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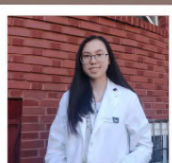
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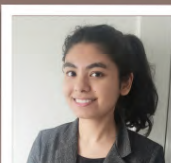
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## QUOTE OF THE MONTH

"The first wealth is health."  
- *Ralph Waldo Emerson*





## Ranitidine (Zantac®) Making a Comeback

By: Mandy Zheng, PharmD Candidate c/o 2024

“Where can I find Zantac?”. From April 2020 to May 2021, the answer was, you cannot. On April 1, 2020, the Food and Drug Administration (FDA) ordered for all ranitidine (Zantac®)- containing products to be removed from the U.S. market.<sup>1</sup> Ranitidine was a popular over-the-counter (OTC) and prescription medication treating heartburn, acid reflux, stomach ulcers, gastroesophageal reflux disease (GERD), and other related health conditions in which the stomach produces excessive acid. Zantac® was FDA-approved in 1983, and in 1988, became the world’s best-selling drug and one of the first drugs to reach \$1 billion in sales.<sup>2</sup>

Ranitidine, the active ingredient in Zantac®, belongs to a class of medications called histamine-2 blockers (H2 blockers) or histamine H2-receptor antagonists (H2RA). H2 receptors are found in stomach linings and are activated by histamine - a chemical naturally produced by certain cells of the body. Once histamine is released, it stimulates the parietal cells in the lining of the stomach to release acid, which aids in food digestion and the killing of bacteria.<sup>3</sup> H2 blockers are antagonists that compete with histamine for binding to H2 receptors, thus reducing the production of stomach acid. The reduction of gastric acid secretion provides patients with symptomatic relief from heartburn, indigestion, acid regurgitation, sour stomach, or bitter belching.<sup>3</sup>

Some advantages of H2 blockers, compared to other treatments for stomach acid-related symptoms, are their fairly quick onset of action and lasting effects. Proton pump inhibitors (PPIs), like omeprazole (Prilosec®) and esomeprazole (Nexium®), are only approved for treating frequent heartburn (heartburn that occurs 2 or more days a week) over-the-counter, and may take several days of continued use in order for patients to experience the maximal effects.<sup>4</sup> PPIs are not intended for immediate relief of symptoms and work best when taken daily, compared to antacids and H2 blockers, which are taken as needed and provide more rapid relief. H2 antagonists begin to work in 30-45 minutes and their effects can last anywhere from four to ten hours, compared to traditional antacids like calcium carbonate (Tums) that tend to wear off within twenty to thirty minutes, requiring more frequent dosing.<sup>5</sup>

The marketability for ranitidine was high due to these positive attributes, but this all changed in the summer of 2019.

The FDA began its investigation when they became aware of an independent laboratory that found the presence of a contaminant known as N-Nitrosodimethylamine (NDMA) in ranitidine.<sup>1</sup> NDMA is classified as a B2 (probable human) carcinogen, which is found at low levels in water and many foods, such as cured meats, cheese, and beer, because of their cooking and fermentation processes.<sup>6,7</sup> Low levels of exposure to NDMA are not expected to cause health concerns, but higher levels of exposure can lead to an increased risk of liver toxicity and cancers such as esophageal cancer, bladder cancer, gastric cancer, liver cancer, among others. In September of 2019, the FDA had insufficient scientific evidence to pull ranitidine off the shelves, so they informed the public of their findings, warned people of the potential risks, and recommended patients to consider alternative medications for their symptoms.<sup>8</sup>

Nearly six months afterwards, the FDA released a statement in April 2020 requesting an immediate market withdrawal of ranitidine products. The FDA determined that traces of NDMA in ranitidine medications increase over time when stored at higher than room temperature, which could result in unacceptable levels of human exposure.<sup>1</sup> However, more than a year after the drug recall, Zantac® was “reformulated” and made a comeback into the consumer market as Zantac 360°™ in original strength (10 mg of famotidine) and in maximum strength (20 mg of famotidine). No longer containing the original active ingredient, ranitidine, Zantac 360°™ is now formulated to contain a different H2 antagonist known as famotidine. Famotidine (Pepcid®) was approved by the FDA in 1998, and has been on the market to treat acid-related symptoms, such as GERD, ulcers, and heartburn.<sup>9</sup> Famotidine has similar uses and effects as ranitidine without the same risks of NDMA exposure.<sup>1</sup> This move was made by Sanofi, the pharmaceutical company that owns the brand name Zantac®. Currently facing a class-action lawsuit encompassing more than 70,000 former patients in the US, Sanofi is being accused of deleting emails that contained information suspecting ranitidine’s link to NDMA in Zantac® products.<sup>10</sup>

While ranitidine will not be coming back to the market anytime soon, famotidine (Zantac 360°™), is now available on store shelves and online retailers. Sanofi is now using the well-known Zantac® name to sell their “new” product that contains the same active ingredient as Pepcid®, which can confuse consumers

## Ranitidine (Zantac®) Making a Comeback

By: Mandy Zheng, PharmD Candidate c/o 2024

and those unaware of the FDA's recall of ranitidine (Zantac®) products. Not everyone reads the back of the medication box for the active ingredient list, and this is one of many areas where the pharmacist should be assisting patients at every opportunity available. Pharmacists should stay aware of new drug updates and be more vigilant in verifying the ingredients in OTC products so they can properly counsel patients on treatment options and relief from symptoms.



