

RHO ^{Rx}CHI *post*

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Zavegepant: An Intranasal Breakthrough in Treating Acute Migraine Attacks

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FDA Regulatory Change Expands Access to Mifepristone

New Study Expands Pharmacists' Role in Treating Opioid Use Disorder

Evaluation of Haloperidol for Treatment of ICU Delirium



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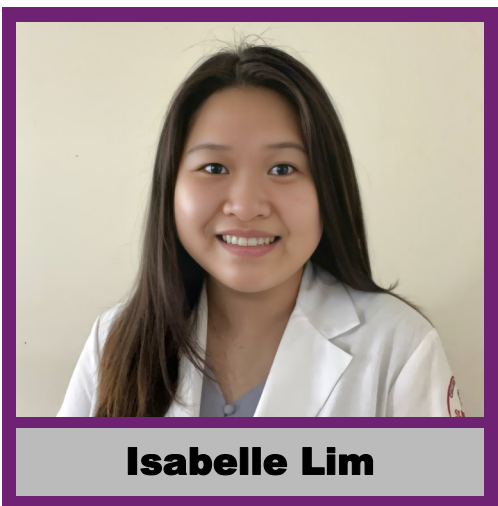
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From The Editor



A Message from the Editor-in-Chief

Congratulations to the sixth-year pharmacy students for graduating and to the rest of the student body for completing another year of pharmacy school! I am humbled and honored to announce my new position as the Editor-in-Chief of the Rho Chi Post for the upcoming year. It is with the continued dedication of the Editorial Team that I am able to serve in this position. It has been extremely gratifying to see everyone's efforts pay off through the announcement of this issue, which consists of seven articles covering topics ranging from pharmacy news to advice for students. I look forward to watching the growth of our Editorial Team and hope that I am able to serve them as well as they have served me! I am also excited

to publish more issues throughout the summer and school year as well as plan events in collaboration with the Executive Board in anticipation of the 2023 Fall Semester. For now, I wish everyone an amazing summer and I hope everyone gets to enjoy some time off!

Frequently Asked Questions

Who can write for the Rho Chi Post Newsletter?

Anyone can write for the Rho Chi Post! Our newsletter is not exclusive to St. John's University students. The Rho Chi Post accepts articles on a daily basis!

How do I submit an article?

You can submit an article by creating an account on our website! Go to www.rhochistj.org/RhoChiPost, click the login button from the upper menu bar, and click register. Upon making an account, you will be able to submit articles to our author inbox.

Who determines article topics?

You are free to choose an article topic of your choice. Take a look at our Author Guidelines for ideas.

What happens after I upload my draft article on the Rho Chi Post website?

Our Editor-In-Chief (EIC) will either edit the article directly or assign the article to a staff editor. If any revisions are needed, the editor will upload the article back to the portal, notifying the author via email. The author can then download the edited article, make the suggested revisions, and reupload the draft back to the portal. Additional drafts will be reevaluated by our copy editors and then EIC, repeating this process. Once no further revisions are needed, the article is accepted for publication.

Is there a deadline for authors to send revisions?

There is no deadline to submit revisions for an article. However, the quicker revisions are made, the quicker the article can move through our editing process. Once an article is accepted for publication, it will be moved into a queue to be placed into an upcoming issue.

About the Rho Chi Post

The Rho Chi Post was developed by the St. John's University Rho Chi Beta Delta Chapter in October 2011 as an electronic, student-operated newsletter publication with a team of three student editors and one Editor-in-Chief. Today, our newsletter boasts 12 volumes, over 90 published issues, and more than 600 unique articles to date with an editorial team of first to sixth year student pharmacists, as well as returning PharmD graduates.

The newsletter is distributed by St. John's University College of Pharmacy and Health Sciences to more than 1,500 students and faculty members. Our monthly electronic mailing list continues to extend readership far beyond campus.

Mission

The Rho Chi Post is an award-winning, 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 and faculty.

Vision

The Rho Chi Post aims to become the most creative and informative 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 sets the stage for the development of individual writing skills, collaborative team work, and leadership.

Contact Information

The Rho Chi Post
St. John's University
College of Pharmacy and Health Sciences
8000 Utopia Parkway, Jamaica, NY 11439

Website: <http://rhochistj.org/RhoChiPost>
Facebook: <http://fb.com/RhoChiPost>
Instagram: @sjurhochipost
Email: RhoChiPost@gmail.com



U.S. Based Pharmaceutical Manufacturer, Eli Lilly & Co., Caps Off Insulin Prices as the Country Pushes to Make the Medication Affordable for Patients

By: Urooj K. Malik, PharmD Candidate c/o 2024

March 1, 2023 marked a substantial milestone in the United States' (U.S.) fight for affordable insulin. Eli Lilly and Company (Lilly) has announced that over the next few months, they will be reducing the price of multiple insulin products as well as capping patient out-of-pocket costs at \$35 or less per month.¹

Starting May 1st, the list price of Lilly's non-branded insulin, Insulin Lispro Injection 100 units/mL, will be reduced from \$82 to \$25 a vial, resulting in it being the lowest list-priced mealtime insulin on the market.² Additionally, the company will be lowering the list price of its most commonly prescribed insulin, Humalog® 100 units/ml (insulin lispro), by 70% in the fourth quarter of 2023. Humulin® 100 units/mL (insulin human) will also have its price cut by 70%.¹

David Ricks, Lilly's Chair and CEO, has acknowledged the significance of the company's decision to slash prices. "While the current healthcare system provides access to insulin for most people with diabetes, it still does not provide affordable insulin for everyone and that needs to change," he proclaimed. "The aggressive price cuts we're announcing today should make a real difference for Americans with diabetes."¹

Lilly's decision to update their Lilly Insulin Value Program to limit monthly insulin costs to \$35 is also major. The program now offers a savings card that covers 30-day supplies of all Lilly insulins at a maximum cost of \$35 for both

insured and uninsured patients.³ However, patients who have government-funded insurance programs such as Medicare or Medicaid are not eligible. The offer is also good for up to 12 calendar months, meaning that patients who benefit from the program may need to find alternative sources of affordable insulin in the future.³

Lilly's announcement comes in response to the rapidly growing issue of American insulin prices, which have been skyrocketing at a rate exceeding the rate of inflation.⁴ According to the American Diabetes Association, the average cost of insulin nearly tripled between 2002 and 2013, making it increasingly difficult for people with diabetes to afford the medication they need to stay healthy. High costs of insulin are associated with inappropriate attempts to ration the medication; this non-adherence can lead to potentially fatal outcomes such as ketoacidosis.⁵

In an effort to tackle this issue, several U.S. states have implemented insulin cost caps. As of now, 22 states and the District of Columbia have capped copayments on insulin, devices, and diabetes supplies.⁶ In 2022, Maryland and Louisiana were the most recent states to pass laws with a \$30 cap and \$75 cap respectively for a 30-day supply.⁶ These caps limit the amount that patients have to pay for insulin, regardless of the list price set by the manufacturer. Last year, President Biden passed the Inflation Reduction Act (IRA) which capped out-of-pocket costs for insulin at \$35

for patients covered under Medicare Part D or Medicare Advantage plans. Patients whose insulin covered under Part B will benefit from a similar cap beginning in July 2023.⁷

