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## **PUZZLE OF THE MONTH**

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DAPAGLIFLOZIN INDICATION ASTHMA **ALVEOLI** ALBUTEROL COUGH WHEEZE **EXACERBATION** MAST CELLS NEUTROPHILS EOSINOPHILS MACROPHAGES PEDIATRIC **INFLAMMATION AUTOANTIBODIES IMMUNOGLOBULIN BLOOD VESSELS** CORONARY ARTERIES **ARTERIAL WALLS** STROKE

HEART FAILURE

CORONARY ARTERIES HEALTH SYSTEM PATIENT SAFETY **MEDICATIONS** TRANSITION PROVIDERS REGULATORS VANCOMYCIN MONITORING BACTERIA INFECTION ANTIBIOTIC RESISTANCE PATHOGENS COMMUNITY PANDEMIC DISEASES HYPERLIPIDEMIA NEXLETLOL CHOLESTEROL PLAQUE

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### **BACK TO COVER**

### A New Drug Class for Heart Failure—Dapagliflozin's New Groundbreaking Indication for Heart Failure with Reduced Ejection Fraction (HFrEF)

### By: Adrian Wong, PharmD Candidate c/o 2021

On May 5, 2020, the Food and Drug Administration (FDA) announced its approval for Farxiga® (dapagliflozin) oral tablets to have a new indication: to lower the risk of cardiovascular death and hospitalization for adults with New York Heart Association (NYHA) functional class II-IV heart failure (HF) with reduced ejection fraction (HFrEF).<sup>1</sup> Dapagliflozin is part of a drug class called sodium-glucose cotransporter 2 (SGLT2) inhibitors. Dapagliflozin works by selectively inhibiting SGLT2 in the proximal renal tubules, thus leading to increased glucose excretion and subsequent decreased serum glucose concentrations.<sup>2</sup> By this mechanism, dapagliflozin, first approved for its use in the US in 2014, first carried a labeled indication as an antidiabetic agent to be used as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus (T2D).<sup>3</sup>

The initial intrigue into SGLT-2 inhibitors and their cardiovascular effects stemmed from the thought that these selective inhibitors (in addition to their effects on glucose) reduce sodium reabsorption and increases sodium delivery to the distal tubule, thus causing a decrease cardiac preload/ afterload and overall, downregulate sympathetic activity.<sup>2</sup> This thought has been supported by large studies involving patients with T2D, including one funded by AstraZeneca titled, the Dapagliflozin Effect on Cardiovascular Events-Thrombolysis in Myocardial Infarction 58 (DECLARE-TIMI 58) trial. This trial concluded that patients with T2D who have an established cardiovascular disease or risk factors, had a lower rate of hospitalization for heart failure while on dapagliflozin.<sup>4</sup> The results of this trial subsequently led the FDA in 2019 to approve dapagliflozin for the reduction of hospitalizations for heart failure in adults with T2D.<sup>5</sup>

Most recently, a phase 3, randomized, placebocontrolled trial funded by AstraZeneca titled, Dapagliflozin and Prevention of Adverse Outcomes in Heart Failure (DAPA-HF) took a look at the effects dapagliflozin had on patients diagnosed with NYHA Class II-IV HF with an ejection fraction of ≤40% regardless if they had a diagnosis of T2D or not. Patients who were included in this study received standard heart -failure device therapies (e.g. implantable cardioverterdefibrillator) as well as a standard drug therapy regimen as appropriate (e.g. angiotensin converting enzyme inhibitors, angiotensin-receptor blockers, and/or beta blockers) in addition to either 10 mg of dapagliflozin once daily or placebo. The results of this study showed that when compared to placebo, patients receiving dapagliflozin had better outcomes with regards to worsening heart failure;16.3% of the 2373 patients receiving dapagliflozin experienced a worsening of HF, as compared with 21.2% of the 2371 patients who received placebo (Hazard ratio, 0.74; 95% confidence interval [CI], 0.65 to 0.85; P<0.001).<sup>6</sup> Furthermore, there were no statistically significant differences between the dapagliflozin group and placebo with regards to adverse effects.<sup>6</sup>

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Overall, researchers of the trial concluded that patients who received SGLT2 inhibitor therapy had a lower risk of worsening HF or resultant death than those who received placebo regardless of their diabetic status. Results from this study prompted the FDA to quickly announce its approval for dapagliflozin to be indicated for the hospitalization and cardiovascular death risk reduction of NYHA HF Class II-IV patients with reduced ejection fraction. With this new exciting and groundbreaking approval, dapagliflozin is now the first drug in its class to carry this indication.

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### Asthma, Alveoli, and Albuterol: A General Overview of Asthma

### By: Jeremy Mesias, PharmD Candidate c/o 2022

It starts with a simple cough or a wheeze. Suddenly, it escalates to tightness in the chest. Breathing gets quicker but shallower, making you feel short of breath. These are the most common and recognizable symptoms of an asthma attack. Around the world, nearly 300 million people suffer from asthma and about 250,000 people die from it each year. So, what is asthma and why is it so deadly? Asthma is a common and often times, serious chronic respiratory disease that can cause various respiratory symptoms and carry the possibility of becoming fatal.<sup>1,2,3</sup> Fortunately, it can be effectively treated. Most patients are able to achieve control of their condition and live long, healthy lives.

While the exact causes of asthma are unknown, scientists continue to explore the various factors that play a key role in determining its etiology. As we learn more about the disease, we have found that the following factors are associated with the development of asthma: genetics, allergies, respiratory infections, and environmental irritants.<sup>4</sup> Each of these factors aid in triggering a complex cascade of mechanisms throughout the body that lead to airway inflammation, excess mucus secretion, airway constriction, and bronchial hyperresponsiveness. The principal cells involved in the inflammatory response include mast cells, eosinophils, macrophages, and activated T-lymphocytes. First, the irritant is carried by an antigen presenting cell, such as a dendritic cell, and exposed to native T-lymphocytes. The lymphocytes are then activated into T-helper cells (Th2), or CD4+ cells. The increased level of Th2 then generates a family of various cytokines, such as IL-4 and IL-13, that mediate allergic inflammation of the airways and cause various asthma symptoms. These responses, when occurring acutely and together, come to form an asthma exacerbation, or asthma attack.<sup>1</sup>

A patient who presents with asthma may present with a number of various symptoms. Wheezing is usually a key indicator of asthma and is defined as "a musical, high-pitched, whistling sound produced by airflow turbulence." However, wheezing is not necessary for the diagnosis of asthma, since it can occur without wheezing in cases when the obstruction involves the small airways of the lung. Additionally, due to the inflammation of the airways and increased mucus production, a patient with asthma may also present with an increased feeling of chest tightness and nonproductive cough, oftentimes leaving them unable to breathe efficiently. Many asthmatics also report experiencing nocturnal symptoms once or twice a month. Furthermore, some patients only experience symptoms at night and have normal pulmonary function in the daytime. Nocturnal asthma is reported to have increased morbidity and mortality when compared to its normal counterpart and should be taken just as seriously, if not more to daytime asthma.<sup>2</sup>

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When asthma symptoms continue to worsen over a short amount of time, the patient may be experiencing an acute exacerbation, more commonly known as an asthma attack. Classified from a mild episode to an imminent respiratory arrest, symptoms can range depending on the severity of the attack. During mild episodes, the patient may be breathless, moderately wheezing, or breathing faster after light physical activity, such as walking. If the patient is experiencing imminent respiratory arrest, in addition to an increased intensity of the aforementioned symptoms, the patient would also be struggling for air. They would begin to experience episodes of confusion or increased agitation, inability to speak coherently, and potentially unconsciousness due to lack of oxygen. Considered a medical emergency, a patient experiencing imminent respiratory arrest must be treated immediately or they may undergo respiratory failure, which can become fatal.<sup>2</sup>

