UNIVERSITY OF GEORGIA
College of Pharmacy

The Transition

Fourth-Year Pharmacy Students Entering the Real World of Pharmacy

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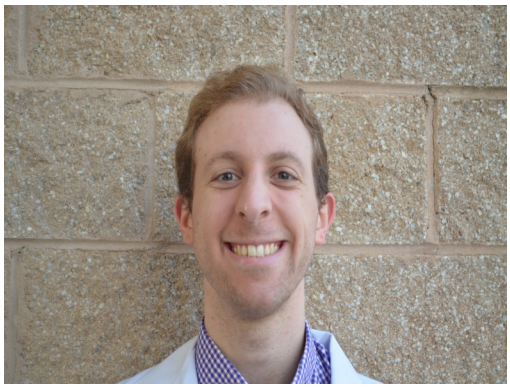

Joseph Torrisi, PharmD, BCIDP

Walking into Grady on my first day of APPEs, I was intimidated by the sheer size of the hospital system. I am a constant worrier, so naturally, I questioned whether I knew enough to be there or if I could handle a rotation in downtown Atlanta. While sweating bullets and anxieties abound, I met my preceptor Dr. Joe Torrisi, an infectious disease clinical pharmacist with focus in HIV and antimicrobial stewardship. Upon our first introductions, the first words that Dr. Torrisi spoke stuck with me immediately. He said, "I don't care where you're at now. I only care about where you are when you leave." From that moment on, I realized that however tough the rotation, Dr. Torrisi's goal was to push me to become a competent and skilled pharmacist.

Dr. Torrisi was upfront about his expectations and spent quite a bit of time with me each day to assess my knowledge. He asked complex clinical questions and challenged me to back up my answers with literature. He also gave me the independence to work up each of my patients in the mornings that helped me develop self-reliance and time management skills in return. He encouraged me to evaluate primary literature to make decisions, so much that he emailed me 50+ primary literature articles during my five weeks at Grady. Each day, he pushed me to improve my interprofessional communication by rounding daily with the Special Immunology Service. This team consisted of Dr. Torrisi, medical and pharmacy residents, and the attending physician. Because of his guidance, my confidence and clinical knowledge developed significantly, preparing me to participate as an integral member of the team. Lastly, Dr. Torrisi gave excellent feedback each Friday that I continue to apply as I grow professionally.

Dr. Torrisi has every quality expected of a preceptor and went above and beyond to help develop my clinical knowledge. He is a well-respected and professional instructor who genuinely cares for each of his patients. I pushed myself each day to enhance my clinical skills due to his facilitation of a rich learning environment. His commitment to his profession, his patients, and his students proves the necessity of pharmacists in practice. While my rotation with Dr. Torrisi has ended, he continues to assist in my education and development as a pharmacist. I am thankful for a preceptor who continues to invest time in me as I grow professionally beyond the last day of APPEs.

Preceptor: Joseph Torrisi, PharmD, BCIDP, Grady Memorial Hospital

Training: University of South Carolina College of Pharmacy Class of 2019

Residency: PGY-1 and PGY-2 Infectious Disease Residency at Grady Memorial Hospital

Position: Clinical Pharmacist in Infectious Disease

Written by Brooks Patterson, PharmD Candidate 2023
Atlanta, GA

Calculations Review: Oncology

"But Edith," you may be asking yourself. "We learned this already last spring, why are you wasting my time?"

Well, did you know that there are actually different equations for calculating BSA? Do you remember what to do for your calculations if you do not think the patient's serum creatinine (SCr) accurately matches their renal function? If you have an oncology rotation coming up or are studying for the NAPLEX, you may very well have questions similar to these coming at you.