Researchers have estimated that 1.5 million people under Medicare would have benefitted from the IRA insulin cost cap if the legislation was in effect back in 2020.⁸

President Biden released a statement in support of Lilly shortly after the company's major announcement. In this statement, Biden says "last year I signed a law to cap insulin at \$35 for seniors and I called on pharma companies to bring prices down for everyone on their own. Today, Eli Lilly did that. It's a big deal, and it's time for other manufacturers to follow."⁹

Decreasing prices of insulin products and introducing price caps are not the only methods of lowering monthly costs for diabetic patients; the application of biosimilars in treatment has been considered. Mylan Pharmaceutical's Semglee® (insulin glargine-yfng), a substitute for Lantus® (insulin glargine), was the first interchangeable biosimilar product for diabetes to gain approval by the Food and Drug Administration (FDA) in July of 2021.¹⁰ Biosimilars marketed in the U.S. tend to launch with initial list prices lower ranging from 15% to 35% than their reference products' list pricing.¹⁰ Lilly plans on following in Mylan's footsteps. The release of the company's own biosimilar, Rezvoglar™ (insulin glargine-aglr) injection, as an alternative to Lantus is set to occur on April 1, 2023. A five-pack of Rezvoglar KwikPens® will be sold for \$92 – a 78% discount when compared to Lantus' current list price.¹ Increasing availability of insulin products will assist in widening access and bringing down the cost of insulin for diabetes patients.¹⁰

Lilly intends on launching a nationwide

public awareness campaign in the coming weeks to educate their consumers on accessing their company's affordability solutions. Ricks has affirmed that the company will continue to make decisions with the wellbeing of patients in mind, declaring that "our work to discover new and better treatments is far from over. We won't stop until all people with diabetes are in control of their disease and can get the insulin they need."¹

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The Rho Chi Society

Membership in the Rho Chi Society is a privilege accorded to the very few who distinguish themselves by their academic and professional achievements and who aspire to the mission and vision of the society. Members may be elected as professional or graduate students in pharmacy, as members of faculties of schools and colleges of pharmacy, as alumni who distinguish themselves in the profession, or as honorary members by special action of the society's Executive Council. By its very existence, the honor society reflects Western cultural beliefs in education and the pursuit of intellectual excellence. The honor society aims to recognize and reward outstanding scholarly attainment, and encourages and stimulates outstanding scholarship.



Rho Chi Talks: Tips to Acquire a Residency

Featuring: Krishna Tamakuwala, PharmD

By: Justin Budz, PharmD



Krishna Tamakuwala is a recent graduate from the St. John's University Doctor of Pharmacy program, class of 2023. Krishna always knew she wanted to go into the medical field. Besides her passion for the sciences, Krishna also enjoyed cooking. She found it interesting how certain aspects of pharmacy practice were similar to cooking, such as following a formula to compound various preparations, ultimately helping her choose the pharmacy profession. Going into her final year of school, Krishna was on the fence between pursuing a fellowship or residency. To help her decide, she ranked her early APPE rotations to have a good mix of industry-related and clinical experiences. As she got closer to the application period, she realized that she more so enjoyed the clinical side of pharmacy practice. As a result, Krishna pursued residency applications, where she was able to match with her top choice residency program at North Shore University Hospital.

What is a residency?

Residency is additional post-graduate training ranging from 1 to 2 years. The first year (PGY1) is just general training where you get a glimpse of the different areas in pharmacy practice. During this time, if you find an area that you're passionate about, you can specialize in it during your second year (PGY2). There are various fields that you can specialize in, like ambulatory care, internal medicine, infectious diseases, and cardiology, among many others!

What made you want to pursue a residency?

I loved the idea of working alongside a team of healthcare professionals to bring together different perspectives and mindsets to ultimately

benefit the patient. As a clinical pharmacist, you also get to practice at the top of your license by challenging yourself with different disease states and medical scenarios that you might not otherwise encounter in the typical community setting.

How did you begin researching residencies?

Originally, I didn't know where to start. However, going through different clinical APPE rotations helped me decide what to look for in different residency programs. I would learn about the residency programs offered by the sites I was at for APPEs. I would also look into different programs based on my interests in electives they offered; specifically, I was interested in ambulatory care. Location was also a big factor for me when I was considering different

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programs because I wanted to stay close to home. Lastly, looking to see if the program is accredited is also important because it can help you apply for PGY2 and jobs in the future.

Did you have the opportunity to meet with residency programs prior to applications?

Yeah, so I went to Midyear which was super helpful because you got to meet with a lot of programs outside of New York. Going to Mid-year did change my mind about what programs I wanted to apply to because I was able to talk to the current residents at different institutions to get an understanding of what they liked and didn't like about their respective programs. The in-person interactions definitely helped make an impact in my application process by helping me build a network with residents, preceptors, and program directors, while also helping me narrow down my selections for applications.

Around what time do you apply for residencies and how do you submit applications?

After Midyear in December, you have some time to work up your CV and letter of intent for different programs. During the first or second week of January, the application portal opens for residencies. Most residency programs will require your CV, which outlines all your APPEs, work experience, publications, research, leadership opportunities, etc. Residency programs will also require a letter of intent, which more specifically highlights why you are interested in a specific residency program and the unique experiences you have that are relevant to their particular program. Lastly, residency programs will require three letters of recommendation. Usually, at least two of them must be from a clinical preceptor.

What experiences should students focus on while they're still in school to help them stand out on their CV or applications?

I definitely think research experience would be a bonus because not many students can say that they conducted research and presented a poster. For example, I was fortunate enough to present a poster at Midyear. This helps you stand out not only because you were able to accomplish a project but because it gives you talking points during your interview. I would also say your work and APPE experiences are important because they too give you various talking points for interviews. Programs want to hear about specific scenarios where you were able to go above and beyond to help a patient, or scenarios where you were able to develop skillsets in leadership, teamwork, communication, etc.

What can students expect during residency interviews?

Residency interviews can be overwhelming depending on how many programs you apply to. I had six interviews, but I scheduled them back-to-back which made it more difficult. Most of my interviews were in-person. Depending on the program, some may be in-person while others may be virtual. Interviews range anywhere from four to six hours. During the interviews, the current residents, preceptors, and residency program director will be present. The interview time is divided, giving everyone an opportunity to get to know you. The beginning is usually the residency program director and the residents telling you more about their program. Next, the preceptors will ask you clinical questions. These are usually on-the-spot patient case scenarios so you can't really prepare for them specifically. However, I think it would help

to refresh yourself on the current guidelines of common diseases. For example, a lot of my patient cases were on infectious diseases. At the end of the interview, you're given the opportunity to talk to the residents and ask any questions that may still be on your mind. My biggest advice is to be yourself during the interview. Don't try to make up a significant intervention or experience you may have had but instead be able to talk about any small intervention that made a big impact on the patient. Being genuine is very important!

