The Transition

4th Year Pharmacy Students Entering the Real World of Pharmacy

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Inside This Issue:

Preceptor Spotlight

Preceptor Spotlight:
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Augusta University Medical Center

Training:
Doctor of Pharmacy from the University of the Sciences at Philadelphia College of Pharmacy

Residency:
Pharmacy Practice Residency (PGY1) and Primary Care Pharmacy Specialty Residency (PGY2) at the University of Pittsburgh Medical Center

Position:
Adult Inpatient Internal Medicine/Hospitalist Service and Pharmacist-Managed Ambulatory Care Anticoagulation Clinic

Dr. Christina DeRemer's Internal Medicine Advanced Pharmacy Practice Experience (APPE) is five weeks of learning how to bridge didactic knowledge to clinical application. As a preceptor, Dr. DeRemer is upfront about her expectations and discusses her objectives on the first day of the rotation. She makes herself accessible to her students by asking each student about what they want to gain from the experience. She is approachable and blocks out time each day to meet with her students while also providing weekly feedback on student performance. She is open and honest, providing methods of improvement where it is needed (not only criticism) and holding an open dialogue that allows students to raise their own concerns about their performance.

As a preceptor, Dr. DeRemer helps students reason as clinical specialists by asking questions that encourage students to think in different ways. For example, instead of asking what the first-line option for a disease state is, she may ask why a certain medication was chosen for this specific patient, thereby enabling students to consider what factors led physicians to follow this specific course of treatment. She gives her students the confidence to think "outside-the-box" and is open to learning about new recommendations and supporting evidence that students provide.

Dr. DeRemer also encourages students to participate in one-on-one interactions with nursing, case management, and physicians to help students build their self-confidence for postgraduate practice. She motivates her students to present pharmacy-related in-services targeting physicians or nurses, encouraging her students to consider the thought process of other healthcare professionals and how the topic pertains to their respective specialties. Having personally experienced this rotation with Dr. DeRemer, I can truly say I have learned a lot about myself as a future pharmacist and how to better interact with other healthcare professionals.

Written by: Ruchita Amin
(Augusta, GA)

Clinical Update: Heart Failure

With the introduction of new agents for heart failure, the American College of Cardiology and American Heart Association released a focused update on new pharmacological therapy for heart failure in 2016. These recommendations are specific for stage C heart failure with reduced ejection fraction (HFrEF).

Sacubitril/valsartan (Entresto®), the new angiotensin receptor-neprilysin inhibitor (ARNI), works by degrading endogenous vasopeptides including brain natriuretic peptide (BNP), bradykinin, and adrenomedullin, which results in afterload reduction and volume autoregulation. Sacubitril/valsartan has been given a Class I recommendation in the treatment of stage C HFrEF in conjunction with evidence-based beta-blockers and aldosterone antagonists, when indicated. This strong recommendation was previously only given for angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs). For patients who tolerate an ACEI or ARB in symptomatic heart failure, replacement with an ARNI has been shown to further reduce morbidity and mortality.

Sacubitril/valsartan should be avoided in patients with a history of angioedema, and a 36-hour washout period is required after the last dose of an ACEI or ARB to reduce the risk of developing angioedema. Potential side effects from sacubitril/valsartan include hypotension, hyperkalemia, cough, dizziness, and renal failure. Patients should have their renal function, potassium, and blood pressure monitored at baseline and periodically thereafter. Sacubitril/valsartan dosing starts at 49/51 by mouth mg twice daily, then increases to the target maintenance dose of 97/103 mg by mouth twice daily after 2 to 4 weeks, if tolerated.

Ivabradine (Corlanor®) is a newly approved hyperpolarization-activated cyclic nucleotide gated channel blocker for stable HFrEF with a heart rate > 70 bpm on maximum tolerated beta-blocker therapy. It targets the I_f ion current in the sinoatrial node to slow the heart rate with no effect on cardiac contractility. The guideline update includes a Class IIa recommendation for the addition of ivabradine to reduce heart failure hospitalization in patients with symptomatic stable chronic HFrEF who are receiving guideline-directed therapy, including a beta-blocker at the maximum tolerated dose, with heart rate still at least 70 bpm.