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## Opioid Addiction During a Public Health Crisis

By: Anjali Rana, PharmD Candidate c/o 2025 and Katharine Russo, PharmD

The Coronavirus disease 2019 (COVID-19) pandemic continues to pose challenges, both nationally and worldwide. Many countries that were facing public health crises prior to COVID-19 have subsequently seen a worsening of these crises, as much of the funding and attention previously available has been diverted and directed towards addressing COVID-19. Opioid addiction is one such public health crisis demanding of our attention. Addiction is a disease of uncertainty, isolation, and anxiety.<sup>1</sup> These are feelings that can oftentimes be the precipitating factors that push folks to clinical manifestations of addiction that include alterations in behavior, mental status, appetite, physical appearance, as well as increased substance tolerance.<sup>1</sup> The emotional strain caused by isolation during quarantine has, in many instances, led to folks looking for ways to cope. Pharmacists play an essential role in caring for patients who are struggling with opioid addiction. In order to provide optimal support, pharmacist should be knowledgeable of local, state, and federal efforts being made to address the opioid epidemic, as well as the numerous resources available to help support those in need.

COVID-19 has led to an increase in overdoses and deaths, with 596 overdose deaths being confirmed in New York City (NYC) during the first quarter of the 2021 calendar year.<sup>2</sup> Numerous states across the United States (US) have reported an increase in overdoses and fatalities, with those numbers expected to increase as the pandemic continues.<sup>2,3,4</sup> Brad Anderson, MD, Chief of addiction medicine at Kaiser Permanente Northwest in Portland, Oregon reiterates, “addiction thrives in isolation and dies in community — but this is a conundrum during the pandemic, because every day we’re being reminded to keep our distance and stop connecting in our usual ways.”<sup>5</sup>

To address the current opioid epidemic, outside of the confounding global pandemic, New York State (NYS) is utilizing tools to educate the community on how to combat substance abuse. With the creation of tools such as the Substance Use Disorder Educational Resource flash drive toolkit, schools will have the resources necessary to facilitate discussions and stay abreast of the latest changes implemented by the state during COVID-19. It is essential to educate students on how prescription drug abuse can be dangerous when individuals are using medications more frequently than prescribed.<sup>6</sup>

Outside of the classrooms, New York continues to push for medication-assisted treatment (MAT) and limits for prescribing of substances carrying the potential for addiction.<sup>7</sup> MAT’s involve the use of medications in conjunction with counseling therapies to treat opioid use disorders (OUD’s), aiding in the recovery process. In 2016, NYS enacted a law stating that practitioners can prescribe no more than a 7-day supply of schedule II, III, and IV opioids for acute pain. The law defines acute pain as pain that the practitioner reasonably expects to last only a short period of time. This applies to the initial prescription of opioids for acute pain. The law later goes on to identify certain exceptions to this rule; prescriptions for chronic pain, pain being treated as a part of cancer care, hospice or other end-of-life care, or pain being treated as part of palliative care practices.<sup>20</sup> By limiting the initial amount of prescription opioids being dispensed to the patient, there is the potential to reduce the incidence of addiction. Prior to enacting this law, practitioners oftentimes inappropriately prescribed large quantities of opioids to patients with acute pain, resulting in many patients developing addiction. As an additional safety measure against irresponsible prescribing practices, prescribers are required to complete three hours of course work or training on pain management and addiction every three years per NYS law.<sup>8</sup>

Enacted into NYS law in 1984, the 911 Good Samaritan Law was put into place in an effort to protect those involved in an opioid-related medical emergency.<sup>23</sup> This law ensures that if an individual witnesses signs of an overdose (slow, weak breathing, choking or gurling, discolored, cold or clammy skin), they can call 911 without fear of retaliation for being in possession of illicit drugs themselves or being underage in the presence of alcohol use, for example. There are exceptions to this law, however. The Good Samaritan Law does not protect individuals from a felony possession charge for possession of substances over 8 ounces, sale or intent to sell controlled substances, individuals found to be in violation of probation orders, or those having an open warrant for arrest.<sup>9</sup>

Methadone, buprenorphine, and naltrexone are Food and Drug Administration (FDA)-approved MAT’s for OUD. These medications help minimize the risk of withdrawal symptoms oftentimes seen in patients suffering from opioid addiction. Signs of withdrawal include nausea, vomiting, diarrhea, anxiety, hyperthermia, tachycardia, sweating, high blood pressure, and

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By: Anjali Rana, PharmD Candidate c/o 2025 and Katharine Russo, PharmD