What is Midyear and how is it related to the residency process?

Midyear is a conference that a majority of residency programs from across the country attend. Each program will have their own individual booth set up at the conference. It can be a maze navigating all the booths so I would recommend checking the ASHP website beforehand. On the website, they post all the locations of each program booth which can help you have a layout of which booths you want to visit. At each booth, you'll usually see the residency program director, a few preceptors, and the current residents. Midyear is really the time for you to ask questions to get to know each residency program. I would recommend researching each program and having a prepared list of any questions before you go to Midyear. It's important to remember that the interviews are when the residency programs will get to know you more so Midyear is the time for you to get to know the programs and "interview" them.

When can students expect to find out about residency acceptances?

Match Day is in mid-March. Typically, you have interviews from late-January to early-February.

You find out if you match or didn't match via email. Afterwards, you can apply to phase two if you would still like to pursue a residency.

What is your biggest tip for students going into the residency process?

I would suggest speaking to current residents or alumni who have gone through the residency application process. Building connections is also very important. Pharmacy is a small world so when you go on rotations, make the most out of them because you never know who you might meet and work with along the way. Always putting your best foot forward and challenging yourself on rotations will help you stand out from other students as well. Lastly, to help relieve some stress during interviews, you can take APPE periods 8 or 9 off. Picking off-periods between December through February can help you have more time to focus on meeting with different programs, preparing application materials, and studying guidelines to get ready for interviews.

**On behalf of the Rho Chi Post,
we would like to thank Krishna
for sharing her experience
through the residency process
with our RCP community!**

Expanded Mifepristone Access

FDA Regulatory Change Expands Access to Mifepristone

By: Ashley Dao, PharmD Candidate c/o 2024

Medical abortion is approved by the Food and Drug Administration (FDA) to end intrauterine pregnancy through ten weeks gestation (i.e., within 70 days of the start of a patient's last menstrual period). Mifepristone plays a major role in the termination of early pregnancies within the United States (U.S.). When taken in conjunction with misoprostol, its mechanism of action allows it to work as a highly effective form of medical abortion. Mifepristone is a progestin antagonist that competes with progesterone at progesterone receptor sites. By blocking the effects of progesterone, mifepristone disrupts pregnancy by causing decidual necrosis, myometrial contraction, and cervical softening. The most common side effects of mifepristone use (reported by >15% of patients in U.S. clinical studies) are diarrhea, nausea, vomiting, dizziness, headache, and fever.¹

In 2020, the Guttmacher Institute conducted a census of all known abortion providers in the US. The data revealed an upward trend in the use of the "abortion pill"; medical abortion accounted for 53% of U.S. abortions that year while in 2017, it accounted for only 39%.² Medication abortion is a safe, effective, and accessible form of abortion. It has an estimated complication rate of 0.22% and a mortality rate of 0.001%, with sepsis being the leading cause of drug-induced death.³ As of June 30, 2022, the FDA states that since its initial approval in 2000, mifepristone has been used by approximately 5.6 million U.S. patients; out of this population, there have been only 28 reports of deaths associated with its use.⁴ Despite over 20 years of scientific reviews and

research supporting medication abortion as a safe and effective regimen, access to mifepristone is still restricted due to the nature of the drug. Mifepristone is subject to an FDA-imposed Risk Evaluation and Mitigation Strategies (REMS) Program that limits who can prescribe and dispense it.

On January 3, 2023, the FDA modified the mifepristone REMS Program to allow mifepristone to be dispensed by certified pharmacies. The new REMS Program states that mifepristone must be dispensed by or under the supervision of a certified prescriber or certified pharmacies for prescriptions issued by a certified prescriber. Prior to this change, mifepristone could only be dispensed in clinics, medical offices, and hospitals, by or under the supervision of a certified prescriber.⁵ The FDA determined that modifications to the REMS Program would reduce burden on the healthcare system and ensure the benefits of mifepristone outweigh the risk. Healthcare providers must complete a Prescriber Agreement Form to become certified and pharmacies must complete a Pharmacy Agreement Form to dispense mifepristone. Before dispensing mifepristone, patients also must review and sign a Patient Agreement Form with a certified prescriber. Healthcare providers are responsible for explaining the risk of the mifepristone treatment regimen to patients before prescribing. Pharmacists are responsible for ensuring that mifepristone is dispensed to patients in a timely manner, and if mifepristone is shipped, they must use a shipping service that offers tracking.⁶

This is not the first time that the federal

government has broadened access to mifepristone. The FDA has incrementally expanded access to medical abortion since approving mifepristone. Prior modifications to the mifepristone REMS Program occurred in 2020 during the height of the coronavirus disease 2019 (COVID-19) pandemic. The pandemic brought to light the benefits of telehealth. On April 12, 2021, the FDA announced its “intent to exercise discretion with respect to in-person dispensing requirement during the COVID-19 public health emergency.”⁷ This would allow mifepristone to be mailed to patients during the pandemic. In December 2021, the FDA issued a permanent decision to allow the mailing of abortion pills and it would modify the REMS Program to add a requirement that pharmacies that dispense the drug be certified. On January 3, 2023, these modifications were reviewed and approved. The new FDA REMS program for mifepristone increases accessibility to abortion medication, but many patients throughout the country still face barriers.⁸

The FDA’s decision of expanding the mifepristone REMS Program to include certified pharmacies demonstrates the agency’s confidence that medical abortion is safe, effective, and time sensitive. Patients now have the ability to choose whether they want to go to their local pharmacy, receive the product by mail order, or visit a certified healthcare provider. There are still barriers in many states to safe abortion care, but this new regulation will benefit many patients in states without abortion bans or restrictions.

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Zavegepant: An Intranasal Breakthrough in Treating Acute Migraine Attacks

By: Samia Rahman Adity, PharmD Candidate c/o 2025

Migraine has been a throbbing topic of discussion and a serious public health concern in the United States (U.S.). As of 2018, headache was seen to be the fourth or fifth most common cause for patients to visit an emergency department.¹ The National Institute of Neurological Disorder and Stroke (NINDS), characterizes migraine headaches as excruciating pain on one side of the head that is primarily caused by nerve fiber activation within the walls of the brain blood vessels into the meninges.²

Characteristics of a Migraine Attack

While incidences of migraine attacks are prevalent in both children and adults, adult females are more likely to be affected in comparison to males. The NINDS has affirmed migraine to be a genetic condition. However, it can also occur in people with other health conditions including those with epilepsy, bipolar disorder, depression, anxiety, and/or sleep disorder. Women are more prone to migraines due to a change in hormone levels during the start of the menstrual cycle or pregnancy.²