Contraindications to Sacubitril/ Valsartan (Entresto®)
History of angioedema related to prior ACEI/ARB therapy
Concomitant use of ACEI within last 36 hours
Concomitant use of aliskiren in patients with diabetes
Hypersensitivity

Contraindications to Ivabradine (Corlanor®)
Resting heart rate < 60 bpm prior to initiation
Myocardial infarction within 2 months
Atrial fibrillation
Severe hepatic impairment
Concurrent use of diltiazem or verapamil
Sick sinus syndrome
Acute decompensated heart failure
Atrial flutter
Concurrent use of class I antiarrhythmic
Strong CYP3A4 inhibitors

Ivabradine may cause bradycardia, hypotension, atrial fibrillation, and visual disturbances. Monitoring should include heart rate, blood pressure, and cardiac rhythm. Initial dosing of ivabradine is 5 mg by mouth twice daily and titration is based off of resting heart rate after 2 weeks. The maximum dose is 7.5 by mouth mg twice daily.

While costs of these medications are currently high, ivabradine may be an appropriate alternative in patients that cannot tolerate full dosages of beta-blockers. In addition, sacubitril/valsartan offers an additional mechanism of action for the reduction of mortality in heart failure patients who have tried and failed either ACE inhibitors or ARBs. With these new therapeutic options and recommendations in mind, clinicians should consider re-evaluating heart failure patients to determine whether a change in therapy could be of benefit.

Written by: Madeline Burke
(Savannah, GA)
Reviewed by: Marci M. Thomson, Pharm.D. Carl Vinson VA Medical Center Dublin, GA

1. Yancy C, Jessup M, Bozkurt B et al. 2016 ACC/AHA/HFSA Focused Update on New Pharmacological Therapy for Heart Failure: An Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure. *Journal of the American College of Cardiology. 2016. doi:10.1016/j.jacc.2016.05.011.*
2. Entresto® (Sacubitril/Valsartan) [package insert]. East Hanover, NJ: Novartis Pharmaceuticals Corporation; 2015.
3. Corlanor® (Ivabradine) [package insert]. Thousand Oaks, CA: Amgen Inc; 2015.

Clinical Update: Influenza Vaccine Recommendations

Influenza is a contagious respiratory disease characterized by fever, chills, and aches. In the United States, flu season typically begins in October and ends in March. Though most will recover in two weeks, influenza kills thousands of Americans each year and hospitalizes many more.[1] To prevent these complications and protect those most at risk from flu, the Centers for Disease Control and Prevention (CDC) recommends an annual seasonal influenza vaccine at least two weeks before the beginning of flu season.

There are two dosage forms available for flu vaccination: the intramuscular shot, which is an inactive influenza vaccine (IIV) or an intranasal vaccine, which is a live attenuated influenza vaccine (LAIV). For the previous flu season, the CDC's Advisory Committee on Immunization Practices (ACIP) had no preference on LAIV vs IIV for qualifying patients. However, on June 22, 2016, ACIP voted against using LAIV for the upcoming 2016-2017 flu vaccine.[2] The American Academy of Pediatrics (AAP) echoed this recommendation.[3]

ACIP based this recommendation on vaccine efficacy data from 2013-2016 that demonstrated poor flu prevention rates for the LAIV. From 2015-2016, vaccine efficacy for LAIV was 3% (with a 95% confidence interval of -49% to 37%) for children aged 2 to 17 years old. In contrast, the efficacy for IIV was 63% (with a 95% confidence interval of 52% to 72%) for the same age group. It is unknown why the data from the clinical trial for LAIV has not been replicated in practice.[2]

These guidelines could affect health care providers who expected LAIV to be an option for the new flu seasons. Vaccine manufacturers projected that 171-176 million doses of flu vaccines would be given during the 2016-2017 flu season and that 14 million of these would be LAIV. Furthermore, LAIV makes up a third of flu vaccines given to children.[2] The AAP, CDC, and vaccine manufacturers state they will cooperate in order to ensure patients have access to flu vaccines and will aid pediatricians who already ordered LAIV. Meanwhile, pharmacists can play a role by informing patients on this updated recommendation and guiding them towards other options.

Written by: Jacqueline Liu
(Savannah, GA)

1. Influenza (Flu). *Centers for Disease Control and Prevention.* May 23, 2016. http://www.cdc.gov/
2. ACIP votes down use of LAIV for 2016-2017 flu season. *Centers for Disease Control and Prevention.* June 22, 2016. http://www.cdc.gov/
3. AAP backs new ACIP recommendation on influenza vaccine. *American Academy of Pediatrics.* June 22, 2016. http://www.aappublications.org

Rotation Highlight: Fecal Microbiota Transplant

While on an Infectious Diseases rotation at Midtown Medical Center (MMC) in Columbus, GA, I was able to witness fecal microbiota transplantation (FMT) for a patient with multiple relapsing *C. difficile* colitis. This process was significantly different from what I had envisioned. Because the patient was receiving someone else's feces to replenish their own gut bacteria, I had assumed the donor feces was compounded into a rectal suppository; however, the donor feces is actually liquefied into a homogenized suspension and then administered by one of three routes: nasogastric (NG) tube/ esophagogastroduodenoscopy (EGD), enema, or colonoscopy.