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muscles aches.<sup>24</sup> Methadone is available through maintenance clinics and opioid treatment programs.<sup>13</sup> Methadone acts as an opioid agonist which binds to mu-opioid receptors, altering the brains response to pain.<sup>10</sup> As a schedule II narcotic, methadone clinics limit patients to a one-day supply of medication, meaning that the patient must present to the clinic daily. This is meant to deter misuse of the opioid medication, as the patient will be less likely to exceed the maximum daily amount. Buprenorphine is a partial agonist at the mu opioid receptor. This enables for an alteration in the brains response to pain sensations, but at a weaker strength.<sup>11</sup> Buprenorphine is available at outpatient pharmacies when prescribed by a physician in an office-based setting, unlike methadone which must be dispensed in a narcotic treatment facility (NTF). Naltrexone is classified as an opioid antagonist which means that it competes with opioids for opiate receptors, displacing opioid drugs and thus reversing their effects.<sup>12</sup>

Prior to COVID-19, patients receiving methadone as part of MAT were required to pick up their medication daily at their opioid treatment center.<sup>13</sup> This process increased the patients risk for contracting or spreading infection. As of May 2020, the federal government has approved methadone deliveries during the pandemic.<sup>14</sup> The New York Health Department and the NYS Office of Addiction Services plan to deliver 1300 prescriptions per month with staff using personal protective equipment (PPE) according to guidelines. The new change in methadone treatment regulations was largely meant to assist patients who contracted COVID-19 or were exposed to someone who contracted COVID-19, so that they can still get their medications without exposing themselves or others to illness. This change has reduced the financial burden of transportation, and greatly reduced the fear and anxiety many patients face leaving their homes during the height of the pandemic.<sup>15</sup> Of note, there is also a push for community pharmacists to dispense the opioid reversal agent, naloxone (Narcan®). States like New Jersey partnered with 322 independent and community pharmacies in September 2020 to give away 72,000 doses of naloxone without a prescription and free of charge to help curb the increase in overdoses during the pandemic.<sup>19</sup>

New protocols have been implemented in the opioid treatment centers according to guidance set by the Office of

Addiction Service and Supports of New York State (OASAS). These centers are now required to provide a COVID-19 questionnaire to individuals entering facilities, check temperatures, and inquire if the patient is experiencing any symptoms. For patients identified to be experiencing respiratory illness, they would be placed in an isolation room. In this situation, the patient can receive their prescription but should be isolated from the public area to decrease risk of disease transmission.<sup>16</sup> Patients who have chronic medical conditions or are vulnerable to infection are given a 28-day supply of their prescription from the treatment center. This is based on risk vs benefit, taking into account the risk of diversion in comparison to risk of infection to the patient and those who they come in contact with.<sup>16</sup>

In response to COVID-19, new tools are being utilized to help patients recover from drug abuse. Telemedicine has expanded the outreach of our nation's healthcare facilities by allowing practitioners to meet with patients remotely. For instance, "Families against Narcotics" and "National Alliance on Mental Illness" are both programs offering opportunities for patients to speak virtually with a specialist and other practitioners who deal with narcotic misuse. The goal is to continue promoting group support despite social distancing protocols put in place in light of the pandemic.<sup>17,21</sup> Yale University has created a guide called, "Guidance for people who use substances on COVID-19", a useful tool for individuals who may not be aware of the serious consequences associated with opioid abuse.<sup>21</sup>

New apps are additional tools that have been created in response to COVID-19 that have helped bolster community support. The Sober Grid, for instance, is a community of individuals recovering from their struggles with drug abuse. This app features live peer coaches who document and share progress with others to build support. This app encourages patients to look towards new activities and hobbies in life that are healthier than drug abuse.<sup>18</sup> This is a free app, ensuring that folks can take part without the worry of another financial burden. WEconnect Health Management is another app that has enabled fresh advances in the lives of those struggling with addiction. Patients can stay on track with their recovery by receiving reminders from their sponsor, or by attending group sessions. This app encourages patients to develop a plan and stay focused on achieving their goals in life.



## Opioid Addiction During a Public Health Crisis

By: Anjali Rana, PharmD Candidate c/o 2025 and Katharine Russo, PharmD

It has been said time and time again how pharmacists are the most accessible health care providers. As the opioid epidemic continues to threaten the world, pharmacists remain an indispensable outlet for those struggling with addiction. It is essential that pharmacists be prepared to provide patients struggling with addiction the appropriate resources needed to overcome these struggles and live a healthier life. Pharmacists can encourage patients to find ways to stay connected with those in their community. Facetime, Zoom, and WebEx are some of many video conferencing platforms that have allowed the world to stay connected during times of isolation. Pharmacists can introduce patients to support groups, such as Alcoholics Anonymous and Narcotics Anonymous, which have gone virtual during the pandemic.<sup>22</sup> Developing a routine can be beneficial to everyone, not just those battling addiction. When possible, patients should be encouraged to identify healthy routines they had prior to the pandemic, and continue them if they can be done in a safe manner. For activities that cannot be done safely, patients should be encouraged to find new activities and hobbies. This can include staying active and exercising, for those who have not engaged in those activities previously. Finally, those struggling with addiction should be encouraged to never give up. Relapse is not a sign of personal failure. Relapse is an opportunity for pharmacists and other healthcare professionals to utilize their knowledge and training to provide better, continued support.