Migraine can be classified into two types – classic and common.² Classic migraine is associated with aura, which includes neuro-

logical symptoms and visual disturbances. Other symptoms of having a classic migraine are increased sensitivity to light, sound, or noise; tingling sensation in the hands or face; abnormal numbness; and muscle weakness. Common migraine is aptly named, being the most prevalent form of migraine among patients; usually, the pain is experienced on one side of the head without any warning. Other symptoms of a common migraine attack include blurred vision, confusion, mood change, and fatigue.²

Treatment of Migraine

The clinical practice established has been using monotherapy with agents like Tylenol (acetaminophen) or nonsteroidal anti-inflammatory drugs (NSAIDs), or a combination of medications to treat the mild to moderate symptoms of migraine. Patients suffering from moderate to severe symptoms of migraine have benefited from the use of a combination of products such as 5-HT_{1B/1D} receptor agonists (-triptans) and NSAIDs.² Lasmiditan, a selective 5-HT_{1F} receptor agonist is associated with fewer adverse events and can be used in patients with cardiovascular medical conditions such as arrhythmia, myocardial infarction, or simply if they are contraindicated to triptans.³

For status migranosus, which is a migraine attack lasting longer than 72 hours, agents like dihydroergotamine or valproate can be given intravenously, especially in cases where prophylaxis or other rescue therapies were not effective.^{3,4} However, this type of treatment is limited to the inpatient setting which is not going to be appropriate for every case of migraines.^{3,4} Additionally, oral forms of therapy may be associated with intolerable side effects like nausea or vomiting associated and can sometimes be considered too slow-acting to counter a migraine attack. These factors have contributed to the need for further research in intranasal dosage forms which would hopefully prove to have a faster onset of therapy and a more tolerable side effect profile.

Zavegepant 10mg nasal spray has been recently approved by the U.S. Food and Drug Administration for the treatment of acute migraine attacks. On March 10, 2023, a study conducted by Richard B Lipton et al. established the safety and efficacy of zavegepant 10mg in treating acute migraine attacks. This was a double-blinded, randomized, placebo-controlled, multicentered phase 3 clinical trial.³ Zavegepant is classified as a calcitonin gene-related peptide (CGRP) antagonist that inhibits the vasodilatory action of the CGRP and helps with pain and inflammation. The medication has been reported to have a longer half-life of 5 to 8 hours.⁴

The inclusion criteria of the study incorporated adults at least 18 years old with at least a 1-year history of migraine (with or without aura), had migraine attacks before the age of 50, had 2 to 8 moderate or severe migraine attacks per month or with less than 15 days of headache per month before screening.³ Participants receiving treatment or having symptoms

of alcohol/drug abuse within the past 12 months were excluded from the study. Pregnant women were also excluded from the study.³

The study has been funded by Biohaven Pharmaceuticals. The investigation was initiated with a pool of 1978 patients, where 1405 patients were randomized.³ Among this population of patients, 703 patients were assigned the intranasal zavegepant and 702 patients were assigned a placebo.³ The acute treatment phase lasted for a total of 45 days. Participants were instructed to self-administer the nasal spray.³ The pain intensity was recorded using the electronic clinical outcome assessment (eCOA) immediately before dosing at 15, 30, 45, 60, and 90 minutes and at 2, 3, 4, 6, 8, 24, and 48 hours after dosing.³ The pain intensity was measured using a four-point scale where 0 is none, 1 is mild, 2 is moderate, and 3 is severe. Pain freedom from migraine was measured as 0 being “absent” and 1 being “present”.³

Statistical Significance of the Study

As mentioned in the study, 22.8% of the participants in the zavegepant group and 15.5% of the participants in the placebo-controlled group reported pain freedom after 2 hours of treatment.³ The relative risk was calculated to be approximately 1.4 which indicates the risk of having pain is greater in the placebo group compared to the treatment intervention. The risk difference was 8.8 which is statistically significant (95% confidence interval [CI] 4.5 to 13.1; $p < 0.0001$).³

In another study, the percentage of participants that reported pain freedom after 2 hours was higher in the treatment group: 22.5% of participants with zavegepant versus

Zavegepant

15.5% of participants in the placebo group.⁴ The approximate relative risk was 1.45, also indicating that the risk of having pain is greater in the placebo group than in the treatment intervention (zavegepant). The alpha level for the study was set at 0.0167; the reported p-value for the experiment with zavegepant 10mg nasal spray has been reported to be 0.0113 which is less than 0.0167, indicating the data is statistically significant.⁴

Adverse Events

According to the study, a greater percentage of patients experienced adverse events in the zavegepant group (30%) in comparison to the placebo group (16%).³ Some of the common adverse events reported include dysgeusia (change in taste), nasal discomfort, nausea, vomiting, throat irritation, and an increase in blood creatinine phosphokinase (CPK) level. These side effects were well tolerated by the participants and there were no signs of hepatotoxicity due to the use of zavegepant.⁴

Conclusion

It can be concluded that zavegepant 10mg nasal spray is efficacious with a good tolerability profile. According to the study above, a greater percentage of patients had a normal functional ability at 30 minutes and 2 hours in the zavegepant group than those in the placebo group.⁴ However, the study was limited by the absence of data on long-term safety and consistency of treatment response. Additionally, the results and the discussions would have been more appropriate if the use of zavegepant had been compared with an active comparator. Despite these limitations, zavegepant is still considered a promising drug. However, no therapy is complete without a non-pharmacological treatment; hence, any combi-

nation of treatment with behavioral therapy, such as mindfulness, biofeedback, and cognitive behavioral therapy, is also useful in treating migraine attacks.⁵

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New Study Expands Pharmacists' Role in Treating Opioid Use Disorder

By: Geraldine Ciaccio, PharmD Candidate c/o 2025

The role of pharmacists in public health has been expanding in recent years. The list of pharmacists' responsibilities continues to grow with the treatment of the opioid crisis in the United States. In the past year, pharmacists newly received the authority to dispense naloxone under a standing order. Similarly, a study conducted this past January showed pharmacists could effectively start patients on buprenorphine.¹ Improving access to lifesaving medications for patients with opioid-use disorder is necessary to combat the ongoing opioid crisis.

Researchers from Brown University, Rhode Island Hospital, and the University of Rhode Island collaborated on a first-of-its-kind feasibility pilot study. Published by the New England Journal of Medicine, this pilot trial was a part of a phase 3 randomized control trial that evaluated pharmacy-based treatment of addiction.¹ The overarching goal of both studies was to increase the accessibility of first-line opioid disorder medications, such as buprenorphine. Pharmacists are viewed as the most accessible healthcare professionals, especially community pharmacists. Jeffrey Bratberg, a clinical pharmacy practice professor at the University of Rhode Island and investigator in the study, described pharmacists as underutilized, stating "there is a pharmacy within five miles of where 95% of Americans live."² Considering the convenience of pharmacies for most Americans, the researchers decided to test the efficacy of opioid use disorder treatment when treated with pharmacy-based care.