The guidelines to treat asthma are published by the Global Initiative for Asthma (GINA), which were established "to increase awareness about asthma among health professionals, public health authorities, and the community, and to improve prevention and management through a coordinated worldwide effort." To treat asthma, GINA recommends utilizing the controlbased asthma management cycle of assess-adjust treatmentreview response. Assessment of a patient's asthma does not only include symptom control, but also addresses risk factors and other comorbidities that could exacerbate the disease or increase the risk of poor health outcomes. Both pharmacological and nonpharmacological treatment is necessary to prevent exacerbations, control symptoms, and treat modifiable risk factors. Finally, the response of the patient to the prescribed medication must be assessed to evaluate if it is working optimally or if it needs to be adjusted. Altogether, the asthma management cycle is used to personalize asthma management therapy, thus preventing exacerbations through effective symptom control.<sup>3</sup>

The GINA guidelines present a 5-step treatment guideline

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### Asthma, Alveoli, and Albuterol: A General Overview of Asthma

### By: Jeremy Mesias, PharmD Candidate c/o 2022

for adults and adolescents greater than 12 years old. The guidelines are divided based on the preferred controller medication, which is used frequently to prevent exacerbations and control symptoms, and the preferred reliever, which is used to quickly treat asthma symptoms or for quick relief during an asthma attack. Depending on whether the patient is responding well or responding inadequately to treatment, they will either need to be stepped up or down in treatment, according to the guidelines.

- Step 1 is mainly for patients with infrequent asthma symptoms, typically presenting less than twice a month. The preferred reliever is an as-needed low dose inhaled corticosteroid (ICS)/ short-acting Beta-2-agonist (SABA), such as budesonideformoterol. Alternatively, a controller low dose ICS may be taken whenever the patient takes their reliever as-needed SABA.
- Step 2 is for patients who present with asthma symptoms or need to use their reliever twice a month or more. The preferred controller is a daily low dose ICS with an asneeded low dose budesonide-formaterol as a reliever. An alternative would be a leukotriene receptor antagonist (LTRA) or a low dose ICS whenever a SABA is taken.
- Step 3 is for patients who have troublesome asthma symptoms most days or who are waking from sleep due to asthma once a week or more. The preferred controller is a daily low dose ICS and a long-acting beta agonist (LABA). An alternative would be a medium dose ICS, or a low dose ICS-LTRA combination. The preferred reliever is an as-needed low dose ICS-formoterol combo for patients who are prescribed both maintenance and reliever therapy. This reliever option continues for steps 4 and 5.
- Step 4 is for patients whose initial asthma presentation is consistent with severely uncontrolled asthma or with an acute exacerbation. The preferred controller is a daily medium dose ICS and a long-acting beta agonist (LABA). An alternative would be a high dose ICS, add-on tiotropium, or add-on LTRA.
- Step 5 is for patients who continue to have uncontrolled symptoms and/or exacerbations despite Step 4 treatment. The preferred controller is a daily high dose ICS and a longacting beta agonist (LABA). Furthermore, patients should be assessed for contributory factors, optimized treatment, and

referred to a specialist to assess severe asthma phenotype, and potential add-on treatment. An alternative controller is an oral corticosteroid (OCS), but long-term systemic side effects are common and are burdensome to patients.

At each step, the patient's response to the medication regimen should be reviewed and optimized if needed. If the asthma is not well-controlled with the current medications, treatment will need to be stepped up to the next level. If the asthma is well-controlled and maintained for 3 months, practitioners may consider stepping down treatment.<sup>3</sup>

Once the patient's asthma is well-managed, it is important to keep them up to date on important patient education points. This is an opportunity for the pharmacist to play an active role in the patient care process. It is important to ensure that the patient understands what asthma is and how to recognize their symptoms in the event of an asthma attack. This empowers the patient to better understand the role that medication plays in management and allows them to better take care of themselves. Another critical counseling point is understanding when and how to use their medications. Given that asthma medications are administered in different ways, it's important that the patient understands the differences; for example, the difference between a rescue inhaler and a maintenance inhaler. Since usage techniques can also vary from device to device, the pharmacist should demonstrate how to use each device properly. The pharmacist should also help the patient understand what triggers their asthma to avoid and limit their exposure to irritants that make their asthma worse.<sup>4</sup>

As our understanding of asthma improves, pharmacists will continue to play a larger role in educating patients on their evolving conditions, and ultimately find better ways to keep our patients' airways happy and healthy.

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### MIS-C: The Impact of COVID-19 on the Pediatric Population

### By: Erica Tonti, PharmD Candidate c/o 2022

Multisystem Inflammatory Syndrome in Children, or MIS-C, is a recent syndrome recognized by the Centers for Disease Control and Prevention (CDC). The emergent outbreak of COVID-19 brought concern as to who would be affected by MIS-C and how severe the impact of the syndrome would be. Children, thought to be somewhat immune from this virus, were deemed to be free from inclusion of the "at-risk" category.

As of April 2020, MIS-C was a growing concern amongst children's hospitals in both the United States and the United Kingdom. While MIS-C may be rare, it is imperative that signs and symptoms are acknowledged in order to treat it before any long-term damage is observed. MIS-C is a condition where organs and tissues, such as the heart, lungs, blood vessels, kidneys, skin, brain, and digestive system become severely inflamed. This inflammation can cause a constriction of blood flow and may lead to damage of multiple organ systems, ranging from aneurysms in the coronary arteries to severe inflammation that can impair the functioning ability of the heart.<sup>2</sup>

According to the CDC guidelines, the diagnosis of MIS-C is seen in patients under the age of 21 years old, most commonly between the ages of 2 and 15, that presents with a persistent fever of 100.4°F and evidence of organ dysfunction including cardiac, renal, respiratory, or neurological involvement.<sup>7</sup> The inflammatory nature of this syndrome also requires that a child suspected of MIS-C must have evidence of inflammation in the form of an elevated C-reactive protein, ddimer protein fragment, the presence of elevated neutrophils, or low albumin levels.<sup>7</sup> This syndrome can develop within four weeks of exposure to COVID-19, so identification of a positive diagnosis will ensure that the symptoms are due to MIS-C.

Although the cause is not yet fully understood, researchers believe that this syndrome is caused by a delayed immune response to the coronavirus that exceeds the typical response, causing an immense amount of inflammation that can progress into organ damage.<sup>2</sup> A recent study explained that serum levels express elevated levels of two specific immune system molecules which could be producing an enhanced immune response to the coronavirus. Kevan Herold, MD, Professor of Immunology and Internal Medicine at Yale University, along with Betsy Herold, MD, Professor of Pediatrics and Microbiology-Immunology at Albert Einstein College of Medicine, studied blood samples of children who were admitted to the Montefiore Medical Center with symptoms of COVID-19. In this cohort were adolescent patients that were diagnosed with MIS-C. They discovered that the levels of interleukin 17A (IL-17A), which plays a key role in mobilizing the immune system during the early stages of an infection, and

interferon gamma (INF $\gamma$ ) which counters viral replication, were higher in younger patients. The upregulation of systemic inflammatory cytokines is similar to other "cytokine storms" activating both innate and adaptive immune cells. This extensive inflammatory reaction in these MIS-C patients led to tissue damage, resulting in activation of T cells and autoantibodies which were among the potential reasons for the occurrence of MIS-C.<sup>4</sup>