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## Pharmacy Meets Technology: Pharmacy Informatics

By: Tiffany Dominic, PharmD Candidate c/o 2022

As student pharmacists, there is no doubt that we have been hearing the words “pharmacy informatics” more frequently. However, a big concern remains. Many pharmacy students are not exactly sure what informatics is or only have a general understanding of the topic. Well, look no further and keep reading to explore the world of pharmacy informatics!

Pharmacy informatics is a specialized field that pharmacists can undergo further training in. This area of study has the special ability of merging the best of two worlds together in different practice settings: clinical information and technology. The necessity and utilization of healthcare technology has been significantly increasing and pharmacy informatics involves the usage and customization of electronic health record systems to optimize access to patient data and improve treatment outcomes.<sup>1,2,4</sup>

According to the American Society of Health-System Pharmacists (ASHP), informatics pharmacists’ responsibilities include, “data, information, and knowledge management” and “knowledge application and delivery”.<sup>1</sup> ASHP also outlines that informatics pharmacists are expected to manage, “medication-related information while promoting integration, interoperability, and information exchange” and should be, “delivering medication-related information and knowledge throughout the clinical knowledge life cycle, from the point of knowledge generation through cataloging, embedding knowledge into the workflow, and measuring the usage and effectiveness of that knowledge”.<sup>1</sup>

Now that we know the official definitions of pharmacy informatics, you may find yourself still asking, “What exactly does an informatics pharmacist typically do?” There is certainly no one correct answer to this question as informatics pharmacists can have a variety of roles.<sup>1</sup> Informatics pharmacists work with numerous electronic and automated health systems such as automated dispensing cabinets, bedside bar coding, electronic medication administration records, computerized provider order entry (CPOE), and Epic.<sup>2</sup> Their roles and tasks can also greatly vary depending on their practice site.

Dr. Brian Fung, a pharmacist who authors blogs on ASHP’s website, outlines his experiences and responsibilities as an informatics pharmacist. Dr. Fung mentions that, “we [informatics pharmacists] help design the screen that pharmacists

see”. He further describes how this specialized field of pharmacy has an immense role in customizing CPOEs to help optimize patient outcomes. For example, they can choose the appropriate dosing options to be included in the drop-down menu for specific medications in the CPOE system. Some dosing options are not appropriate and therefore should not be listed as a therapeutic option. They also help maintain automatic dispensing cabinets, such as Pyxis, so only the appropriate medication is available to be taken out which greatly helps prevent medication errors.<sup>4</sup> Bar Code Medication Administration maintenance is also one of their roles to ensure that the right drug and dose is given to the right patient. They also develop alert systems to notify providers of duplicate therapies, drug interactions, or inappropriate drug therapy regimens.<sup>6</sup> Dr. Fung also creates technological tools to identify “bug and drug” mismatches to alert antimicrobial stewardship providers.<sup>4</sup> These preventative measures can significantly reduce medication errors and adverse drug reactions.

Informatics pharmacists can also decide which medical information, such as past medications, creatinine clearance (CrCl), and allergy history, should be included in patient profiles of electronic health records (EHRs). Customization of information systems can also lead to improved monitoring for assessing the effectiveness of Drug X compared to Drug Y and better identification of at-risk patients for certain medical conditions. For example, “At Adventist Health Portland, teams use a disease registry to identify at-risk patients. This system is comprised of biometric information, claims data and pharmacy information, which helps providers to determine populations that could be at risk for certain conditions, as well as those whose clinical needs are not currently being met”. Information systems also help maintain and program dose error reduction and infusion delivery rate software in “smart” infusion pumps. Studies have ultimately proven that pharmacy informatics have beneficial impacts on the healthcare system. In 2014, a study published in the journal *Health Affairs*, “suggested that predictive systems could help identify patients and consequently improve outcomes in six categories: high-cost patients, readmission rates, triage, decompensation, adverse events and diseases affecting multiple organ systems. These areas alone have far-reaching benefits on both health and financial levels”.<sup>5</sup> Informatics pharmacists also have the power to create tools to improve medication



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**Pharmacy Meets Technology: Pharmacy Informatics**

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**By: Tiffany Dominic, PharmD Candidate c/o 2022**

reconciliation which is an area that consists of high potential for errors. The Healthcare Information and Management Systems Society (HIMSS) suggests potentially “creating computerized processes to suggest acceptable inpatient medications on formulary that would substitute for the patient’s home medications”.<sup>6</sup> Creating these tools and resources ultimately involves using a combination of technical skills and clinical knowledge.