The study was conducted from Febru-

ary 2021 to April 2022 in Rhode Island and involved six behavioral health pharmacies, 21 pharmacists, and 100 patients. Of these 100 patients, 34 were people of color, 44 were homeless, and 76 had no reliable transportation.¹ The pharmacists received training in buprenorphine treatment from the American Society of Addiction Medicine, which is required for prescribers of buprenorphine.³ Inclusion criteria for patients included a history of an opioid-use disorder, interest in being treated with buprenorphine, and aged 18 years and older. Patients received 1:1 care and follow-up, either with a pharmacist or a provider, for three months. Pharmacists were instructed to assess the patients' opioid use history and withdrawal symptoms using the Clinical Opiate Withdrawal Scale. After reviewing patient information, the pharmacist recommended a buprenorphine regimen, consulted an addiction medicine physician, and initiated the treatment plan. Initial buprenorphine regimens varied between patients and lasted for three to seven days. 1 participant received 4 mg per day, 6 received 8 mg per day, 82 received 16 mg per day, 1 received 20 mg per day, and 10 participants received 24 mg per day. After the initial doses, 30 participants received weekly doses, 10 participants received doses every two weeks, and 18 participants received a combination of weekly and biweekly doses. All participants were also offered naloxone, but only 36 chose to accept.¹

The outcome of interest in this study was treatment retention after one month. Out of 100 participants, 58 progressed to mainte-

Opioid Use Disorder

nance care. Randomization assigned 28 patients to be given pharmacy-based care, which served as the experimental group, and 30 to be given provider care, which served as the standard group. After one month of treatment, 25 patients (89%) receiving pharmacy-based care kept up with attending follow-up visits, versus only 5 patients (17%) in the standard care group did so.¹ Pharmacy-based care proved to have higher patient outcomes and satisfaction. A clinical pharmacist who participated in the study, Linda Rowe-Varone, shared one of her patient experiences while providing buprenorphine. The patient told her that the pharmacy hours and location were more convenient than the clinic she had previously used. She also felt more comfortable attending the pharmacy for her appointments and bringing her children along.⁴ The pharmacy environment and convenient location remove the stigma of going to a clinic or doctor's office, which typically can discourage patients from following up on their health conditions.

The researchers who conducted this study described their passion for making medications accessible to everyone regardless of socioeconomic status. Dr. Josiah D. Rich at Brown University School of Medicine explained that opioid use disorder “kills by stigma and isolation” and the study showed that “a diverse patient population could benefit from treatments offered in a community pharmacy.”² In December of 2022, President Joe Biden signed the Mainstreaming Addiction Treatment (MAT) Act, which aims to make buprenorphine more readily accessible to patients suffering from opioid use disorder.⁵ This also abolishes the X waiver, which was previously required for providers to have to prescribe buprenorphine.² Due to these recent changes in legislation, the researchers are hopeful of expanding the phar-

macist's role in no time.

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6th Year Perspective: Industry Elective APPE with Pfizer

Featuring: Isabella Chow, PharmD Candidate c/o 2024

By: Isabelle Lim, PharmD Candidate c/o 2024

Isabella Chow is a sixth-year pharmacy student at St. John's University. She was involved in various organizations on campus, including PLS, Rho Chi, LKS, Crafts Club, and VSA. She held leadership positions in multiple pharmacy organizations, including IPhO Director of Communications, DIA Community Service Chair, and APhA Operation Public Health Committee Chair. She is looking to pursue a fellowship post-graduation in order to gain experience in industry pharmacy.

What interested you in the industry side of pharmacy?

I love the idea of the drug approval process and seeing a drug from the beginning to end of the process. Additionally, I am very passionate about medication access to patients, which I believe drug companies play a large role in. Industry pharmacy also emphasizes office work, presentations, networking, and communication. This appeals to my type of work ethic, especially in a dynamic and different environment.

Summarize your time at Pfizer. What was your biggest accomplishment while on this rotation?

My time at Pfizer was absolutely fantastic! I had the invaluable experience of speaking to many pharmacists and other healthcare workers about their work experiences and what they do at Pfizer. My biggest accomplishment was a

successful final presentation on the newest updates to tuberculosis treatment.

What was the most valuable thing you learned from the Pfizer rotation?

The most valuable thing I learned at this rotation was about the value of connecting and networking with people. At every meeting I had with a Pfizer employee, they emphasized the importance of utilizing your connections in the pharmaceutical industry.

Is there anything you wish you could have done differently? What advice would you give someone who will be rotating here later?

I wish the rotation was longer! I had so much fun in the office and meeting new people. The advice I would give to someone rotating at Pfizer would be to make the most of your time since four weeks flies by really quickly.

What tips would you give younger pharmacy students that may be interested in pursuing industry or are unsure of their career goals?

I would recommend attending as many co-curriculars as possible, and join clubs like IPhO or DIA if you're interested in industry. If you're unsure of your career goals, hands on experience is the best way to understand your interests - I recommend pursuing job opportunities and summer internships within industry or institutional pharmacy, and I highly advise speaking to upperclassmen who have these experiences in order to make connections and understand various routes of pharmacy you can pursue post-graduation.

On behalf of the Rho Chi Post, we would like to thank Isabella for taking the time to share her APPE experiences with our RCP community!

Want to learn more about different career opportunities for pharmacists within the pharmaceutical industry? Visit the Industry Pharmacists Organization website at:

www.industrypharmacist.org

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Have Questions? Feel free to email us at RhoChiPost@gmail.com

Evaluation of Haloperidol for Treatment of ICU Delirium

By: Nancy Yousry, PharmD Candidate c/o 2024

Delirium is characterized as impaired cognition with a wide range of manifestations that are nonspecific to the state, making it harder to detect in its earlier stages.¹ Inadequate management has frequently resulted from a failure to recognize the condition. Elderly patients are most often susceptible to delirium when checked into the intensive care unit (ICU). Some of the negative consequences of delirium in ICU patients include increased mechanical ventilation duration, prolonged hospitalization, increased rates of self-extubation, and increased risk of mortality.¹

ICU Delirium Diagnosis

ICU Delirium is typically seen in patients who have experienced prolonged intubation and usually presents as a disturbance of consciousness within short periods of time and distinct changes in psychotic features from baseline. According to the American Psychiatric Association, there are five available tools utilized for valid screening of delirium in adult patients. The two most commonly used studies in clinical practice are Confusion Assessment Method-ICU (CAM-ICU) and Intensive Care Delirium Screening Checklist (ICDSC).¹

Risk Factors for ICU Delirium

One study conducted in a medical ICU discovered several modifiable and non-modifiable risk factors that increase a geriatric patient's susceptibility to ICU delirium. For example, hypertension-related vascular damage predisposes patients to cerebral hypoxia, increasing their risk of altered mental states and progression into delirium. Additionally, some of

the modifiable risk factors associated with increased susceptibility to ICU delirium include the use of certain classes of medication, such as steroids, benzodiazepines, and morphine analgesics.²