Since MIS-C is a relatively new syndrome, the symptoms vary among patients. Kawasaki disease is an illness that correlates with many of the symptoms that are seen in MIS-C. This illness is characterized by inflammation of the blood vessels, damaging the coronary arteries and limiting the oxygen supply to the heart. These symptoms include the presence of a rash, bloodshot eyes, a swollen tongue, and enlarged lymph nodes in the neck. Another syndrome that is closely related to MIS-C is Toxic Shock Syndrome, which is a complication associated with bacterial infections due to toxins produced by Staphylococcus aureus. These symptoms include high fever, a sunburn-like rash, and hypotension. Other symptoms associated with MIS-C include diarrhea, abdominal pain, or respiratory problems that have been reported with COVID-19 such as persistent cough or shortness of breath.<sup>6</sup>

Early detection of MIS-C is essential for achieving the most effective results of treatment. The key to treating these patients is to control the inflammation to avoid any long-term organ damage. The three classes of medications utilized for the treatment of MIS-C include anticoagulating agents, IV immunoglobulin, and anti-inflammatory drugs. Low dose aspirin at a dose of 3-5mg/kg/day is also commonly used in treatment. If there is decreased left ventricular ejection fraction, patients should be receiving enoxaparin as an anticoagulating agent.<sup>8</sup> High dose intravenous immunoglobulin (1-2g/kg) may be another treatment option, given the patient has proper fluid administration and appropriate cardiac function. In the event that MIS-C is refractory to intravenous immunoglobulins, anakinra (Kineret<sup>©</sup>), which is another immunosuppressive agent, may be considered to treat these patients. As observed in adult patients diagnosed with COVID-19, respiratory symptoms are most commonly reported. Anakinra, at a dose of 4mg/kg/day is first-line therapy for immunomodulatory treatment in children with hyper-inflammation in association with a COVID-19 diagnosis.<sup>8</sup> As with other medications in the pediatric setting, weight-based dosing should be utilized. A patient weighing less than 30kg requires a dose of 12mg/kg IV. A patient weighing more than 30kg requires a dose of 8mg/kg IV.<sup>8</sup> Regardless of the regimen chosen, the patient is at the center of this critical decision and therapy must be optimized accordingly.

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### MIS-C: The Impact of COVID-19 on the Pediatric Population

### By: Erica Tonti, PharmD Candidate c/o 2022

Although rare, MIS-C is dangerous if untreated in the pediatric population. MIS-C is quite a new discovery, and while its causes are still mainly unknown it is important to be aware of the signs and symptoms associated with this syndrome in order to effectively treat and maintain organ function. Prevention of exposure to COVID-19 is imperative in preventing the escalation to the symptoms correlated with Multisystem Inflammatory Syndrome in Children.

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### Transition of Care: A New and Emerging Pharmacy Specialty

### By: Sami Barakat, PharmD. and Natalia Jucha, PharmD. Candidate c/o 2022

Since the publication of the Institute of Medicine report To Err is Human: Building a Safer Health System, there has been a growing movement to improve patient safety. The report revealed that more than 7000 deaths occur annually due to medication errors.<sup>1</sup> It is estimated that 60% of medication errors occur during a patient's transition between healthcare settings.<sup>2</sup> As a result, there has been a growing focus on improving outcomes during the transition phase. Although safety is a big concern in practice, we cannot overlook the rising cost of healthcare and how errors contribute to that cost. It is estimated that medication errors cost our healthcare system 21 billion dollars every year.<sup>3</sup> Many of these errors lead to adverse drug events and re-hospitalization. It is therefore no surprise that healthcare systems, providers, and quality regulators have centered their efforts around optimizing transition of care (TOC).

Transition of care is the movement of a patient from one setting of care (hospital, ambulatory primary care practice, ambulatory specialty care practice, long-term care, home health, rehabilitation facility) to another. While an effective transition of care can lead to reduced hospital readmission, healthcare costs, and adverse events, several barriers negatively impact the quality of the transition. Inadequate discharge counseling and medication education can lead to lack of patient and family engagement. In addition, involvement of multiple specialists can lead to polypharmacy, medication errors, lack of accountability, and poor follow-up after discharge. Pharmacists have the education and expertise to address these barriers, collaborate with a multidisciplinary team, and provide a successful transition of care.<sup>4</sup> Moreover, quality regulators such as the Joint Commission recognize the pharmacist's role within interdisciplinary teams and recommend that all care settings should involve a pharmacist when possible in medication reconciliation.<sup>5</sup>

Health care organizations developed several TOC models with varying degrees of pharmacy team involvement. Some examples include Project RED (Re-Engineered Discharge) and Medication Management in Care Transitions Model (MMCT). Activities can range from performing medication reconciliation on admission to conducting discharge counseling and following up with the patient after discharge. By doing so, pharmacists act as the bridge between the patient, their providers, and their pharmacy to fill the gap that exists during their transition.

To test Project RED, researchers from Boston Medical Center randomized eligible hospitalized patients to receive RED intervention or usual care. Interventions included patientcentered education, comprehensive discharge planning, and post discharge reinforcement. A clinical pharmacist made telephone follow-ups to reinforce discharge plans, review medications, and solve problems. Patients in the intervention group had lower rates of hospital utilization (ER visits and readmission) within 30 days after discharge (116 vs. 166, pvalue 0.009). In addition, the intervention group had a higher rate of PCP follow-up (190 vs 135, p-value <0.001). This study reinforced the utility of the pharmacist as part of the transition of care team.<sup>6</sup>

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As the practice of pharmacy continues to grow and evolve, more institutions are implementing pharmacist-led TOC models. The University of Pittsburgh Medical Center executed a MMCT pilot to address issues in their existing TOC process. In the study, the pharmacists had a myriad of responsibilities: performing medication reconciliation on admission, resolving medication-related problems during hospital stay, conducting discharge counseling, communicating with the outpatient physician, facilitating medication delivery from the outpatient pharmacy, and following-up with the patient after discharge. As a result of implementing a MMCT pilot, pharmacists identified 774 medication discrepancies (mean 3.6  $\pm$  3.4 per patient) and reduced readmission rate from 23.7% to 10.5%. Furthermore, pharmacists helped resolve medication adherence issues in 16% of the patients and access insurance issues in 24% of patients. Thus, this pilot further substantiates the importance of a TOC pharmacist in the inpatient setting.7

As patients move across the care continuum, their healthcare costs increase significantly. To test the impact of TOC pharmacists on cost savings, Synergy Pharmacy Solutions implemented a pharmacist-provided TOC services for patients enrolled in Kern Health Systems (KHS) managed Medicaid health plan. The pharmacist contacted recently discharged patients, who were at high risk of readmission, to perform medication reconciliation, conduct comprehensive medication management, and communicate with providers to address medication-related problems. Before the intervention, the average six-month total health care cost was \$8,383 per patient. After factoring the TOC services cost of \$99 per patient referred, the net cost savings after the intervention was \$2,139. This resulted in cost avoidance of \$4.3 million to the KHS plan. This study illustrates the role of the TOC pharmacist in the managed care and outpatient settings.8

As seen with the different TOC models, pharmacists need expertise in the inpatient, ambulatory, and community pharmacy settings as they practice in different patient care areas. While not every TOC pharmacist completes residency training, it is highly encouraged due to the growing demand of the specialty and the knowledge needed to perform inpatient and outpatient patient care functions. In addition, a PGY-1

### **Transition of Care: A New and Emerging Pharmacy Specialty**

### By: Sami Barakat, PharmD. and Natalia Jucha, PharmD. Candidate c/o 2022

training is the new norm for many institutional positions. Many PGY-1 programs incorporate rotations in transition of care within their curriculum. In addition, there are PGY-2 programs in transition of care and ambulatory care programs with a focus on transition of care.