Additionally, informatics pharmacists are similar to data scientists because they have a great role in analytics. Dr. Fung analyzes data on formulary compliance, bar code medication administration compliance, and turnaround time for time-critical medications. Informatics pharmacists often compile their analysis into reports which are then presented to administrative officials. Dr. Lukasz Przychodzien, a former clinical pharmacy manager of data analytics at New York Presbyterian, spoke about his experiences with analytics as an informatics pharmacist in his interview with Pharmacy Times. Dr. Przychodzien states, “For example, I would take a look at the data and actually see if any type of benefit has been shown for the medication or if the medication had previously been approved through F&T [usually known as Pharmacy & Therapeutics committees in hospitals] and to see if it has been giving the benefit claims and outcomes that we’re looking for in the medication”.<sup>2</sup>

Data analysis performed by informatics pharmacists can also lead to institutional-level widespread changes and is often used to increase efficiency in the workplace. Dr. Przychodzien explains, “one of the best things about being in informatics...is that you get to work on problems that affect the whole institution. I look from the perspective of I’m doing my clinician duties to try and serve as many patients as possible through this role. If I’m improving how an ICU can get its vasopressors to its patients, then I’m going to be improving how every patient that walks into the ICU that needs it gets taken care of... When I look at things from a financial aspect, I look at how the pharmacy is doing in terms of the initiatives that we have in saving us money. Are we billing things correctly? I’m even working on billing medical procedures”.<sup>2</sup> Dr. Rilwan Badamas, the chief of pharmacy informatics at the National Institute of Health (NIH) Clinical Center, had even implemented a pharmacy inventory ordering and management system and developed a Warfarin Dose Computer Algorithm for EHRs

during his residency at Mayo Clinic. Through these technological initiatives, pharmacists are able to serve and impact large populations of patients.<sup>7</sup>

Pharmacy informatics is significantly utilized in hospitals and other healthcare institutions, but it can be applied to almost any setting where medications are involved. Pharmacy informatics is also greatly needed in the Food & Drug Administration (FDA), NIH, and other governmental agencies.<sup>2</sup>

The FDA has its own division for informatics which is called the Office of Health Informatics (OHI). Informaticists at the FDA store data from drug manufacturers, health providers, and scientists to help properly evaluate and analyze regulated products, such as drugs, biological products, and medical devices. In 2014, the OHI launched “openFDA”, which consists of data regarding drug side effects, adverse event reports, enforcement reports, registrations and listings of companies and products, premarket approvals, and recalls issued for human drugs and devices.<sup>9</sup> Through the initiatives of “openFDA”, informaticists can help data become more accessible to the public while developing transparency and accountability within the agency. Similarly, the NIH also heavily utilizes informatics for, “ensuring data quality and safety, minimizing data-quality risks, and affirming medication-related data, information, and knowledge management best practice across the NIH Clinical Center”.<sup>7</sup>

For those reading this article that now find themselves interested in specializing in pharmacy informatics, there are numerous pathways to become an informatics pharmacist. You may consider applying to informatics residency programs during your post-graduate years. Many hospital systems and institutions, such as Johns Hopkins and Mayo Clinic, offer informatics training for pharmacy graduates. You may also consider obtaining a graduate degree in informatics.<sup>10,11</sup> Of course, informatics may not be for everyone and perhaps you may find yourself not as tech-savvy, however, it is definitely worth your attention as its utilization and necessity in healthcare significantly continues to increase.

Ultimately, the old cliché holds true – “with great power comes great responsibility”. Informatics pharmacists have various roles and can customize numerous health information systems to reduce adverse events, screen for inappropriate drug regimens, and increase medication safety. These measures all work

## Pharmacy Meets Technology: Pharmacy Informatics

By: Tiffany Dominic, PharmD Candidate c/o 2022

together to achieve one overarching goal: improving patient outcomes.

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## Understanding the MELD and PELD Score and Its Role In Liver Transplant Allocation

By: Jason Ifeanyi, PharmD Candidate c/o 2022

The liver is one of the most commonly transplanted solid organs in the United States (US) today. The United Network for Organ Sharing (UNOS) is a mission-driven non-profit that leads the network of transplant hospitals, organ procurement organizations, and thousands of volunteers who are dedicated to saving lives through organ transplants.<sup>1</sup> According to UNOS, 8,494 livers were transplanted in 2021. These numbers are similar to data provided from 2020 which showed that a total of 8,906 liver transplants occurred.<sup>2</sup> Despite these impressive numbers, there are a significantly larger number of patients still in need of a liver transplant who are currently on a waiting list. One of the many factors that gets taken into consideration when determining which patients are in more urgent need of a liver transplant is the MELD score.<sup>1,3,4</sup>

The MELD score stands for “Model for End-Stage Liver Disease”. This is a prognostic scoring system based on specific laboratory measurements, used to predict 3-month mortality due to liver disease in patients 12 years of age and older.<sup>3</sup> The MELD score, as previously mentioned, helps clinicians determine how urgently a patient needs a liver transplant. Scores can range anywhere from 6-40, and are based on results of several lab tests. The higher the number, the more severe the liver impairment, and the more likely that the patient will receive a liver transplant from a deceased donor when an organ becomes available.<sup>3,4</sup>