An Overview of Haloperidol

Haloperidol, a first-generation antipsychotic drug, mechanistically works to block postsynaptic dopamine (D2) receptors in the mesolimbic system of the brain. In addition to this, haloperidol exhibits anti-noradrenergic, cholinergic, and histaminergic activity. Due to its nonselective nature, the blocking of these various receptors is associated with various adverse drug reactions. Such include extrapyramidal symptoms such as acute dystonia, akathisia and neuroleptic syndrome, while others can encompass anticholinergic effects such as elevated temperature, dry mouth or sedation. Assurance of appropriate dosing by the pharmacist is of importance to minimize toxicity and maximize therapeutic efficacy.³

Clinical Effects of Haloperidol in ICU Delirium Treatment

The New England Journal of Medicine reported a multicentered, blinded, placebo-controlled trial that randomly assigned adult patients with delirium admitted to the ICU for an acute condition to receive intravenous haloperidol (2.5 mg 3 times daily plus 2.5 mg as needed up to a total maximum daily dose of 20 mg) or placebo. Haloperidol or placebo was administered as needed for recurrences for as long as delirium continued. The primary outcome of this study was the number of days alive and out of

the hospital at 90 days after randomization. From the 963 patients analyzed, it was revealed that the mean number of days alive and out of the hospital at 90 days was 35.8 in the haloperidol group and 32.9 in the placebo group [adjusted mean difference: 2.9 days; 95% confidence interval (CI) -1.2 to 7.0; $p = 0.22$]. Although the difference between the two groups was not statistically significant, it shows promise that haloperidol may have potential as a treatment option. Meanwhile, the mortality rate at 90 days was 36.3% in the haloperidol group and 43.3% in the placebo group (adjusted absolute difference: -6.9; 95% CI -13.0 to -0.6), further supporting the use of haloperidol in ICU delirium.⁴

Nonpharmacologic Prevention

Due to the lack of conclusive data for haloperidol, it is recommended that nonpharmacologic strategies for minimization of risk factors be practiced as well. Such practices include early rehydration, establishing a sleep protocol, timely removal of catheters, and physical restraints.⁵

Conclusion

ICU delirium is a condition that is unavoidable in nature for some elderly patients with comorbidities that make them vulnerable to it. Further research is needed to conclude haloperidol's efficacy in treating ICU delirium, and to assess the spectrum of side effects and their consequences on treatment progression.

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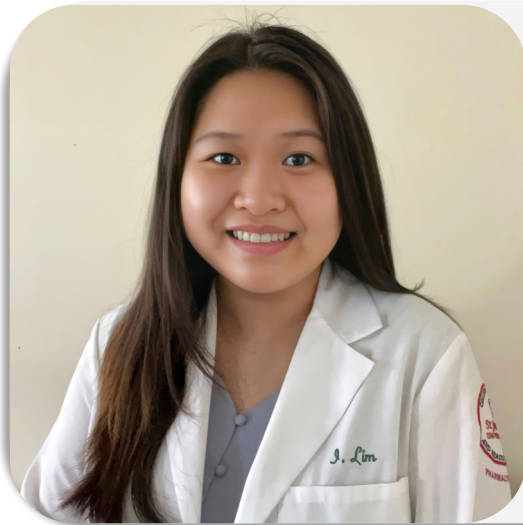
Interested in writing for the Rho Chi Post?

Go to <http://rhochistj.org/RhoChiPost> and click on the login option from the menu bar to make an account! With an account, you'll have access to the article submission portal where you can submit your writing for publication in an upcoming issue!

Remember, you do NOT have to be a member of Rho Chi, a member of the editorial team, or a student of St. John's to write for our newsletter!

Meet Our 2022-2023 Editorial Team

Editorial Team & Production



Isabelle Lim

Editor-in-Chief

The Rho Chi Post serves as a platform for students and faculty to collaborate in sharing their knowledge and ideas with the pharmacy community. As future pharmacists, it is important that we keep ourselves updated as well as voice our opinions on healthcare matters. Engaging in the Rho Chi Post helps us accomplish this while also providing students with a unique experience to develop their writing and editing skills outside of the classroom. I am honored to be a part of the Editorial Team and look forward to serving as a Managing Editor!

John Ortiz

Content-Focused Copy Editor

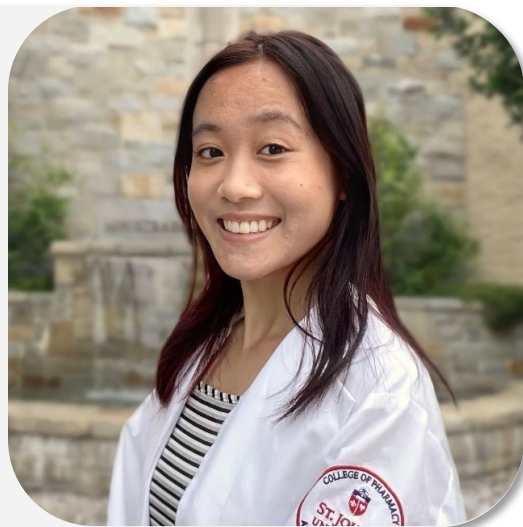
Rho Chi Post is an opportunity for students to foster their writing and investigative skills concerning pharmacy practice. By honing our understanding of new innovations and developments in pharmacy, we will be better at providing accurate information to readers and maintaining the continuous education expected of pharmacists.



Joanne Fung
Content-Focused Copy Editor

If there is one thing that pharmacists and students should understand, it is that the world's knowledge regarding drugs, disease states, and public health matters is ever-growing. As a pharmacy student, I feel responsible for keeping myself and others up to date.

Being a part of the Rho Chi Post's editorial team is a unique and creative way to educate myself and help relay important information to my peers. It is also an excellent opportunity to expose myself to a variety of perspectives. I appreciate the newsletter for providing me an opportunity to not only pursue one of my lifelong interests of writing, but to start delving even deeper into the field of pharmacy unlike ever before.



Ruksabha Zaman
Graphics-Focused Copy Editor

It is an honor to be able to contribute to the Rho Chi Post, a publication that promotes intellect, values, and inclusivity in order to allow student voices to make an impact, not only in our school, but in the pharmacy profession as a whole. The role of pharmacists is constantly evolving and it is more important than ever for us to not only be aware of the changes and new discoveries that are occurring in our field of practice but to be able to collaborate with other professionals on our team as well. The Rho Chi Post serves as a bridge between students, faculty, pharmacists, and other healthcare professionals outside of the classroom. I look forward to gaining new knowledge on current events from my peers and providing my own insight to further the excellence of this newsletter.

Mandy Zheng
Senior Graphics-Focused Copy Editor

The Rho Chi Post allows pharmacy students the opportunity to be well informed about the amazing contributions in the field of pharmacy. It is a great platform for students to report current advancements in healthcare. My passion for writing began at a young age as I began to understand just how powerful words can be to communicate. I look forward to being a part of the editorial team and to share new information to my peers. I am so excited to be a part of the Rho Chi Post team.