The plethora of evidence presented in this article supports the role of TOC pharmacists in every practice setting. However, some barriers still exist in implementing pharmacistled TOC services including, limited financial resources, limited staffing resources, and limited front-line staff buy-in. With the availability of non-profit organizations and federal grants, funding can be secured. Moreover, leveraging the talent of pharmacy students and pharmacy residents to assist in carrying out certain functions of the program, can help provide additional support staff. Lastly, providing data and evidence on the program's impact on patient care can help gain support from institution leadership and staff.<sup>7</sup>

In conclusion, becoming a TOC pharmacist can be exceptionally rewarding. The ability to use pharmacotherapy knowledge to provide pharmaceutical care, as well as being able to provide comprehensive patient education provides a unique, intellectually-stimulating career that can be found in transition of care.

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### Vancomycin Monitoring for Serious MRSA Infections in Adults

### By: Darien Lee, Pharm D Candidate c/o 2021

Vancomycin, a glycopeptide antibiotic, is one of the most commonly used medications in hospitals. Its widespread use is attributed to its efficacy for the treatment and prevention of bacterial infections caused by gram-positive bacteria. One of its most notable features is its coverage of methicillin-resistant Staphylococcus aureus (MRSA), an organism that can cause serious bacterial infections with few treatment options. Although the prevalence of MRSA in the United States has been steadily declining each year, healthcare providers cannot rule out the possibility of MRSA in a patient, often including vancomycin in the patient's empiric medication regimen.<sup>1</sup> The therapeutic monitoring of vancomycin for serious MRSA infections has primarily been based on guidelines published 11 years ago, in January 2009. Since then, numerous publications have had an impact on the 2009 guidelines as more data became available. In March 2020, a revised consensus guideline was published by the American Society of Health-System Pharmacists, the Infectious Diseases Society of America, the Pediatric Infectious Diseases Society, and the Society of Infectious Diseases Pharmacists. This article serves to highlight updates to the guideline, focusing on optimizations in vancomycin dosing and monitoring in the adult population.

One of the most significant changes to the guidelines is the recommendation for an optimal monitoring parameter for vancomycin concentrations. The authors of the 2009 guidelines recognized that the ratio of area under the curve over 24 hours to minimum inhibitory concentration (AUC/MIC) was a pharmacodynamically linked parameter for measuring vancomycin's effectiveness in treating MRSA.<sup>2</sup> However, due to the difficulty in estimating AUC in clinical practice, the guidelines recommended maintaining trough serum vancomycin concentrations between 15-20 mg/L as a surrogate marker to achieve the AUC/MIC target of  $\geq$ 400 in most patients with MIC  $\leq$ 1 mg/L.<sup>2</sup> The authors noted that there were limitations to this recommendation as few prospective or randomized trials of vancomycin monitoring were available to support its efficacy and safety.<sup>2</sup>

The investigators of the 2020 guidelines corroborate these limitations as their updated recommendation abandon the use of trough-only monitoring based on recent efficacy and nephrotoxicity data.<sup>3</sup> Investigators have determined that trough-only monitoring has yielded less accurate AUC estimations compared to other methods.<sup>3</sup> Although targeting trough concentrations of 15-20 mg/L will achieve minimum AUC/MIC values of 400, studies have shown that a wide range of concentration-time profiles can result from an identical trough value.<sup>3</sup> In other words, the trough level will not be able to accurately estimate AUC values before the time of its measurement. This type of monitoring puts the patient at risk as higher unmonitored AUC values can result in serious acute kidney injury (AKI). As such, the 2020 guidelines recommend monitoring vancomycin efficacy and safety by directly targeting an AUC/MIC ratio of 400 to 600 through the use of Bayesian software programs.<sup>3</sup> The Bayesian method associates a vancomycin population pharmacokinetic (PK) model with the individual patient's drug concentrations to establish the patient's PK parameters and optimize current and future dosing regimens.<sup>3</sup> Although this method can similarly be accomplished with first-order PK equations, Bayesian software programs offer many advantages. The use of equations requires near steady-state conditions and only provides the estimation of AUC during the specific time period when levels are collected. <sup>3</sup> On the other hand, Bayesian software has the ability to collect vancomycin concentrations within the first 24-48 hours (rather than at steady-state conditions), adapt to physiologic changes in the patient's PK profile during or after the sampling period, and account for patients with multiple dosing regimens within a 24-hour period.<sup>3</sup> In all, the 2020 guidelines currently value Bayesian software programs as the preferred approach to monitor AUC and recommends estimation using 2 vancomycin concentrations (peak and trough). The dosing recommendation of 15-20 mg/kg (based on actual body weight) administered every 8 to 12 hours as an intermittent infusion (II) for patients with normal renal function remains the same between both guidelines.

In addition to therapeutic monitoring parameters, the authors of the 2020 guidelines also took a more comprehensive look at the clinical applications of vancomycin continuous infusion (CI) administration. The previous 2009 guidelines did not have any recommendations for CI due to little to no data supporting improved patient outcomes.<sup>2</sup> But, recent studies have led the 2020 guideline panel to recommend CI as a viable alternative to conventional II dosing when the AUC target cannot be achieved.<sup>3</sup> Target serum concentrations can be achieved more quickly with Cl as it is easier for clinicians to measure steady-state concentrations and modify the rate of infusion.<sup>3</sup> Although it appears that CI has similar or lower risk of nephrotoxicity, more studies are needed to make a definitive recommendation.<sup>3</sup> Furthermore, one of the greatest disadvantages to CI administration is its incompatibility with other drugs, challenging healthcare providers to use alternative agents, independent lines, or multiple catheters.<sup>3</sup>

Loading dose recommendations are mostly the same between both guidelines; however, the 2020 guidelines provided extended guidance on dosing recommendations for obese adult patients. The current guidelines broadened the loading dose from 25-30 mg/kg to 20-35 mg/kg, with a

### Vancomycin Monitoring for Serious MRSA Infections in Adults

### By: Darien Lee, Pharm D Candidate c/o 2021

maximum dose of 3,000 mg.<sup>3</sup> Typically, a higher dose within this range is used for critically ill patients, while a lower dose is used for patients who are obese and/or receiving Cl administration.<sup>3,4</sup>

Overall, the current guidelines addressed many gaps in the 2009 guidelines. However, the 2020 guidelines still present a few concerns and unanswered questions. Although most situations of empiric vancomycin dosing can assume a MIC of 1 mg/L, there are some occasions in which patients demonstrate a MIC >1 mg/L. The investigators recognize that the probability of achieving an AUC/MIC target of  $\geq$ 400 is low with conventional dosing in this population group; however, higher doses to compensate for higher MIC values may put the patient at an increased risk for nephrotoxicity.<sup>3</sup> As more studies are required to determine an optimal AUC/MIC target for patients with MIC > 1 mg/L, healthcare providers must consider the use of alternative antibiotics.<sup>3</sup> Another concern related to AUC/MIC monitoring is the actual implementation of Bayesian software programs. Although these programs provide accurate and individualized dosing, its implementation will require additional costs to the institution, specialized training, and informatic resources to integrate software.<sup>5</sup>

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### By: Natalia Jucha PharmD Candidate c/o 2022

Due to the overuse and misuse of these medications, antibiotics are no longer as effective against their intended pathogens.<sup>1</sup> In 2019, the World Health Organization (WHO) released its AWaRE Classification Database which stands for "Access, Watch and Reserve".<sup>2</sup> Clinicians use this database as a guide to appropriately select antibiotics for the pathogens they are fighting. The "Access" group in the WHO database identifies antibiotics used to treat common pathogens seen in clinical practice. The entire database is comprised of 180 antibiotics, 48 of which are in the access group. The "Watch" group describes antibiotics utilized in pathogens with the potential of displaying resistance; these are antibiotics that infectious disease teams focus on monitoring in different health care systems. As for the "Reserve" list, there are 22 antibiotics specified for the use in multi-drug resistant pathogens; our "last resort." This is merely 10% of the antibiotics currently recommended through the AWaRE Classification Database, which shows the alarming need for antibiotic stewardship.

