and aprepitant have similar value in clinical practice. According to the guidelines, olanzapine or aprepitant can be combined with standard therapy of the corticosteroid, dexamethasone, and a 5-HT3 receptor antagonist, such as ondansetron or palonosetron, to effectively prevent CINV. Olanzapine is also used in combination to treat acute and delayed CINV.

Rising drug costs have been of major concern with both patients and healthcare professionals. The latest price hike with the pyrimethamine brand named product, Daraprim® has brought this controversy to the forefront of national conversation. As a first line treatment for toxoplasmosis in patients with immunocompromised conditions such as HIV, pyrimethamine has been around for several decades. Once Turing Pharmaceuticals acquired the marketing rights to pyrimethamine in August 2015, the price of this drug increased by the following day from $13.50 to $750 per tablet, as reported by the New York Times.1 Pyrimethamine is not the only drug of its kind to experience substantial price increases overnight. Cyclosporine, an antibiotic used to treat multi-drug resistant tuberculosis, also had a price increase of 2,600% after acquisition from Rodelis Therapeutics in August 2015.2

In response to the initial backlash regarding the price increase of pyrimethamine, Martin Shkreli, founder of Turing Pharmaceuticals, stated the reasoning behind the drastic price increase was to generate enough money to “develop better treatments for toxoplasmosis, with fewer side effects”.1 Shkreli also countered that because pyrimethamine is rarely used, the price jump would have a minimal impact on the healthcare system. Other drug companies who have increased the costs of other older medications claimed these drugs were too low priced to be sustainable on the market given the lack of demand.3

After the announcement of Turing Pharmaceuticals acquiring pyrimethamine and its increased cost, the Infectious Diseases Society of America (IDSA) and the HIV Medicine Association (HIVMA) responded with a public letter urging the company to reverse its pricing. The letter addressed concerns that the “cost is unjustifiable for the medically vulnerable patient population in need of this medication and unsustainable for the health care system”.4 The drug company has now announced plans to reduce the cost of pyrimethamine by up to 50% in hospitals, as well as working with federal and state health insurance companies to further decrease the price.5

Price hikes in drugs can lead to unsettling implications further down the road. Hospitals may be unable to keep these drugs on their formulary due to high costs. Additionally, patients receiving these drugs in an outpatient setting may not be able to afford them if insurance companies cannot cover the cost of the drug. As a result, second or third line agents may have to be used to treat a condition or patients may forgo treatment altogether. Ultimately, untreated or inadequately treated conditions may lead to even higher healthcare costs due to the need for more frequent or extended hospital visits.


4 Rockoff J. (2015). Turing to Discount Daraprim Anti-Parasitic Drug as Much as 50%. WSJ.
Technology Update: Who Leaves Home Without Their Cell Phone?  
*By Abigail Shell, Pharm.D. Candidate*

Ask a mother, neighbor, or coworker how many medications they may be taking, or which ones, and the answer will likely be full of vague descriptions, or maybe a drug name or two. Despite Americans on average taking ten or more prescription medications each year according to the Kaiser Family Foundation,1 when questioned about their medication regimens, most know little more than their various diagnoses and the corresponding medications. Couple this lack of knowledge with a failure to report the use of herbal and other over-the-counter preparations, and an emergency hospitalization becomes a drug interaction nightmare, forcing healthcare professionals to piece together a medication history from a potentially stressed patient. As medication experts, pharmacists are on the front line of this dilemma. Even though physicians and pharmacists encourage patients to carry cards with a list of their medications and allergies in their wallets, adherence remains an issue. In this quagmire, technology offers an accessible solution.

Although health information apps for electronic devices are relatively recent releases, the basic principles underlying their key elements have existed prior to cell phones entering the market. One of the earliest recommendations was the use of the acronym I.C.E., “in case of emergency,” being connected with at least one contact in a phone. The acronym identified primary contacts, allowing anyone who may find a lost phone to reach out to a named individual in the event of an emergency. Camera phones increased compliance by allowing users to store photos of documents containing pertinent medical information, but with the advent of the smartphone and the need for password protection, accessing this information became less achievable.

For iPhone aficionados, Apple offers a solution to the password problem with its integral Apple Health app. In addition to tracking sleep patterns and the ability to sync movement with exercise using popular gadgets like FitBit, Apple Health contains the Medical I.D. which can be accessed from an iPhone’s emergency screen once activated. Within the Medical I.D., the user can provide his or her birthday, medical notes, allergies, medication regimens, emergency contacts, blood type, height, and weight. Android’s answer is named ICE: In Case of Emergency and can also be accessed from the smartphone’s emergency screen. Like Apple Health, users can input their allergies, medical conditions, medications, and medical notes into ICE. Additionally, users can include insurance information and the names and contact information of their physicians. The expanded data scope of Android’s ICE is not synced with their health app, Google Fit, while the Medical I.D. is a connected component of Apple’s Health app. Ultimately, both the Android and Apple versions contain the key information needed by first responders in a medical emergency.2

What are the three things most people never leave home without? Keys, wallet, and phone. In the event of a medical emergency, there could be a delay in treatment or an increased risk of error when the basic components of a patient’s medical history are unknown. Apple’s Health and Android’s ICE offer valuable repositories for critical health information needed to make treatment decisions, and while they require regular updating, their vast accessibility makes them vital aspects to ensure improved medical care and patient safety. With these advances, not only can a cell phone now call 9-1-1 but it can also provide medical history highlights, a combination that can potentially save more lives.