Celestine Van Sertima
Graphics-Focused Copy Editor

When applying to the Rho Chi Post, I was initially fascinated by their goals of providing the highest quality of information to the St. John's community through a student operated newsletter that cultivates both student spirit and expansion of knowledge. Through my passion for writing and health care, combined with my experience in graphic designing, I look forward to what I can contribute to the Rho Chi Post.



Sana Ahmed
Staff Editor

I believe the Rho Chi Post is a means to serve the university and impact its professional and health-oriented student community through its various stories. With exposure to a myriad of areas of the healthcare field throughout my work experience, I have secured much knowledge from assisting a diverse array of patients. I will prioritize staying up to date and aiding student writers in presenting the latest pharmaceutical and medical advancements. Through the Rho Chi Post, I intend to promote the pharmacy profession through creativity and effective communication. I am honored to serve as a Staff Editor for this organization and hope it will facilitate meaningful connections with my peers.



Emily Kelley
Staff Editor

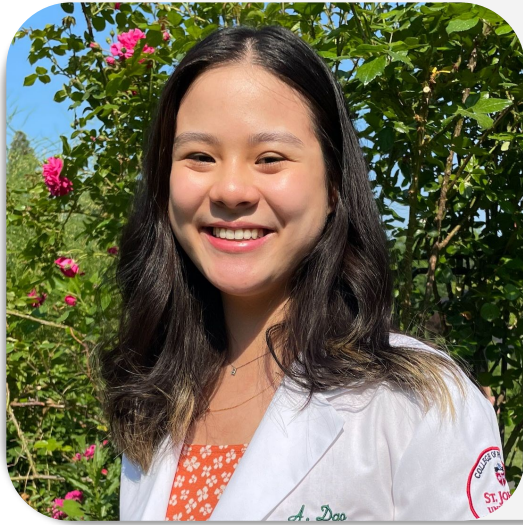
As a part of the Rho Chi Post team, I aspire to expand the importance of the health education programs by empowering and educating the community to live healthier lives. Knowing that my work and research could change the lives of millions is inspiring and motivating.



Geraldine Ciaccio

Staff Writer

The pharmacy profession is constantly growing as it drives for discovery. The Rho Chi Post allows student pharmacists to expand their knowledge of pharmacy while offering a space of collaboration and encouragement. I have always enjoyed writing, and I am so honored to be a Staff Writer for the Rho Chi Post this year. This opportunity will allow me to explore my personal interests within the pharmacy profession as well as encourage my peers to do the same. I am excited to collaborate with and learn from faculty, alumni, and my fellow students. These conversations are vital for change and discovery to occur. Taking a step beyond the classroom and building on previous knowledge is all it takes to grow as professional student pharmacists



Ashley Dao

Staff Writer

The Rho Chi Post offers a place for students, alumni, and faculty to collaborate and share their experiences. Last year, I had the opportunity to serve as the Website Liaison of RCP and I am happy to come back this year as a Staff Writer. As someone who has always had a love for writing, I am grateful for the voice that the Rho Chi Post has given me. I hope that I can encourage more students to contribute to the Rho Chi Post. After all, without conversations, there can be no change.

Imaan Sekhery

Staff Writer

As students in pharmacy, it's our responsibility to educate and update, not only our peers on new medical advancements, but also educate ourselves. Being apart of the Rho Chi Post team allows us to consistently keep up to date with the ongoing improvements and innovations within the pharmaceutical field. There is only so much we can learn from our day-to-day classes, Rho Chi Post stands as another gateway to familiarizing ourselves with the professional world we will soon enter. The world around us continues to evolve, it is up to us to remain in the know. As a staff writer, I am delighted to join the editorial team and look forward to contributing in the aspect of benefitting the pharmacy community as a whole.



Jennifer Galvet

Staff Writer

With the pharmacy profession constantly evolving and shifting its focus to advanced patient care, it is important to be knowledgeable of these changes. Although never formally part of the Rho Chi Post e-board before, I was able to utilize this platform in the past to share my writing on various pharmacy topics. I am looking forward to serving as a staff writer this upcoming year and continuing to share my passion about vital developments in healthcare through my writing. As I enter my fifth year of pharmacy school, I hope to keep fellow students informed, while simultaneously inspiring them to expand their knowledge on our ever-changing profession.



Urooj Malik

Staff Writer

The Rho Chi Post is a valuable platform that connects students and faculty with the most up-to-date information within the pharmacy profession. The field of pharmacy is constantly expanding with vital developments, so it is important for us to stay informed in the world of healthcare. The Rho Chi Post serves as a creative outlet for student pharmacists to voice their various perspectives and ideas for others to utilize as an educational resource. As a staff writer, I hope to channel my passions and interests through this newsletter in an effort to impact those around me .

Aditi Ghosh

Staff Writer

Being a part of the Rho Chi Post allows me to share news, updates, and information with the St. John's community. It is very rewarding to have the opportunity to write about topics pertaining to healthcare while also being able to educate our readers.



Sairah Sheikh

Staff Writer

Ever since I was little, writing has always been a passion of mine. I would find joy in editing my friends' and family's works of writing. I would create short stories and eagerly read them out loud to entertain guests at social gatherings, which they would take great joy in listening to. As a staff writer now for the Rho Chi Post, I am excited to merge the knowledge I have gained in pharmacy school with my love for writing to create thought-provoking pieces for our community to read. Since pharmacy is an ever-evolving profession, it is important for our community to stay informed on the latest events in our field and I am looking forward to playing a small part in that as a member of the incredible editorial team.



Learn More About Our Editorial Team Responsibilities!



Staff Editor

Staff editors are the first to revise an article upon submission. The focus is to review the structure and content of an article. Specifically, staff editors evaluate the clarity/flow of the article and writing mechanics used by the author.



Staff Writer

Staff writers produce 2 articles per semester. Topic ideas are pharmacy/healthcare related, falling under any of the following categories: *News/Politics, Events, Clinical Articles, Pharmacy Pearls, Advice/Opinions*



Content-Focused Copy Editor

Content-focused copy editors are second in line to revise an article. After staff editors have made revisions, copy editors go through the same steps, with the addition of fact checking. Copy editors ensure that all names, dates, times, statistics, facts, URL's, and citations are all accurate, properly cited, and from credible sources.



Graphics-Focused Copy Editor

Graphics-focused copy editors create the upcoming official electronic issue via Microsoft Publisher. They are tasked with updating the Rho Chi Post template with newly approved articles, relevant images, advertisements/filler information, etc.

Social Media & Outreach

Noor-ul-ain Buksh

Engagement & Outreach Manager

I am incredibly grateful to be serving as an Engagement and Outreach Manager for the Rho Chi Post. As someone who has frequently seen people silenced in the media, I strongly feel that it is important that our newsletter displays diverse perspectives on pharmaceutical topics and I hope to play a meaningful part in helping that happen. Oftentimes, it is easy to lose connection with the student community. I want to avoid that and prioritize the opinions of our readers and writers. While upholding the Rho Chi Post's mission, I plan to work my hardest to promote inclusivity and stay connected with the student body. The pharmaceutical world is never static so I am excited to learn and work alongside my peers.