In order to calculate the MELD score, clinicians must have access to the patients most recent INR (international normalized ratio), Scr (serum creatinine), bilirubin, and serum sodium levels. INR levels are indicative of how well the liver makes proteins necessary for blood to clot, while bilirubin levels are indicative of how well the liver clears bile. Serum creatinine is indicative of how well the kidneys are functioning, while serum sodium is indicative of well the body regulates fluid balance. A logical question one may ask is how often the MELD score needs to be calculated. Typically, this is variable, and will depend on the patients current MELD score at the time. For instance, a patient with a MELD score  $\geq 25$  will typically get their MELD score recalculated every week. A patient with a MELD score of 19-24 will have their MELD score recalculated every 30 days. Patients with a MELD score of 11-18 will have their score recalculated every 30 days, patients with a MELD score  $\leq 10$  will have their score recalculated ever year.<sup>4</sup>

The PELD (Pediatric End-Stage Liver Disease) score is similar to the MELD score, with a few key differences. Firstly, the PELD score is meant for patients who are less than 12 years of age. Secondly, the criteria used in calculating a PELD score differs from that of the MELD score. In particular, to calculate a PELD score clinicians will need access to a patients albumin, which measures the liver’s ability to maintain nutrition. Additionally, clinicians need to determine if the patient has growth failure, which is based on the patients height, weight, and gender. Age at listing is also recorded.<sup>5</sup> Shared lab values recorded both for PELD and MELD score are bilirubin and INR. As is the case with the MELD score, a patients PELD score may fluctuate depending on the status of their disease state. Most patients will have their scores assessed numerous times while they are on a waiting list.<sup>6</sup>

It is important to note that the MELD score does not accurately predict survival in all patients with liver impairment. There are certain forms of liver disease that are associated with higher mortality than a MELD score would be able to predict.<sup>3</sup> Consequently, there exists a MELD exception scoring system. This system of exception points gives patients who have certain liver conditions a standard score on the UNOS transplant waitlist. The patients transplant hospital makes customized exception score requests to a national review board of independent medical experts comprised of liver transplant physicians and surgeons. Requests should not contain any patient or hospital identifiers so that the review remains completely unbiased, and the decision based solely on medical information presented.<sup>7</sup>

Penn Medicine is an example of one transplant institution with a MELD score exception system. Patients who qualify for a MELD exception at Penn Medicine include patients with hepatocellular carcinoma, cholangiocarcinoma, cystic fibrosis, hepatopulmonary syndrome, familial amyloid hypertension, portopulmonary hypertension, and primary hyperoxaluria.<sup>8</sup> At Penn Medicine, in order to qualify for an exception, each of the conditions mentioned above has specific guidelines or protocols, which require diagnostic testing, blood work, and/or genetic markers, among other materials. Additionally, each exception must be re-certified, or re-reported to UNOS, every 3 months, with updated information that is diagnosis- specific. For example, as outlined on their website, hepatocellular carcinoma requires an updated MRI or CT abdomen along with an alpha-fetoprotein (AFP) tumor marker test, every three months. For reference, AFP

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is a protein made in the liver during fetal development. AFP greatly reduces by 1 year of age, and should only be found at low levels in adults (10-20 ng/ml). Higher than normal levels (> 400 ng/ml) of AFP could be suggestive of liver cancer, among other health conditions.<sup>9</sup> Cystic Fibrosis (CF), however, requires no new additional information once the first exception has been submitted. Penn Medicine simply needs to re-verify with UNOS every three months that the patient remains listed with a diagnosis of CF.<sup>8</sup>

Patients who are listed with a MELD exception are listed with what is known as a Median MELD at transplant (MMaT). The MMaT varies for each transplant program, and is calculated using the median of the MELD scores at the time of transplant of all recipients at least 12 years old, who were transplanted at hospitals within 250 nautical miles (NM) of the candidate's listing hospital, in a 365-day period.<sup>10</sup> The MMaT scores were updated on September 29th of 2021, with scores being updated twice yearly. MPaT refers to the Median PELD at Transplant, and applies to patients less than 12 years of age. The MPaT is a national calculation and, unlike the MMaT score, is the same for all transplant programs with PELD exception candidates. It will remain at 35.<sup>11</sup>

In conclusion, liver transplant is a procedure that for many patients can be the difference between life and death. The MELD and PELD score are both prognostic scoring systems based on laboratory parameters used to predict three-month mortality due to liver disease, and aid clinicians in determining which patients are at the greatest need of a liver transplant. Despite the clear utility of both scores, it is important to note that there are some patients with certain liver conditions for which the MELD or PELD score cannot accurately characterize long-term risk. Consequentially, there are MELD and PELD exception scores, which aid in providing patients with the best chance possible for getting a liver transplant based on their health condition. As aspiring healthcare clinicians, it is important to understand that our role involves much than knowing the medications used in managing a disease state. Having a solid understanding of common prognostic tools used in assessing the overall status of disease severity will ultimately enable us to achieve optimized patient outcomes. While it is impossible to know all the prognostic tools, one should take advantage of every opportunity to become more familiar with those

encountered during clinical practice.