Two new ultra-long-acting insulin products by Novo Nordisk, Tresiba® (insulin degludec) and Ryozdeg® 70/30 (insulin degludec with insulin aspart), were approved by the FDA in September 2015.1

These two medications had previously been approved in 2012 in Europe and Japan, but the FDA declined initially due to lack of cardiovascular safety data.2 In March of this year, Novo Nordisk resubmitted their application, including the interim results of their long-term cardiovascular safety trial, DEVOTE, which should be completed in September 2016. We can expect to see these products on the market in early 2016.3

Insulin degludec is ultra-long-acting by forming soluble multi-hexamers and its duration of action is roughly 42 hours.4 When studied in patients with Type 1 diabetes, insulin degludec showed no statistically significant difference in lowering A1c compared to A1c lowering with insulin glargine or insulin detemir, and was found to be non-inferior to insulin detemir.5,6 When studied in a randomized, open-label study in Type 1 diabetic patients, insulin degludec resulted in a statistically significant lower total daily dose of insulin and lower daily dose of basal insulin compared to insulin glargine and insulin detemir.5 In an open-label, non-inferiority trial comparing insulin degludec and insulin detemir in Type 1 diabetes, insulin degludec was found to have a statistically significant difference in lowering fasting plasma glucose and lowering rates of nocturnal confirmed hypoglycemia.6

Insulin degludec with insulin aspart was compared to insulin glargine with insulin aspart in patients with Type 1 diabetes in a 2-year open-label study and resulted in no statistically significant difference in fasting plasma glucose or A1c.

However, insulin degludec with insulin aspart had statistically significant less nocturnal confirmed hypoglycemia and total daily basal insulin doses. There were similar proportions of adverse events between the two treatment arms.5

Type 1 diabetic patients were studied in a double-blind, randomized crossover study comparing insulin degludec to insulin glargine. The investigators were concerned that the ultra-long action of insulin degludec would decrease hypoglycemic response and awareness. To study this, they induced hypoglycemia and used a clamp to compare the hypoglycemic severity score between the two treatment groups and found no statistically significant difference between the two insulins.5

In another open label, randomized trial comparing insulin degludec and insulin glargine in Type 1 diabetes, the investigators found similar A1c values between the two treatment groups. However, there was a statistically significant difference in nocturnal hypoglycemia, favoring insulin degludec. They also used a monitoring form to assess the patient’s physical and mental health status and found that the mental component improved with a Cohen’s effect score of 42, which indicates a small to medium clinically significant benefit of insulin degludec.4

Insulin degludec was studied in insulin naïve Type 2 diabetic patients currently taking metformin ± a DPP4 inhibitor. This study was open label and compared insulin degludec to insulin glargine. The patients were randomized 3:1 and their basal insulin was titrated to a pre-breakfast target glucose. They found no statistically significant difference in A1c lowering between insulin degludec and insulin glargine, but found a significantly greater decrease in fasting plasma glucose in the insulin degludec group.

While there was no statistically significant difference in overall hypoglycemia between groups, there was statistically significantly less severe hypoglycemia and nocturnal confirmed hypoglycemia in the insulin degludec arm. Only five patients with Type 2 diabetes per year would need to be treated with insulin degludec to avoid one confirmed nocturnal hypoglycemic episode compared to insulin glargine, as indicated by the results of this study.5

Some likely side effects of these medications include hypoglycemia, allergic reactions, injection site reactions, weight gain, and itching. Do not use insulin degludec in patients with diabetic ketoacidosis. These products will come in a FlexTouch device, like LeveMir and Novolog.1

New clinical data released in September of 2015 has required modification to the package insert labeling of canagliflozin (Invokana) and canagliflozin/metformin (Invokamet) to reflect bone fracture risk. Canagliflozin is a member of the class of SGLT-2 inhibitors, which first received approval in March of 2013. Canagliflozin and other members of the sodium-glucose co-transporter 2 (SGLT-2) class work on the sodium-glucose co-transporter 2, which can be found in the proximal renal tubule. SGLT-2 is responsible for the reabsorption of glucose. Inhibiting SGLT-2 prevents the reabsorption of glucose from the urine, thereby increasing glucose excretion and lowering blood glucose levels. Advantages of the SGLT-2 class include a low risk for hypoglycemia and the potential for weight loss.