In 2016, the Centers for Disease Control and Prevention (CDC) established the Antibiotic Resistance Lab Network (AR Lab Network), where multi-drug resistant pathogens can be identified efficiently and accurately. Health Care Providers (HCPs) are expected to be familiar with resistant strains in each facility and community. All HCPs are required to be notified by the laboratory for any antibioticresistant pathogen as well as be responsible for informing patients and family members. Reporting unusual cases to local health departments is an additional obligation intended to protect the community.<sup>3</sup> The world is a global community, where it is ever more difficult to control infections (as seen with the recent COVID-19 pandemic). Antibiotic resistance and multi -drug resistant pathogens are an ever-evolving problem in need of a global effort and solution.

Nosocomial infections, or infections acquired in a hospital setting, pose a unique danger for patients as they can be more difficult to control. Hospitals, nursing homes and systems with many patients in a given area exhibit a higher incidence of infectious pathogens. The acronym, ESKAPE, identifies pathogens that are deemed Infectious Disease Society of America's (IDSA) largest threats in terms of drugresistant tendencies: Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, and Enterobacter species.<sup>4</sup> New antibiotics are in constant demand for these pathogens that haunt health care systems and provide an additional peril to immunocompromised patients. According to the Pew Charitable Trusts Organization, as of December 2019 there are 41 antibiotics in development and are evenly dispersed between Phase 1 through Phase 3 clinical trials. About 40% of these

antibiotics exhibit a potential to treat ESKAPE pathogens, and close to 25% of them exhibit a new mechanism of action.<sup>5</sup> Although this seems like promising news, these are still medications in clinical trials. Infections spread rapidly, and if not treated correctly, pathogens will express a greater degree of pathogenicity. As seen with former antibiotic discoveries, some resistance mechanisms develop as quickly as the same year a drug is released or approved [seen with methicillin and Methicillin-Resistant Staphylococcus aureus (MRSA)].<sup>3</sup>To combat antibiotic resistance effectively, practitioners must start their work at the patient level. We are all far too familiar with patients telling us, "I felt better, so I stopped taking my antibiotic" and suddenly we feel an itch at the tip of our tongue to protest and educate. It is also important to give back to our communities by educating future generations such as children in elementary schools, middle schools, and even high schools. Pharmacy students such as ourselves and pharmacists must utilize our skill sets to improve society's knowledge, and by doing so, health.

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Amidst the rise of the COVID-19 pandemic, in late February 2020, St. John's University's (SJU) American Pharmacists Association – Academy of Student Pharmacist's (APhA-ASP) Operation Public Health embarked on a mission to raise awareness about antibiotic resistance in a Brooklyn Middle School. Four SJU pharmacy students, myself included, along with the faculty advisor for Operation Public Health acted as substitute-science teachers for four different classes (6th and 7th graders). The presentation that was developed for class time outlined two major topics: "what is a pharmacist" and "antibiotic resistance". The students seemed engaged, wanting to learn about the field of pharmacy and what role pharmacists have "in the real world". Additionally, there was an interactive activity where we asked students about the process of a prescription – many of whom thought it was a 5-minute process! Once we felt they were more comfortable as to the role we play in society as health care professionals, we started our mini lesson on different "bugs" including bacteria, fungi and viruses, outlining the differences between them We talked about good versus bad bacteria with a True and False activity and tested their math skills with a simple dosing question for an antibiotic. Along with interactive activities and videos, we tried to give them enough background information for the bigger issue at hand, antibiotic resistance. We concluded the presentation with a Timeline of the "Bigger Picture" and what we as a society can do to collectively combat this issue.

Throughout the 40 minutes we had with each class, the students exhibited incredible focus on the topic at hand. We had many students that asked about current events such as COVID-19, the Fiscal Year 2020 President's Budget for Health



### Antibiotic Resistance: Why It's Important to Educate the Future Generation & What I Learned from Doing So

### By: Natalia Jucha PharmD Candidate c/o 2022

and Human Services, and general follow up questions about how to stay safe from infections. Although we aimed to answer many questions about antibiotic resistance, there seemed to be an overwhelming amount of questions about COVID-19, which at the time hadn't even had its first case in the United States. Some questions included:

- How is coronavirus different than the regular flu or cold?
- When will we have a vaccine?
- How fast can a vaccine be developed?
- What are the signs and symptoms of coronavirus?
- How are the symptoms different from other infections?
- How can we avoid/prevent catching the virus?
- Where did the virus actually come from?
- How does coronavirus spread?
- Is there any treatment for this virus?
- Is the United States allocating enough money for the medical system this year?
- Why is coronavirus such a threat to the United States?

Having 11 and 12-year-old children asking these questions in the span of 5-10 minutes, you'd think you're subbing in for Governor Cuomo at a Statewide Press Conference with a room full of relentless reporters. Throughout this presentation, I gained a better appreciation for the knowledge and curiosity these younger students displayed about current events and topics that they don't have exposure to during their normal science classes. The students' excitement on the subject of antibiotic resistance, bacteria and COVID-19 truly parallels general society because it is important for the public to understand basic scientific concepts that can affect their health, especially in urban areas. Seeing this parallel between younger students and the general public, I am confident that members of society are not only more knowledgeable than we think, but ask the right questions due to their curiosity.

Schools and education systems are responsible for preparing students for the future and fuel their passion. The public-school system fails to give students the ability to fuel their curiosity unless students are already in a supportive environment and driven to achieve their goals. Not all students have the drive to explore their interests unless they gain exposure. Public schools in New York city should openly invite alumni to speak to current students about the field they chose to go into as well as what problems the future generation can face within that field. My experience with these extremely intelligent middle school students showed me that with the right delivery, children can excel in understanding current situations, ask valid questions and express genuine interest. The topics that we discussed with these middle school students are only a small portion of what pharmacists are bound to overcome in their careers for the greater good of society. Healthcare is an area that affects all individuals, but is only a small stitch in society's greater fabric. <u>Acknowledgements:</u>

I would like to thank Yumi Lee, PharmD. BCPS for encouraging me to write about my experience and further reflect on the impact this event had on younger students. I would like to express special thanks to my mentor, Lane Nguyen, PharmD. BCPPS for providing feedback and guiding me in the construction of this article. His thorough review process and extensive conversations helped reignite my passion for antibiotic resistance and necessary antibiotic stewardship.

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### Next Up in the World of Hyperlipidemia: Nexletlol™

### By: Preethi Samuel, Pharm.D. Candidate c/o of 2021

In the United States, at least one person has a heart attack every 40 seconds and 1 of every 5 is silent.<sup>1</sup> Heart attacks are commonly a result of atherosclerotic cardiovascular disease (ASCVD). Preceding plaque buildup in arterial walls can potentially lead to a heart attack or stroke.<sup>2</sup> Plaques that accumulate are composed of cholesterol. LDL is the "bad" cholesterol, which increases ASCVD risk.<sup>3</sup> By lowering LDL levels, the potential for a life- threatening cardiovascular event is reduced. First line pharmacologic therapy for hyperlipidemia are statins. However, in February 2020, a new treatment strategy was introduced to the market with the U.S. Food and Drug Administration's approval of bempedoic acid (Nexletol<sup>TM</sup>).<sup>4</sup>