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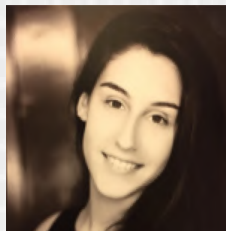
## RHO CHI POST: TEAM MEMBERS



**@ Jason Ifeanyi**

**6th Year, STJ; Editor-In-Chief**

Last year I had the pleasure of serving as Social Media Manager and Staff Editor for the Rho Chi Post. It was amazing to see the growth we had as an organization, and the many students, faculty, and pharmacists we were able to connect our content with. I aim to continue and expand upon this growth as the new Editor-In-Chief this academic year. I look forward to working alongside this group of talented and driven students to effectively deliver newsletter publications that keep readers up to date on advancements made within the field of pharmacy.



**@ Anna Diyamandoglu, PharmD**

**Graduate Copy Editor [Content-Focused]**

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 non-pharmacy students alike will find relatable and take an interest in.



**@ Katharine Russo, PharmD**

**Graduate Copy Editor [Content-Focused]**

The Rho Chi Post has 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. My involvement with the RCP during my years of study greatly impacted my education and I look forward to continuing my contributions as I start my career as a clinical pharmacist.



**@ 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.



**@ Lexie Villarias**

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

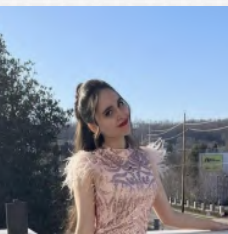
With the world of pharmacy changing day by day, it can be challenging to keep up with all the updates. The Rho Chi Post provides an excellent platform for students to share their insights and thoughts on the happenings within the field. I'm excited to join the Rho Chi Post and a team that is passionate 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!



**@Mandy Zheng**

**4th Year, STJ; Copy Editor [Graphics-Focused]**

I am excited to be a part of Rho Chi Post, a place for pharmacy students to share insights, opinions, and new discoveries. As future pharmacists, the issues that exist in the US healthcare system will have to be addressed and improved by us. Rho Chi Post informs students on all aspects of pharmacy and serves as an example and inspiration for others. Pharmacy is an ever-changing and dynamic field, and there are vast career opportunities and pathways for pharmacy students. I look forward to working, listening, and learning from my fellow students and future colleagues; and I hope to serve as a guide to others as others have done for me.



**@ Nancy Yousry**

**5th Year, STJ; Finance & Outreach Manager**

Beyond grateful and excited to embark on carrying Rho Chi's Mission of providing an invaluable literature medium to the Student Community in an empowering and influential way. In these ever-changing times, it is crucial now more than ever to take on the invaluable active role of listening, learning and understanding the change of dynamics within our communities and what that means towards the future of Healthcare and the Pharmaceutical Field in its constant interdisciplinary evolution. As Finance and Outreach Manager of the Rho Chi Post, I aim to ensure inclusivity in sharing diverse perspectives and raise awareness of just how capable we are as future Pharmacists in being able to innovate revolutionary solutions while advocating for our Passions, Profession and the sustainable wellbeing of our Patients.



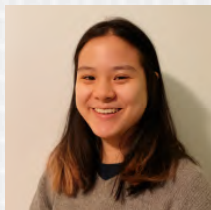
**@ Aiša Mrkulić**

**6th year, STJ; Social Media Manager & Staff Writer**

"I am excited to have the honor of serving on the 2021-2022 Executive Board as Social Media Manager, eager to showcase the award-winning work of our editorial team, staff and contributing writers alike. Since joining the Rho Chi Post as a Staff Writer, I have been a frequent contributor to the newsletter—sought out by prospective staff writers interested in using cowlriting as a springboard for their own involvement with the Post. If this tells us anything, it's that the potential for expansion over the coming year is promising! Those interested in applying for the Staff Writer position always have the option to collaborate with our published authors. Certainly, all are free to contribute independently at any point; however, those who may be hesitant to do so might benefit more from a firsthand account of newsletter writing, with the added bonus of guidance from one of our own—a polished writer familiar with the process.