The concern for bone fracture risk stems from the mechanism of action of these agents. Inhibiting SGLT-2 increases tubular reabsorption of phosphate in the serum and increases the concentration of parathyroid hormone (PTH). Increased PTH concentrations promote bone resorption, causing bone breakdown to lead to the natural process of bone remodeling. SGLT-2 inhibitors may also decrease 1,25-dihydroxy Vitamin D concentrations, which impairs the ability of calcium to be absorbed from the gastrointestinal tract and bone to be calcified. The combination of increased reabsorption and decreased calcification may lead to decreased bone mineral density (BMD) and an increased risk for fractures.

In response to concerns of adverse bone metabolic effects, a clinical trial was conducted to determine the effect of canagliflozin on bone fracture risk. In this study, 714 older adults were randomized to receive placebo, canagliflozin 100 mg, or 300 mg. Changes in BMD at the total hip, lumbar spine, femoral neck and distal forearm were measured using dual energy X-ray absorptiometry (DXA). After two years placebo-corrected decreases in BMD were noted at the total hip, lumbar spine and femoral neck for both dosages.

The most notable decrease in BMD occurred at the total hip, which is also one of the most common places for an osteoporosis-related fragility fracture. Placebo-corrected declines at the total hip were 0.9% in the canagliflozin 100 mg group and 1.2% in the canagliflozin 300 mg group (p<0.001).

Following these clinical trial results, the canagliflozin package labeling was revised to suggest that prescribers inform patients of the possibility of bone fracture, particularly in patients with a prior history of bone fractures. Prior to the data being released in September, the warning was included in the Adverse Reactions section, but was not included in the Warnings and Precautions section. Currently, osteoporosis or low bone density is not a contraindication of canagliflozin use.

The FDA is currently evaluating whether other members of the SGLT2 inhibitor class—dapagliflozin and empagliflozin—will have this same adverse effect, and whether adjustments should be made to the prescribing information for these agents as well. The FDA is urging health care professionals or patients taking SGLT-2 inhibitors to report any side effects to the FDA MedWatch program.

New drug highlight:
Lonsurf for colorectal cancer
By: Priyan Lan, Pharm.D. Candidate

In September 2015 the FDA approved Lonsurf® (trifuridine/tipiracil) for patients with an advanced form of colorectal cancer who have already tried other chemotherapy treatment options including fluoropyrimidine, oxaliplatin and irinotecan or an anti-EGFR therapy. Lonsurf® is a combination drug that includes a nucleoside metabolic inhibitor, trifuridine, and a thymidine phosphorylase inhibitor, tipiracil. Due to a difference in its mechanism of action compared to fluoropyrimidines, Lonsurf® has been proven effective in both in vitro and xenograft models against resistance in previously treated patients by causing DNA damage via thymidine kinase. According to the National Cancer Institute, colorectal cancer is currently the third most common non-skin cancer in men and women and is the second leading cause of cancer-related deaths in the United States. Due to the increase in colorectal cancer screenings with colonoscopies that number has continued to decrease. Lonsurf® is an oral medication that comes in two different strengths (15mg trifuridine/6.14mg tipiracil and 20mg trifuridine/8.19mg tipiracil) and is recommended to be dosed twice daily after meals during a 28-day cycle on days 1-5 and days 8-12 of the cycle. The most common side effects were neutropenia, febrile neutropenia, anemia, and thrombocytopenia. The manufacturer suggests that a blood count should be conducted before the start of each cycle and again on Day 15. Other side effects include vomiting, diarrhea, decreased appetite, fatigue, abdominal pain, and pyrexia.1

In a phase 3, placebo-controlled, doubleblind clinical trial (RE COURSE), Lonsurf® plus best supportive care improved the median overall survival to 7.1 months from 5.3 months compared to placebo plus best supportive care (p<0.001). A total of 798 patients participated in this trial and all have been previously treated with chemotherapy agents such as fluoropyrimidine, oxaliplatin, and irinotecan. Patient groups with KRAS (Kirsten rat sarcoma viral oncogene homolog) or wild-type tumors both benefited from treatment; however, a large enough patient group was not available to determine the benefit for patients with BRAF mutation. Lonsurf® also demonstrated superiority in progression-free survival (2.0 months) compared to placebo (1.7 months) (p<0.001).2

While Lonsurf® has demonstrated benefits as monotherapy, efficacy can also be improved when it is used in combination with other agents. In a Phase 1 combination study with irinotecan (Camptosar®), the combination showed a response rate of 22.2% in patients who are refractory to fluorouracil and oxaplatin. However, the study demonstrated severe limitations due to a small sample size (n=10) and no follow-up data to determine dose limiting toxicities, safety, or efficacy. In another in vivo study, there was an increase in sensitivity when used with oxaplatin. Overall, the increase in synergism when used as a combination therapy shows promise, while additional studies still need to be conducted in order to determine if combination therapy with Lonsurf® is equally as effective.