Anjali Thykattil

Engagement & Outreach Manager

I am beyond grateful for this opportunity, and I am excited to have the honor of serving on the executive board as the Engagement and Outreach Manager. The Rho Chi Post is not only a creative outlet for students, but also one that is invariably relevant to the ever-changing world of healthcare. In this position, I aim to further expand the growth of the Rho Chi Post among pharmacy students here at St. John's. Let's not forget, it is us as students who will become the healthcare leaders of tomorrow.

Nancy Yousry

Engagement & Outreach Manager

It was such an amazing opportunity to become part of Rho Chi Post's Editorial Board last year, and I am really excited to continue being a part of Rho Chi Post this year! I believe one of our responsibilities as Student Pharmacists is to be aware of the current events impacting our profession as well as the critical and unique role Pharmacists play in a variety of healthcare settings. As incoming Staff Writer, I look forward to bringing these current events to light and to serve as an educational resource for passionate readers and writers alike.



Advisors

Dr. Elsen Jacob

PharmD, MS, BCPS, BCGP, CPPS

As the faculty advisor for the Rho Chi Society and Rho Chi Post, I've had the opportunity to work closely with exceptional students who have a genuine passion for learning, service, leadership, and innovation. I look forward to what Rho Chi will accomplish this year!



Dr. Joseph Etzel

PharmD

Dr. Joseph Etzel is serving as the Rho Chi Post's interim faculty advisor for the 2022-2023 academic school year. Dr. Etzel is not new to our organization, as he has previously served as the faculty advisor for the Rho Chi Honor Society. He has been a huge influence to the success of Rho Chi in the past, and we look forward to working with him this year!

Dr. Mohammad Rattu

PharmD, BCOP, BCPS, BCGP

I am thankful to have been the 2012 editor-in-chief of the Rho Chi Post newsletter, as well as on the 2019 alumni honor roll of the national Rho Chi organization. This is one of the most successful longitudinal projects at my alma mater, as evidenced by its decade-long persistence and teams of highly-motivated students. I remain available for professional support and assistance with the new year's initiatives.



The Rho Chi Society

Meet Our 2022-2023 Rho Chi Executive Board

Executive Board

Vassilia Plakas

President

Rho Chi represents academic excellence, professional development, and service to our younger peers and fellow colleagues. Our programs and events reflect the value of scholastic leadership. Being part of Rho Chi has been such a wonderful experience so far; I am humbled and grateful to work with a strong executive board and a dedicated fifth year class.



Frances Alexis Dela Cruz

Vice President

Rho Chi is a community that promotes academic excellence and service to others. By providing academic assistance and professional development opportunities, we strive to foster a supportive space for our members and younger peers to succeed. Rho Chi has played a significant role in my pharmacy journey thus far, and I am honored and humbled to be a part of this organization.



Rachel Kneitel

Secretary

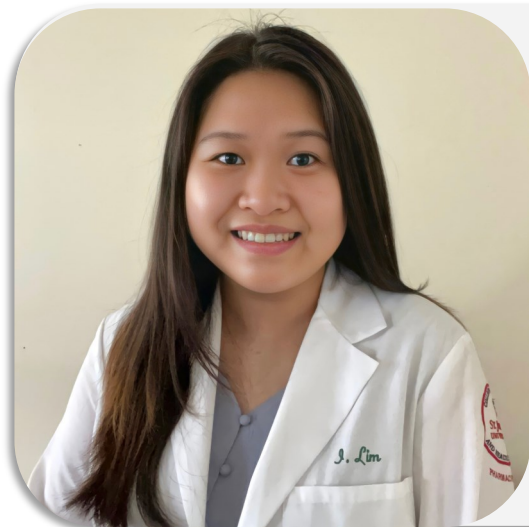
Rho Chi to me is a collaborative space where students can encourage and support each other to excel. This organization allows students to spark stimulating conversations about pharmacy and healthcare as a whole.



Isabelle Lim

Treasurer

Rho Chi serves as an opportunity for students to academically support and collaborate with one another. Over the years, I personally have come to appreciate Rho Chi's study materials and review sessions as an integral resource when preparing for exams. I am honored to be a part of Rho Chi in a way where I can help other students just as Rho Chi has helped me in previous years.



Amanda Schleider

Historian

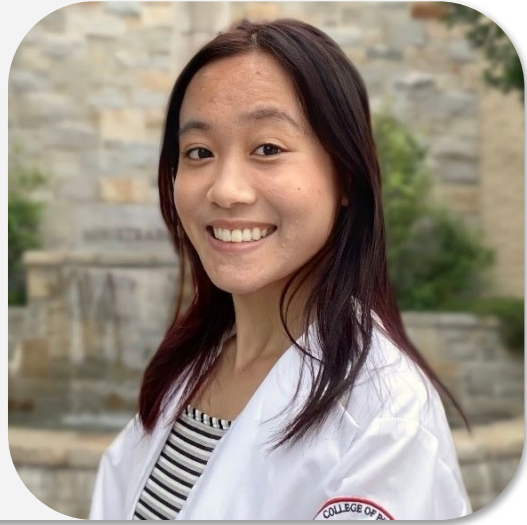
As the top students in our class, we have a unique opportunity to help our fellow classmates and younger pharmacy students succeed. This is a challenging program, and we all want to get through it. I am proud to be part of an organization that values assisting pharmacy students with their studies and connecting them with alumni and faculty members at our famous coffeehouse chats!



Joanne Fung

Development & Outreach Coordinator

To me, Rho Chi is a great opportunity for all pharmacy students to advance themselves. This society offers something to everyone, whether you are a member of the society, a part of the newsletter staff, or a student taking advantage of the resources offered by Rho Chi. The effort put forth by every person affiliated with Rho Chi is amazing, and I will always appreciate this society's mission and values.



Shankun Lin

Academic Committee Coordinator

Rho Chi is an honor and an accomplishment that I am proud of. As a Rho Chi member, we should be humble and give back to our community for intellectual and professional success



Riya Vinoy

Academic Committee Coordinator

Rho Chi is a collaboration of individuals that are committed to advancing the field of pharmacy that recognizes and promotes intellectual leadership. This collaboration fosters the growth of intellectual leaders by providing resources that can assist in achieving academic excellence.





The Rho Chi Post would like to wish all students and faculty a happy and safe summer vacation!

Interested in writing for the Rho Chi Post?

Go to <http://rhochistj.org/RhoChiPost> and click on the login option from the menu bar to make an account! With an account, you'll have access to the article submission portal where you can submit your writing for publication in an upcoming issue!

Remember, you do NOT have to be a member of Rho Chi, a member of the editorial team, or a student of St. John's to write for our newsletter!

Interested in joining our 2023-2024 Editorial Team?

The Rho Chi Post currently has applications open for staff writers, staff editors, content-focused copy editors, and graphics-focused copy editors. Scan the QR Code below to learn more about these positions and to apply for a spot on our editorial team!