Bempedoic acid, by Esperion Therapeutics, is the world's first ever adenosine triphosphate lyase (ACL) inhibitor. It is indicated in the treatment of adults with heterozygous familial hypercholesterolemia or established ASCVD as an adjunct to diet and maximally tolerated statin therapy. <sup>4</sup> Bempedoic acid, a prodrug, is activated in the liver by acyl-CoA synthetase 1 (ACSVL1). It is not active in skeletal muscle due to lack of ACSVL1.<sup>5</sup> Once activated, inhibition of the ACL enzyme occurs. Inhibition occurs two steps upstream of HMG-CoA in the cholesterol synthesis pathway.<sup>5</sup> As a result, reduced cholesterol synthesis is observed, as well as LDL receptor upregulation and increased clearance of LDL from the bloodstream.<sup>5</sup> (Figure 1)





St. JOHN'S UNIVERSITY College of Pharmacy and Health Sciences Two double-blind, randomized controlled trials were conducted to demonstrate the safety and efficacy of bempedoic acid. CLEAR Harmony was the first of these trials, lasting 52 weeks. Patients (n= 2,230) were randomized 2:1 to either receive bempedoic acid (n=1,488) or placebo (n=742). The second trial, CLEAR Wisdom, like its sister trial, lasted a total of 52 weeks. Patients (n= 779) were randomized 2:1 to either receive bempedoic acid (n=522) or placebo (n=257). For both trials, it was required that all participants had to be at least 18 years of age and had a fasting LDL-C > 70 mg/dl/. Patients needed to have either established ASCVD or heterozygous familial hypercholesterolemia. If the patient was randomized to bempedoic acid, he or she would continue to take their maximally tolerated statin, or any other lipid lowering therapies that they were already using.<sup>6</sup>

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The primary endpoint of CLEAR Harmony was its general safety, including ADR's, clinical safety labs, physical examinations, ECG, and vitals. The percent change in baseline LDL-C by week 12 was the secondary endpoint. Incidence of any adverse event, such as upper respiratory tract infections, muscle spasms, and hyperuricemia, was similar and not statistically significant (p=0.91) between both groups, bempedoic acid (78.5%) and placebo (78.7%). Serious adverse reactions were also statistically insignificant (p=0.80) in this trial. Secondary endpoints of CLEAR Harmony proved to be significant (95% Cl: -20%, -16%; p < 0.001) with an 18% mean decrease in LDL from baseline when comparing bempedoic acid to placebo.

The primary endpoint of CLEAR Wisdom was the percent change in baseline LDL-C from baseline to week 12. The secondary endpoints were the percent change by week 24, change in baseline by week 12 in HDL, total cholesterol, apolipoprotein B, and hsCRP, and absolute change in baseline weeks 12-24 in LDL. The difference in CLEAR Wisdom between treatment and placebo mean percent change in LDL-C from baseline to Week 12 was -17 percent (95% Cl: -21%, -14%; p < 0.001). Bempedoic acid has shown significant LDL reduction regardless of what dose of statin, or other lipid lowering agents, the patient was on.<sup>6</sup>



### Next Up in the World of Hyperlipidemia: Nexletlol™

### By: Preethi Samuel, Pharm.D. Candidate c/o of 2021

Dosing of this novel drug therapy is currently set to be 180 mg daily without regard to meals and in combination with the maximally tolerated statin. No titration is required for initiation of the medication.<sup>7</sup> Following initiation, changes in LDL levels should be detected in 8 to 12 weeks. Use in pediatric, pregnant, or lactating patients has yet to be approved due to a lack of data. Dose adjustments are not needed in both mild to moderate renal and hepatic impairment. Clinical trials did not include patients with severe renal impairment (eGFR < 30ml/min), end stage renal disease on dialysis, or severe hepatic impairment. Bempedoic acid should not be used in combination with doses greater than simvastatin 20 mg or pravastatin 40 mg, as it increases the concentration of these statins. This elevates the risk of myopathy. Bempedoic acid also carries a risk of tendon rupture and hyperuricemia. Elevated uric acid levels can lead to the development of gout, as seen in 1.5% of patients treated with bempedoic acid. Tendon rupture occurred in 0.5 % of patients treated with the drug versus placebo treated patients. Common sites of tendon rupture are the rotator cuff, biceps tendon, or Achilles tendon- all which occurred within weeks of starting therapy. The likelihood of tendon rupture is increased in patients who are over 60 years of age, in patients with renal failure, or those with previous tendon issues. Other side effects include cold or flu-like symptoms, stomach pain, muscle spasms, elevated liver enzymes, and bronchtits.<sup>4</sup>

Belonging to an entirely new class of medications, bempedoic acid is one-of-a-kind. From a pharmacist's perspective, bempedoic acid shows promise as an adjunctive therapy to statins. It is by no means a replacement for evidence-based use of antihyperlipidemic agents and diet- a point that should be stressed to patients during counseling. It has proven itself to be generally well tolerated when given to patients who fit the necessary criteria. This novel drug has shown significant LDL reduction and can prove to be an option for those who are not candidates for other lipid lowering agents. In combination with the statins, hyperlipidemia might have just met its match!

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# **RHO CHI POST: TEAM MEMBERS**



### (a) Katharine Russo 6th Year, STJ; Editor-in-Chief

The Rho Chi Post as been a forum for students, faculty, and staff to advance their knowledge in the field of pharmacy since 2011. The platform allows for students to practice their written communication skills while offering an innovative and creative workspace to bring together various aspects of the pharmacy profession. I am proud to continue this tradition by fostering a publication suited to keep our readers up-to-date, especially in these unprecedented times during the COVID-19 pandemic.

### @ Shireen Farzadeh, PharmD

Graduate Copy Editor [Content-Focused] I am excited to join Rho Chi Post and contribute to the award-winning newsletter for students to share ideas, opinions, and pertinent topics! Writing for the Rho Chi Post is an opportunity to express our appreciation for pharmacy and educate ourselves and our peers. I hope to inspire students to discover their passion for writing and to stay up to date on our evolving profession!



### @ Kathleen Horan, PharmD

Graduate Copy Editor [Content-Focused] I have always loved writing, and I hope to couple my passion for writing with my interest in clinical pharmacy by becoming a writer and staff editor for the Rho Chi Post. As a writer and staff editor for the Rho Chi Post, I hope to write and edit informative and interesting articles that relate to the world of healthcare and pharmacy. I am so excited to join this team of student pharmacists and writers.



### @ Nicollette Pacheco, PharmD Graduate Editor [Graphics-Focused]

As a member of the Rho Chi Post team, I have a vast appreciation of what it means to be a pharmacist in the rapidly evolving world of healthcare. As a graduate editor, I will continue to bring my passion for science and creativity to the Rho Chi Post.



# Throughout my time in the PharmD program, my understanding of pharmacy as a profession has evolved and deepened as much as

my desire to create awareness, particularly to non-science students, about the diverse role pharmacy plays in various healthcare and non -healthcare settings. I have always had an affinity for writing and look forward to combining my interests in literary composition, editing and pharmacy to produce relevant issues which both pharmacy students and nonpharmacy students alike will find relatable and take an interest in.

### @ Sarah Hewady, PharmD

@ Anna Diyamandoglu, PharmD

Graduate Copy Editor [Content-Focused]

Graduate Copy Editor [Content-Focused] The importance of staying updated on rele-

vant healthcare matters cannot be overstated. I appreciate the mission of Rho Chi Post in that it successfully compiles clinically relevant and up-to-date information for its audience. Wanting to contribute to this cause is what sparked my interest to become a staff editor. I hope to broaden the scope of knowledge of the public as well as aid healthcare practitioners in the clinical decision-making process.

### Ø Jonathan Mercado, PharmD

Graduate Copy Editor [Content-Focused]

The Rho Chi Post breaks barriers for students that want a glimpse of their future and acts as an inspiration to work harder to achieve their goals. It is an embodiment of the motivation and intelligence that drives pharmacy students to be the most informed and capable professionals they can be. I am glad to a part of that mission and to channel my passion and interests through this newsletter.