Du Bois	**BSA = 0.007184 × $W^{0.425}$ × $H^{0.725}$**
Mosteller	**BSA = 0.016667 × $W^{0.5}$ × $H^{0.5}$**
Haycock	**BSA = 0.024265 × $W^{0.5378}$ × $H^{0.3964}$**

BSA Calculations: these will be used for a good number of chemotherapy agents. Du Bois is the most commonly used formula—a lot of online calculators use Du Bois as their base for BSA calculations.

$$BSA\ (m^2) = \sqrt{\frac{Ht\ (Cm) \times Wt\ (kg)}{3600}}$$

Don't forget! When the patient comes in for each chemotherapy session, look at their weight and renal function. If it's changed, recalculate their BSA, and use that new BSA to calculate their new dose. Per the Hematology/Oncology Pharmacy Association (HOPA), if it's within 10% of the original dose, you're good to go.[1] If not, then you need to change the patient's order. If their renal function is worsening, you may have to consider holding their chemotherapy or redosing depending on the regimen.

EXAMPLE: Mr. RT was unfortunately diagnosed with gastric cancer at his visit with the oncologist, and agreed to start irinotecan monotherapy. At his visit, Mr. RT was 72 inches tall and weighed 180 lbs; for his regimen of 150 mg/m^2, the pharmacist utilized the Du Bois equation to dose him at 306 mg of irinotecan based on a BSA of 2.04.

However, after a few rounds of chemotherapy, Mr. RT suffered from severe chemotherapy induced nausea and vomiting (CINV) that affected his appetite. He presented at his latest appointment at the infusion clinic weighing a trim 140 lbs; the astute pharmacist recalculated his BSA and found it to be 1.86, putting his new dose at 274.5 mg—*just* outside of 10% of the original dose of 306 mg. Time to call the oncologist!

Additional Equations and Their Role in Care[2]		
ANC (absolute neutrophil count)	ANC = (segs + bands) x 1000	ANC <1000 is generally when you start becoming concerned for infection, especially if patient is receiving chemotherapy.
Calvert Equation	Total dose (mg) = (target AUC) x (CrCl +25)	Used for carboplatin dosing. Some formulas replace CrCl with GFR. Target AUC is typically in the range of 4-6.

So, what *do* we do for dosing if a patient's SCr does not accurately match their renal function?

Per National Comprehensive Cancer Network (NCCN) guidelines, 0.7 should be the *minimum* value for SCr in your calculations. This would be used for elderly patients and patients who have severely decreased muscle mass (emaciated, underweight).[3]

Written by Edith Ford, PharmD Candidate 2023
Augusta, GA

References:

1. https://globalrph.com/medcalcs/body-surface-area-bsa/

2. National Comprehensive Cancer Network. Chemotherapy Order Templates. June 15, 2018. https://www.nccn.org/docs/default-source/clinical/order-templates/appendix_a.pdf?sfvrsn=fc9a9a17_10

3. https://www.nccn.org/docs/default-source/clinical/order-templates/appendix_b.pdf?sfvrsn=6286822e_6

Residency Tip!

Start working on your letters of intent NOW and make sure to keep your CV updated after each APPE rotation. Take an hour or two every few weeks to make sure you don't miss anything!

Rotation Highlight: Cardinal Nuclear Pharmacy

I had the privilege of spending my second block of APPE rotations at Cardinal Health Nuclear Pharmacy Branch with Dr. Kristin Swann. The nuclear pharmacy is located just outside of Atlanta, Georgia which allows Cardinal to deliver to hospitals all over the state and sometimes out of state too! My experience here was unlike any pharmacy experience I had ever had. It is a closed-door pharmacy due to the profile of the medications produced. Although nuclear medicine has come a long way in its safety, anyone who enters the pharmacy must wear some type of dosimeter just to measure the amount of radiation exposure.

In nuclear pharmacy, hospitals have standing daily orders, but can call in additional doses over the phone. Since the medications are prepared for the hospital, the prescription labels have the hospital name instead of a patient's name. The nuclear medicine world is small and heavily diagnostic with less than twenty common products that are often used to detect abnormalities or tumors. The steps to producing a nuclear medicine product can be tedious, but the final patient dose is usually a combination of medication. One component consists of a medication that works on the site of action and the second being an attached metastable element. Together, the final product is radioactive and creates the image produced from a medical scan.