At least one week prior to FMT, the potential donor must bring in a stool sample for testing to ensure it is negative for the presence of contagious infectious agents. If negative, then the donor will collect a fresh stool sample the morning of the FMT and bring it to the hospital, where it will be prepared and administered into the patient within 6 hours of collection. At MMC, the stool is compounded into a suspension by either the infectious disease (ID) pharmacist or the ID PGY2 resident using sterile normal saline and a blender. After the suspension is blended and homogenized, it is then filtered using a sterile four-by-four or screen filter. The suspension will then be administered into the patient by a gastroenterologist.

Colonoscopy is the preferred route due to the high cure rate (96.3% vs. 88%–94.5% with enema vs. 76% with NG tube/ EGD)[1]. Colonoscopy also allows FMT administration directly to the affected site and allows the physician to visualize the

(Continued on page 4)

Rotation Highlight: Fecal Microbiota Transplant, *continued*

affected mucosa. However, if the patient has a contraindication to receiving a colonoscopy, such as physically challenging anatomy or is at an increased risk of perforation, then EGD is the second-line option used at MMC. Enema route is not preferred because it requires a series of enemas to achieve the final dose and therefore is a time consuming, impractical process. With EGD, there is potential for the stool sample to be degraded by gastric acid, so the patient is prescribed a proton pump inhibitor (PPI) the night before and the morning of FMT.

At MMC, I witnessed both the fecal compounding and the FMT by EGD. If you have the opportunity, I encourage each of you to witness an FMT during your APPE year or future practice. It is a great opportunity to work interprofessionally in the care of patients.

Written By: Dakotah H. Mallery
(Columbus, GA)
Reviewed by: Deanne Tabb, Pharm.D.

1. Rohlke F and N Stollman. Fecal microbiota transplantation in relapsing *Clostridium difficile* infection. *Therapeutic Advances in Gastroenterology*. 2012. doi: 10.1177/1756283X12453637

Career Spotlight: Specialty Pharmacy

How do specialty pharmacists differ from their retail counterparts, and what role does specialty pharmacy play in the realm of pharmaceutical care?

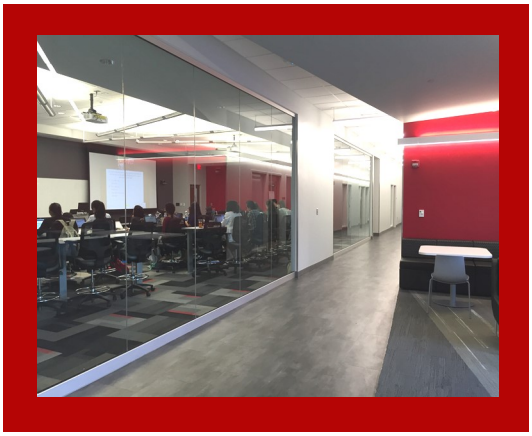
Adjudication Reject – Prior Authorization Required. A relatively common sight during the processing of prescriptions in the retail setting, such a message inevitably ends with a call or fax back to the prescribing physician's office, especially for common disease state medications, but what of prescriptions for statistically less common conditions? Known as specialty medications, treatments for conditions like multiple sclerosis, hepatitis, and moderate to severe forms of other diseases like rheumatoid arthritis, irritable bowel disease, and psoriasis are often restricted by insurance companies and even limited in their distribution. In the face of the more extensive and diverse demands in the pharmaceutical care of such patients, a relatively new career niche, objectively termed specialty pharmacy, has arisen.

Currently, specialty pharmacies are associated with insurance conglomerates like Caremark and UnitedHealthcare, but large retail chains like Walmart and Walgreens have branched into the market alongside a few independents. Pharmacists employed with these pharmacies maintain the prescription processing and dispensing functions of their retail counterparts in addition to the more clinical requirements of their narrowed area of focus. Such requirements include the completion of prior authorization forms and the writing of letters of appeal for prior authorization denials as well as detailed initial counseling with injection training when required, medication therapy management, and compliance follow-up. Ultimately, these pharmacists spend most of their days on the telephone, but the complete services they provide to their patients when fully actualized have few parallels in the realm of pharmaceutical care.