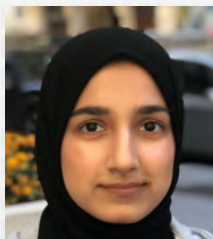
## RHO CHI POST: TEAM MEMBERS



**@ Ashley Dao**

**4th Year, STJ; Website Liaison**

The Rho Chi Post offers a place for students, alumni, and faculty to collaborate and share their experiences. Each bringing their own perspectives and opinions. I am very excited to be part of the Rho Chi Post team. 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 have also had the opportunity to learn from the articles published by my peers. I hope that I can encourage more students to contribute to the Rho Chi Post. After all, without conversations, there can be no change



**@Rubab Hassan**

**6th 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.



**@ Zarnab Jillani**

**6th 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.



**@ Tiffany Dominic**

**6th Year, STJ; Staff Writer**

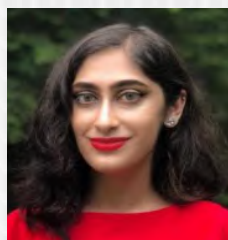
My name is Tiffany Dominic and I am currently a sixth year pharmacy student. After being a dedicated reader of Rho Chi Post for years, I wanted to give back and be a part of this amazing community of writers and editors who work tirelessly to publish quality pieces of knowledge, news, and opinions. Being part of Rho Chi Post allows me to shed light on issues that aren't touched upon in our didactic courses and helps me connect students to real-world applications and approaches in pharmacy. I am beyond grateful that Rho Chi Post has given me the opportunity to continue my love for writing while also promoting patient advocacy and public health. I look forward towards writing about current events and essential healthcare issues while being part of this incredible team!



**@ Mah Noor**

**Graduate, STJ; Staff Writer**

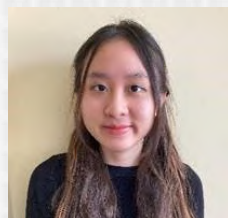
Rho Chi Post is an amazing student-operated newsletter publication that is doing an astonishing job delivering updated news as well as giving students the opportunity to give back to the pharmacy community. As a staff writer, I hope to play a key role in educating students on the different aspects of 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.



**@ Bisma Sekhery, PharmD**

**Graduate 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.



**@ Holly Nguyen**

**4th Year, STJ; Staff Editor**

The pharmacy profession treasures the continuous search for knowledge in the fast-paced, ever-changing catalog of old, new, and developing drugs and therapies, whilst maintaining a manner of grace and compassion in everyday settings among patients, medical professionals, and higher associates. The St. John's University Rho Chi Post is an emblem of this pursuit, bringing together an incredibly talented team of pharmacy students and graduates to present the latest pharmacy news to our fellow colleagues. I'm incredibly honored to be part of such an esteemed newsletter as a staff editor, which has since given me the opportunity to connect with a network of truly influential colleagues. I pledge to help aspiring student writers speak directly to the pharmacy community, in a voice that further empowers the words they convey.



**@ Richa Tamakuwala**

**6th Year, STJ; Staff Editor**

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



## RHO CHI POST: TEAM MEMBERS



**@ Jeremy Mesias**  
**6th 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



**@ Tolulope Omisakin**  
**6th 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.



**@ Anjali Rana**  
**3rd Year, STJ; Staff Writer**

My desire to learn about medicine and its effect on the human body began with a nebulizer. I had asthma as a young girl. At the age of ten, the vaporous gases from the pump never ceased to amaze me. My sickness, although unfortunate, fueled my interest in the functions, limitations, and exploitations of drugs. I have always had a passion for advocating for change and believe the Rho Chi Post adds great value to the community. As the world grows and develops each individual has an opportunity to express their thoughts on its development. Having the chance to become a Staff Writer provides me an opportunity to learn information about my peers to better assess the nature of their situation. When people begin discussing concepts at a younger age, they are able to influence people of their generation to care more about their own health. Combining concepts learned from pharmacy school with the mission to help those in need will create a stronger foundation for future healthcare professionals.



**@ Preethi Samuel**  
**Graduate, 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.



**@ Erica Tonti**  
**6th 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.



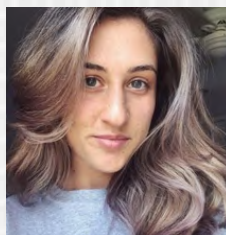
**@ Lyana Sayilar**  
**6th Year, STJ; Staff Writer**

I am thankful for the opportunity Rho Chi Post provides by engaging students, pharmacists, and faculty to learn from each other and spark new ideas, thoughts, and interests. The pharmacy profession is an ongoing and lifelong learning path and Rho Chi Post emphasizes and mirrors the importance of learning to provide pharmacists at our current jobs and patients in the future with recent information to improve patient care and outcomes. With the help of Rho Chi Post we can practice analyzing the literature that we read to improve our decision-making skills and communicate our findings with other members of the healthcare team.



**@ Arya Firoozan**  
**5th Year, STJ; Staff Writer**

Joining the Rho Chi Post is an opportunity to remain updated with new advancements in the science of pharmacy. The Post provides students with a platform to present the rest of the student body with interesting articles regarding new medications and important changes in the field. Keeping up with new developments and innovations is key to becoming a capable pharmacist. I am quite excited to join a team that is a voice of research and knowledge and look forward to contributing in a way that will benefit the pharmacy community.



**@ Dana Weinstein**  
**6th 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.

## RHO CHI POST: TEAM MEMBERS



**@ Nishanth Viswanath**

**6th 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.



**@ Edwin Gruda**

**6th 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 en-



## 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