Employees must wear a lab coat prior to entering the restricted area alongside dosimeter rings to continue to track exposure. The restricted area is where doses are packaged for dispatch to their destination. Within the restricted area, this pharmacy has a typical buffer and clean room set up with the addition of a blood room used to radio tag blood products which describes the process of attaching a radioactive element to the patient's red blood cells. I was able to get certified during my rotation, so that I could compound my own patient doses. Although there are few drugs, each dose is vastly different. In community pharmacy may commonly count 30 or 90 capsules, but in nuclear pharmacy, each dose is calculated specifically on the scan being performed, the patient, and the calibration time of the dose.

While on rotation, I also got to experience the true nuclear pharmacist schedule with an entire week of overnight shifts. Most products are completed during these hours, so it was neat to see the process from start to finish. I even got to go on a delivery run with a driver to see what happens to the doses once they arrive to the customer.

Over the five-week rotation, the whole team became like family. I guess that is what happens when you spend crazy hours together! This rotation provided me with many opportunities to learn and grow in an area I did not know much about. I am eager to see how this experience impacts my pharmacy career! I owe a HUGE thank you to Kristin and the whole Cardinal team!

Written by: Sarah Adam, PharmD Candidate 2023
Athens, GA

Campus Highlight: Savannah, GA—The City that Never Sleeps

When ranking the different campuses at my UGA College of Pharmacy interview, I never realized how much that moment would impact my life. I walked into the classroom at Candler Hospital not knowing anyone, but that quickly changed. My classmates and I have become more of a family over the past year. We've bonded through the uncertainty of moving to a new city, studied for exams together, and headed into our fourth year with each other's support. We also receive constant advice and encouragement from the faculty. The professors at the Savannah campus have always kept an open-door policy with us. We can go to them for any questions or concerns that we have. It is due to their guidance that I was able to confidently transition from the classroom to rotations. While rotations keep me busy, I still try to spend quality time with everyone. Luckily, the city of Savannah offers a variety of options.

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Campus Highlight: Savannah, GA—The City that Never Sleeps *Continued...*

Have you ever seen over 3,000 people all wearing yellow at once? If not, then you have never attended a Savannah Bananas baseball game. The electrifying atmosphere brings me back to Saturdays in Sanford Stadium. The evening is filled with cheerful music, entertainment in between every inning, and sometimes the baseball players even wear kilts. I've never experienced anything like it! Other weekly activities include music bingo on Mondays, trivia night at McDonough's, and the farmer's market in Forsyth Park on the weekends. A historic celebration we look forward to annually on the Savannah campus is St. Patrick's Day. The streets are filled with people from all over the world and shades of green you didn't know existed. Savannah is filled with life and has provided UGA pharmacy students with memorable opportunities inside and outside the classroom.

Written by Tori Redshaw, PharmD Candidate 2023
Savannah, GA

Clinical Update: Heart Failure Guidelines

In 2022, the American College of Cardiology (ACC)/American Heart Association (AHA) Joint Committee released an updated guideline on heart failure (HF) management. The new guideline focuses on several key updates. First, the guideline established updated terminologies for stages A and B, where stage A is considered "at-risk" patients, and stage B is considered "pre-heart failure" patients.[1] Both stages A and B are considered asymptomatic HF, while stages C and D are symptomatic and advanced HF, respectively. Another update within the guideline was regarding the classification of HF type based on ejection fraction (EF). An EF ≤40% is categorized as HF with reduced ejection fraction (HFrEF), EF 41-49% is HF with mildly reduced ejection fraction (HFmrEF), EF ≥50% is HF with preserved ejection fraction (HFpEF), and a follow-up EF >40% after a previous EF ≤40% is HF with improved ejection fraction (HFimpEF).[1] The last significant update within the guideline focused on the expanded use of sodium-glucose contransporter-2 inhibitors (SGLT2-inhibitors) based on new clinical trial data.