### @ Joseph Eskandrous, PharmD Graduate Staff Writer

In the world of pharmacy, knowledge becomes outdated within hours of when you learned it. The miracle drug that used to be considered the standard of therapy is replaced by the latest and greatest. My role as a Staff Writer for the Rho Chi Post is to bring these changes to the forefront in order to empower future pharmacists and to improve the quality of patient care.









# **RHO CHI POST: TEAM MEMBERS**



### @ Daniela Farzadfar, PharmD **Graduate Staff Writer**

Pharmacy is a constantly evolving profession. Writing for the Rho Chi Post gives me the opportunity to enlighten my peers and myself on changes occurring in the field that we are often not taught in the classroom. The Rho Chi Post serves as a creative outlet where students can express their opinions and share new information by combining their passion for writing and the pharmacy profession. I hope that my contribution to this newsletter inspires others to improve patient outcomes by staying up to date on recent changes.



### @ Maryam Sekhery, PharmD Graduate Staff Writer

I have always looked forward to reading Rho Chi Post's newsletters and can now proudly say that I am a member of the Rho Chi Post team! The field of pharmacy is always changing, and Rho Chi Post is one-way students can stay up to date regarding current events in the profession and express their views on the dynamic aspects of pharmacy. I look forward to contributing to Rho Chi Post as a staff writer and am grateful for the opportunity to create original content for the newsletter.



### @ Judy Koag

### 6th Year, STJ; Copy Editor [Graphics-Focused]

I am so excited to join the Rho Chi Post, a newsletter which strives to create high quality and creative content. I look forward to working with the team to promote the profession of pharmacy and communicate ideas that inspire and attract readers through the use of graphic design. Graphic design has always been my passion and I hope my contributions continue the Rho Chi Post's mission.



### @ Lexie Villariasa 5th Year, STJ; Copy Editor [Graphics-Focused]

With the world of pharmacy changing day by day, it can be challenging to keep up with all the updates. The Rho Chi Post provides an excellent platform for students to share their insights and thoughts on the happenings within the field. I'm excited to join the Rho Chi Post and a team that is passionate about the profession. With a passion in graphic design, I hope to continue the vision the newsletter has and am grateful for the opportunity to do so!











### @ Michael Lim, PharmD **Graduate Staff Writer**

learn to teach and get to give.

In the spirit of advancing the pharmacy profession, the Rho Chi Post never ceases to produce valuable content showcasing the innovation and diversity of the career. As a Staff Writer for the Post, I am honored to have the opportunity to use writing to both educate and push readers to strive for excellence in their professional pursuits. I hope that my contributions to the newsletter are able to foster growth in an informative and accessible manner.

vant topics which have an impact on patients'

lives. I have learned so much from writing for

the Rho Chi Post and hope to inspire others with

my words. As a future pharmacist I want to

### @ Jason Ifeanvi

### 5th Year, STJ; Social Media Manager

The Rho Chi Post has a clear mission: to advance the profession of pharmacy by instilling the desire in others to pursue intellectual excellence and critical inquiry. I could not be more excited to join the Rho Chi Post. This an interactive platform that affords me a unique opportunity to contribute to the process of educating readers on advances made in drug discovery and development, modifications in treatment guidelines, and the implications these changes have on the practice of Pharmacy. I am eager to work on this team of equally motivated students, and I look forward to utilizing my skills, past work and volunteer experiences to assist the Rho Chi Post in achieving their goals.

### @ Alisha Kuriakose

5th Year, STJ; Finance & Outreach Manager I wanted to be part of Rho Chi Post as it provides a platform for students to express their ideas and educate others on global healthcare issues. As a future pharmacist, this is my way of contributing to the change I want to see in our growing profession and make my voice heard. I am very excited for the privilege to work alongside the editorial board to produce a newsletter and serve as the 2020-2021 Finance and Outreach Manager!





# **RHO CHI POST: TEAM MEMBERS**



### @ Carolina Guerreiro

### 6<sup>th</sup> Year, STJ; Staff Editor

As a student of the arts and sciences all my life, I have always been interested in the intersection between the two. The most exciting part about being a Staff Editor for the Rho Chi Post is not only the ability to share the most exciting and clinically relevant healthcare news with our audience, but also having the opportunity to tap into my creative side while relying on my clinical knowledge and previous scientific writing experience. When I'm not busy editing, I am working to capture stories that raise awareness about the diverse roles pharmacists can play in healthcare settings worldwide. I strive to share my vision of untamed areas of pharmacy practice and hope to inspire you as readers to explore them for yourselves



### @Erica Tonti 5<sup>th</sup> Year, STJ; Staff Writer

The profession of pharmacy is constantly evolving and adapting to the ever-changing field of healthcare. The Rho Chi Post serves as an amazing outlet for students to be informed, as well as to inform others, on the most up to date and relevant information. I could not be more excited to join the Rho Chi Post. This opportunity allows myself and my peers to take initiative and raise awareness of the advancements in the field of pharmacy. As a staff writer, I look forward to contributing to the Rho Chi Post and am grateful for the opportunity to educate students on the growth within our profession.



### @Rubab Hassan

5th Year, STJ; Staff Writer

The Rho Chi Post gives pharmacy students the opportunity to explore their interests, whether it be editing, writing, or graphics, while also enhancing their skills and knowledge as student pharmacists. I am excited to be a part of the Rho Chi Post because it is a great way to expand on what I have learned during my time in pharmacy school and also keep developing my writing skills. Being a writer gives me an outlet to raise awareness on the advancements that are constantly happening in the field of pharmacy and allows me to be part of an amazing team in hopes of providing other students with our best work.



### **Obin Kuriakose** 6<sup>th</sup> Year, STJ; Staff Writer

The world of pharmacy is constantly making advancements day after day in order to better care for patients and allow them to return to their healthy lives. Rho Chi Post serves as an outlet for students to update themselves without the hassle of having to debate whether the information is accurate or not. I look forward to working with the Rho Chi Post staff to educate students about the growth within the field of pharmacy and to be source of enrichment during a busy school schedule.



### @Edwin Gruda 5th Year; STJ; Staff Writer

My name is Edwin and I am a Doctor of Pharmacy student at St. John's University. My favorite aspect of pharmacy school is learning about the clinical and therapeutic components of drugs and diseases. As a kid, I was interested in both the math and sciences. The reason I chose pharmacy over other health care professions is because a lot of people rely on their medications to make them feel better. Pharmacists are the most accessible healthcare providers and are able to help patients optimize their drug therapy in order to improve their health. Throughout the beginning of pharmacy school, I volunteered at Columbia University Medical Center on the oncology department for one year. After that, I have been working as a pharmacy intern at Sandcastle Pharmacy, which is primarily an HIV specialty pharmacy. As a staff writer, I want to highlight the critical role of clinical pharmacists within an interdisciplinary team, in improving and enhancing a patient's quality of life.

### @ Natalia Loomis

### 5th Year STJ; Staff Writer

The profession of pharmacy and what a pharmacist entails is an ever evolving journey. Rho Chi Post becomes an excellent resource in tracking these advances. It provides student pharmacists to not only read and become educated on what other paths might be in store for them, but to become part of the team and create their path. I am so thankful and excited for the opportunity to become a staff writer for the RCP; allowing myself to use my creative ability to not only create my path, but write content to shed a light on all the amazing opportunities that of being a pharmacist entails.