As is the case in the larger retail setting, independent specialty pharmacies provide more individually tailored and detailed services than their corporate counterparts, but pharmacists employed across the spectrum of specialty pharmacy provide unique and much needed services to a previously underserved population. Although this career path is still in its relative infancy, the increase in approvals of biologic medications and the trend toward personalized medicine provide promising support for the continued maturation of specialty pharmacy. No national organization yet exists, but further information regarding specific career opportunities can be found on each company's website.

Written by: Abigail Shell
(Atlanta, GA)

Region at a Glance: Augusta, Georgia



You may have heard of this little city on the border of Georgia and South Carolina called Augusta. It is home to The Masters golf tournament, an event that shuts down the city each spring with a star-studded list of guests coming into town. It is also not so little, being the second largest city by metropolitan area in Georgia with over half a million people. The city is a huge medical hub, fed for many generations by the recently rebranded Augusta University. The campus has a strong clinical focus and direction with many practicing faculty members, pharmacy and medical residents, plus 3rd and 4th year pharmacy students. The main rotation sites include University Hospital, Augusta University Medical Center, Doctors Hospital, Charlie Norwood VA Medical Center, Eisenhower Medical Center, and various others including community and nuclear settings. New rotations, in particular those at the VA, are constantly being added as the demand from preceptors for students has increased all across the city. This year alone over 10 new positions were added for 4th year students to come and experience all of the wonderful rotations and experiences Augusta has to offer. This growth has also been accompanied by a welcome rejuvenation of our pharmacy school presence in Augusta.

When I took my first step into the newly renovated University of Georgia College of Pharmacy building on the Augusta University campus, I thought to myself so loudly that it came out of my mouth—"Wow." Totaling in at over 10,000 square feet, the sleek, modern space is a dream for students and professors alike. The first thing you notice in the impressive foyer is the classroom, revealed by sweeping glass windows and brimming with studious pharmacy students, their backs turned to you and eyes glued to the presentation ahead. A turn to the left takes you to the space for faculty, staff, and residents, while a turn to the right takes you to all the new student spaces including the collaborative workspaces, a computer lab, and an abundance of modern technology. During your tour of the building you will see the attention to detail and beauty of this University of Georgia-sponsored gem. The space for faculty and staff is impressive, boasting many offices, a drug information center, a resident office, and office for all our support staff (including space for a new IT employee), a poster printing area, and an expansive workspace. Overall, the building features high ceilings, a pleasing red and black color scheme, a thoughtful layout, and a fresh layer of slate paint on the exterior. The aesthetics and the people inside the building make you feel that even though this new space is almost 100 miles away from Athens, you are home.

Written By: Hannah Keith
(Augusta, GA)

Test Your Knowledge

Alligation:

Prepare 500 mL of a 10% dextrose solution (D10W) using 5% dextrose solution (D5W) and 50% dextrose solution (D50W). How many milliliters of each solution would you need?

Drip Rates:

Your patient who weighs 142 lbs requires a 60 units/kg bolus of unfractionated heparin and then 12 units/kg/hour continuous infusion. You have heparin 25,000 units in 250 mL D5W available as a pre-mix. What bolus dose and infusion rate does the patient require?

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Upcoming Events

September 29, 2016: Mandatory Class Meeting & Career Fair

October 1, 2016: Midyear Poster Abstract Submissions Deadline
"Research in Progress" submissions no longer accepted

October 7, 2016: Residency Showcase Atlanta, Georgia

October 21-23, 2016: GSHP Fall Meeting Young Harris, Georgia

October 23-26, 2016: ACCP Annual Meeting Hollywood, Florida

December 4-8, 2016: ASHP Midyear Meeting Las Vegas, Nevada

Test Your Knowledge: Answers

Alligation:

50% 5 parts

10%

5% 40 parts

45 parts

$$\frac{x \text{ mL of D50W}}{500 \text{ mL}} = \frac{5 \text{ parts}}{45 \text{ parts}}$$

$$x = 55.6 \text{ mL of D50W}$$

$$\frac{x \text{ mL of D5W}}{500 \text{ mL}} = \frac{40 \text{ parts}}{45 \text{ parts}}$$

$$x = 444.4 \text{ mL of D5W}$$

Drip Rates:

142 lbs = 64.5 kg

60 units/kg x 64.5 kg = 3870 units bolus

12 units/kg/hour x 64.5 kg = 774 units/hr

25,000 units/250 mL = 100 units/mL

774 units/hr ÷ 100 units/mL = 7.74 mL/hr