SGLT2-inhibitors reduce sodium and glucose reabsorption while promoting urinary excretion and were originally approved by the Food and Drug Administration (FDA) for the treatment of type 2 diabetes mellitus (T2DM). In HF, this mechanism also reduces plasma volume, improves endothelial function, and promotes diuresis. Therefore, a reduction in blood pressure, afterload, and preload help improve loading conditions in patients with HF.[2] These beneficial effects were seen in trials such as DAPA-HF (Dapagliflozin in Patients with Heart Failure and Reduced Ejection Fraction) and EMPEROR-reduced (Empagliflozin Outcome Trial in Patients with Chronic Heart Failure with Reduced Ejection Fraction), for dapagliflozin and empagliflozin, respectively. These trials demonstrated that SGLT2-inhibitors can be beneficial in patients with symptomatic HFrEF regardless of the presence of diabetes.[3] Currently, dapagliflozin and empagliflozin are approved by the FDA for the treatment of HFrEF in combination with other evidence-based drugs discussed in the following paragraph.[4,5]

Because of their significant benefits seen in clinical trials, SGLT2-inhibitors, specifically dapagliflozin and empagliflozin, now have a class 1a recommendation and have been added as one of the four guideline-directed medical therapy (GDMT) drug classes to reduce hospitalization and cardiovascular mortality in patients with symptomatic chronic HFrEF, regardless of patients' diabetes status.[1] The other GDMT drug classes include renin-angiotensin-aldosterone system (RAAS) antagonists, beta blockers (BBs), and mineralocorticoid-receptor antagonists (MRAs). Additionally, SGLT2-inhibitors now have a class 2a recommendation and are preferred over RAAS antagonists, BBs, and MRAs for patients with HFmrEF or HFpEF.[1] Furthermore, SGLT2-inhibitors are recommended to manage hyperglycemia in stage A and B patients with diabetes and established cardiovascular disease (CVD) or risk factors to prevent the progression from asymptomatic to symptomatic HF.[1]

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Clinical Update: Heart Failure
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In summary, due to the focus of SGLT2-inhibitors in the new guideline updates after their significant benefits seen in clinical trials, it may be more common to see them added to a patient's drug regimen for the optimal management of HF. Not only will SGLT2-inhibitors be used for primary prevention to stop asymptomatic patients with diabetes and CVD from progressing into symptomatic stages of HF, but they will also be beneficial in symptomatic patients to help reduce hospitalization and cardiovascular mortality. Therefore, SGLT2-inhibitors might play a big role in managing HF patients moving forward.

Written by Monica Acharya, PharmD Candidate 2023
Atlanta, GA
Reviewed and Edited by Devin Lavender, PharmD

References

1. Heidenreich PA, Bozkurt B, Aguilar D, et al. *Circulation. 2022;145(18):e895-e1032.* doi:10.1161/CIR.0000000000001063
2. Joshi SS, Singh T, Newby DE, Singh J. Sodium-Glucose Co-transporter 2 Inhibitor Therapy: Mechanisms of Action in Heart Failure [published online ahead of print, 2021 Feb 26] [published correction appears in Heart. 2021 Nov;107(22):e15]. *Heart. 2021;107(13):1032-1038. doi:10.1136/heartjnl-2020-318060*
3. Fadiran O, Nwabuo C. The Evolution of Sodium-Glucose Co-Transporter-2 Inhibitors in Heart Failure. Cureus. 2021 Nov 8;13(11):e19379. doi: 10.7759/cureus.19379. PMID: 34925982; PMCID: PMC8654149.
4. Lexi-Drugs. Lexicomp [Internet]. Hudson, OH: Wolters Kluwer Health, Inc. 1978-2022. Dapagliflozin; [2022 Aug 25]. Available from: http://online.lexi.com
5. Lexi-Drugs. Lexicomp [Internet]. Hudson, OH: Wolters Kluwer Health, Inc. 1978-2022. Empagliflozin; [2022 Aug 25]. Available from: http://online.lexi.com

New Drug Approval:
Enhertu® (fam-trastuzumab-deruxtecan)

In recent history, Human Epidermal Growth Factor Receptor 2 (HER2) protein expression and Hormone Receptor (HR) expression on tumor cells have been the characteristics driving treatment decisions in breast cancer. The National Comprehensive Cancer Network (NCCN) uses HER2 and HR status to define 4 major categories of breast cancer. Treatment regimens are largely based on which of the 4 categories the breast cancer falls into: HER2+/HR+, HER2+/HR-, HER2-/HR+, or HER2-/HR-. New drug approvals were contingent upon the re-defining of these traditional categories. In the DESTINY-Breast04 Trial, researchers define a new subcategory in breast cancer: HER2-low.