### @ Jeremy Mesias

### 5<sup>th</sup> Year, STJ; Staff Editor

The field of pharmacy is constantly growing and improving with every coming day. Today's headlines become tomorrow's history. As healthcare leaders in a dynamic field, it is important to stay up to date. The Rho Chi Post serves as an excellent tool to help students become more informed about our profession, as well as providing them with the opportunity to contribute their own two cents to the conversation. I am excited to join the team and look forward to contributing to keeping students on top of current pharmacy advancements.

### @ Aiša Mrkulić

### 5th year; STJ; Staff Writer

It is admirable of the Rho Chi Post to provide us student pharmacists with a platform to use our voice. Home to the free-exchange of thoughts, opinions & ideas, all are welcome to contribute—so don't count yourself out! Eager to use my voice more than ever before, I counted myself in. As a Staff Writer, patient advocacy, furthering of public health initiatives & diversifying public perception of pharmacists all suddenly become possible. After all, who if not us is to showcase the value of America's most-trusted healthcare professional? I encourage both our loyal & firsttime readers to please, read on with us. To learn to read is to learn to write and to learn to write is to become better communicators—disseminators of information. When this occurs, the quality of patient care improves...& that is always the goal.

St. JOHN'S UNIVERSITY College of Pharmacy <u>and Health Sciences</u>





# **RHO CHI POST: TEAM MEMBERS**



### @ Nicole Ng

5th Year, STJ; Website Liaison Being able to join the Rho Chi Post not only gives me the opportunity to expand my knowledge of the profession of pharmacy, but also allows me to be a part of educating students about the constant changes within the field. Through my involvement, I hope to increase the accessibility of our content and motivate students to broaden their knowledge and stay up-to-date. I am excited to work with the team to produce a newsletter that effectively and efficiently communicates all news that affects our healthcare profession.



### Tolulope Omisakin 5<sup>th</sup> Year, STJ; Staff Editor

As an avid reader, I have always taken an interest in how things were written. Whether it be novels, journal articles, or magazine columns, there is always a peculiar way in which a writer tells a story. The real story is only 50% of what is written and the rest is in how the writer decides to disseminate that information. The Rho Chi Post serves as an amazing outlet for student pharmacists, allowing us to delve into the intricacies of different perspectives and ideas in the world of pharmacy. It also gives us the opportunity to decide how we want to detail these new found perspectives and ideas to our audience. As an incoming editor for The Rho Chi Post, I hope to enhance and curate the way each writer tells their stories and help them reach their audience at new levels.



### @ Mah Noor 6<sup>th</sup> Year, STJ; Staff Writer

Rho Chi Post is an amazing student-operated newsletter publication that is doing an astonishing job delivering updated news as well as giving students the opportunity to give back to the pharmacy community. As a staff writer, I hope to play a key role in educating students on the different aspects of pharmacy and how much growth takes place in this field. Reading the Post since freshman year has helped me gain a better understanding of what it means to be a pharmacist and I hope to achieve that same understanding in students who read my articles.



### O Nishanth Viswanath 5<sup>th</sup> Year, STJ; Staff Writer

The profession of pharmacy is continuously expanding to meet new demands and offer novel platforms for innovation in healthcare. With an abundance of new information and guidance being published everyday, it can become difficult for students and professionals to stay updated with relevant information and find new outlets to learn. The Rho Chi Post not only allows us to be informed about the current state of our profession, but also allows students to voice their opinions and connect with each other through literature. I am excited to be part of its team, and hope to provide meaningful and resourceful contributions.



### @ Shivani Shah

### 6th Year, STJ; Staff Writer

As students in an dynamic healthcare profession, it is important to keep up to date with literature and publications regarding the pharmacy profession. Rho Chi Post serves as a great outlet for students to catch up on pharmaceutical innovations and progress going on in the career. Being a staff writer motivates me to constantly research and share new, exciting advancements with fellow students. I look forward to reading articles in the Post and hope to spark others curiosity and interest!



### @ Preethi Samuel

6th Year; STJ; Staff Writer

As future drug experts, we student pharmacists have a responsibility to take initiative and educate ourselves on advancements in healthcare, so as to improve the quality of patient care. The Rho Chi Post serves as a great platform for students to get information that is both accessible and accurate. To be a voice for my future, fellow pharmacists is to be heard and my patients cared for---as pharmacists are their best, sometimes their only, advocates. I hope that my contributions to the RCP spark readers' curiosity, and inspire conversations of how we may become better pharmacists.



### Dana Weinstein 5th Year; STJ; Staff Writer

I am so excited to be a part of the Rho Chi Post team. This opportunity allows both myself and my peers to be well informed about the ever-changing profession of pharmacy and the vital developments in science and healthcare. Beyond the classroom setting, this newsletter fills in the gaps for the most up-to-date and current advancements for students and faculty. As a staff writer, I look forward to acting as an educator, a motivator, and an executor to further the mission and goals of the Rho Chi Post.

### **Zarnab Jillani** 5th Year: STJ: Staff Writer

The Rho Chi Post is a great platform for students to not only apply what they have been learning in school, but to break norms and report on pharmacy related events that are not always addressed in an academic setting. I look forward to writing for the Rho Chi Post because it will give me a way to delve deeper into what I'm studying at the moment and give me a chance to share that with my peers. Moreover, with the constantly changing world of pharmacy it is important to stay up to date and present the information in a creative way.



# RHO CHI post

# **RHO CHI POST: TEAM MEMBERS**



### Richa Tamakuwala 5<sup>th</sup>, STJ; Staff Writer

Growing up, reading was always my favorite hobby. The way the authors were able to create such vivid images, the way they could make you feel what the characters were feeling, the way they captured their readers' attention so tightly that nothing else mattered in the moment all motivated me to start writing. Since starting pharmacy school, my writing has unfortunately been placed on hold, but after learning about Rho Chi Post, I'm excited to start writing again. Writing for Rho Chi Post will allow me, along with many other students, to do something I enjoy while updating fellow future pharmacists on the ever-changing field of pharmacy.



### **Bisma Sekhery** 6<sup>th</sup> Year, STJ; Staff Writer

There are two things I am passionate about one which is pharmacy and the second which is writing. The Rho Chi Post is a professional newsletter, which allows students to educate as well as learn more about the field of pharmacy as it evolves. I am beyond excited to contribute to this newsletter and provide my fellow classmates and peers interesting news about pharmacy. I have always enjoyed reading The Rho Chi Post articles throughout pharmacy school. The articles were interesting and educational. This allows me to make an important contribution to society and spread awareness not only of new drugs and advancements in the field, but current issues in the pharmacy world. Having a voice is very important and writing for this newsletter allows me to have one.

# "WHEREVER THE ART OF MEDICINE IS LOVED, THERE IS ALSO A LOVE IN HUMANITY"

-Hippocrates

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### BACK TO COVER

# MISSION

The Rho Chi Post is an award-winning, monthly, electronic, student-operated, faculty-approved publication that aims to promote the pharmacy profession through creativity and effective communication. Our publication is a profound platform for integrating ideas, opinions, and innovations from students, faculty, and administrators.

# VISION

The Rho Chi Post aims to become the most exciting and creative student-operated newsletter within St. John's University College of Pharmacy and Health Sciences

Our newsletter continues to be known for its relatable and useful content

Our editorial team continues to be known for its excellence and professionalism

The Rho Chi Post essentially sets the stage for the future of student-operated publications in pharmacy VALUES

Opportunity

Teamwork

Respect

Excellence

# GOALS

To provide the highest quality student-operated newsletter with accurate information

To maintain a healthy, respectful, challenging, and rewarding environment for student editors

To cultivate sound relationships with other organizations and individuals who are like-minded and involved in like pursuits

To have a strong, positive impact on fellow students, faculty, and administrators

To contribute ideas and innovations to the Pharmacy profession

St. JOHN'S UNIVERSITY College of Pharmacy and Health Sciences

RHO CHI post