Enhertu (Fam-Trastuzumab Deruxtecan) is a HER2 directed monoclonal antibody and topoisomerase 1 inhibitor conjugate. It received its original approval in December 2019 as a treatment for adult patients with unresectable or metastatic HER2 positive breast cancer who have received two or more prior anti-HER2 based regimens. Following its initial accelerated approval in 2019, the DESTINY-Breast04 Trial, a phase 3, multicenter, open label, randomized control trial, was conducted as a confirmatory trial to verify clinical benefit. HER2 positive breast cancer is defined as an ImmunoHistoChemistry (IHC) score of 3+ or an IHC score of 2+ and positive results on in situ hybridization (ISH). Prior to the Destiny-Breast04 trial, the HER2-low category did not exist. Therefore, if patients did not meet the criteria of IHC 3+ or IHC 2+/ISH+, their cancer would be categorized as HER2 negative, thus limiting their targeted treatment options. However, research has shown that 60% of breast cancer diagnoses that would traditionally be categorized as HER2 negative express low levels of HER2 that could be targeted. Using targeted therapy to combat HER2-low expressing tumors could potentially provide better outcomes for patients. For this reason, researchers tested fam-trastuzumab-deruxtecan against physician's choice chemotherapy in patients with low HER2 expressing tumors defined as IHC2+/ISH- or IHC1+

https://www.fiercepharma.com/pharma/historic-fda-nod-astrazeneca-daiichis-enhertu-snags-ultrafast-approval-broad-her2-low-breast

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New Drug Approval: Enhertu® (fam-trastuzumab-deruxtecan) *Continued...*

The primary endpoint of the DESTINY-Breast04 Trial was progression free survival among HER2-low/HR+ patients. Fam-trastuzumab-deruxtecan was shown to have a progression free survival time of 10.1 months vs 5.4 months (p-value <0.001 and HR 0.51) for the physician's choice group. A significant secondary endpoint was overall survival in all patients. The experimental group was shown to have an overall survival average of 23.4 months while the physician's choice group was shown to have an average progression free survival time of 16.8 months (p-value 0.001 and HR 0.64). Therefore, in HER2-low breast cancer patients, The medication could potentially provide 5 additional months of progression free survival and almost 7 additional months of overall survival. The authors of the DESTINY-Breast04 Trial concluded their findings by stating: "These results have the potential to improve the treatment outcome for more than half of patients historically categorized as having HER2-negative breast cancer." Since the publishing of the DESTINY-Breast04 Trial, the NCCN guidelines have been updated to now include fam-trastuzumab-deruxtecan as a category 1 recommendation for treatment of recurrent unresectable or stage IV HER2-low breast cancer. In a cancer subtype with limited treatment options, fam-trastuzumab-deruxtecan is a promising option for patients whose cancer falls into the new HER2-low category. This redefining of traditional breast cancer categories has the potential to transform the way that drugs are designed and tested and the way that breast cancer is diagnosed and treated.

Written by Kaitlin Grout, PharmD Candidate 2023
Northeast GA
Reviewed and Edited by Sara Hall, PharmD

References

1. Modi S, Jacot W, Yamashita T, et al. Trastuzumab. *N Engl J Med*. 2022;387(1):9-20. doi:10.1056/NEJMoa2203690
2. National Comprehensive Cancer Network. Metastatic Breast Cancer (Version 4.2022). https://www.nccn.org/patients/guidelines/content/PDF/stage_iv_breast-patient.pdf. Accessed October 9, 2022.

Important Dates!

November 2nd
Residency Application (PhORCAS) Opens

December 4th-8th
ASHP Midyear Convention
Las Vegas, NV

December 17th - January 1st
Winter Break

January 2nd
APPE Block 7 Begins

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