

RHO_{Rx}CHI

post

VOLUME 3, ISSUE 8

- IN THE NEWS / POLITICS
- LOCAL EVENTS
- CLINICAL ARTICLES
- PROFESSIONAL ADVICE / OPINIONS
- PUZZLES
- CURRENT EDITORIAL TEAM

A STUDENT-OPERATED NEWSLETTER BY THE
ST. JOHN'S UNIVERSITY COLLEGE OF PHARMACY AND HEALTH SCIENCES' RHO CHI BETA DELTA CHAPTER

Inside This Issue

Pressure Ulcer Wounds	1
Prostate Cancer Screening	4
Rho Chi Annual Meeting	6
Brown Bag Event	7
Clinical Corner	12
Trivia Questions	18
Asking Questions	19
Crossword Puzzle	20
Look Alike Sound Alike	21
Puzzle Answers	22
Editorial Team	23
Upcoming Events	25
About Us	25

The Use of Topical Opioid Treatment for Pressure Ulcer Wounds

By: Katharine Cimmino, Editor-in-Chief

Pressure ulcers can be a painful condition decreasing the quality of life of patients and prolonging hospital stays.¹ About 10% of hospital inpatients and 26% of hospice admissions have pressure sores.² Pressure ulcers are injuries that occur when pressure is applied for prolonged periods of time over bony prominences.¹ There are many factors that play into the development of pressure ulcers including the pressure applied to the area, the lack of oxygen being supplied to the tissue, shear force applied to a patient, friction to superficial skin, moisture (mostly from perspiration, feces, or urine), immobility, incontinence, circulatory factors, nutritional status, neurologic disease, and more.³ The severity of the pressure ulcer can range from redness of the skin to deep ulcers that extend to the bone. While the best relief would come from a completely healed ulcer, this can be a slow process and may not always be achievable, especially in a palliative care setting.² Since this condition is mainly prevalent in the elderly and critically ill, therapy should be tailored that provides the most pain relief with the least amount of side effects. Because of this, topical morphine can be considered a good pharmacologic option for patients who suffer from pressure ulcer wounds. Opioid receptors are generally found in the central nervous system, however after inflammation, they can be found in normal tissues in the nerve terminals.^{2, 4-5}

[Continue on Page 10](#)

Single Line Stories

-Congratulations to the Class of 2014!-

- Follow us on Twitter @ RhoChiPost and on Facebook: FB.com/RhoChiPost -

FDA Approves Drug Elosulfase Alfa (Vimizim™) for Mucopolysaccharidosis (MPS IVA)

By: Erica Dimitropoulos Co-Copy Editor [Content- Focused]

On February 14, 2014, elosulfase alfa (Vimizim™) became an FDA-approved enzyme replacement therapy for Morquio A Syndrome, a type of mucopolysaccharidosis (MPS IVA).¹ Elosulfase alfa was granted priority review and was also the first drug to receive the Rare Pediatric Disease Priority Review Voucher that motivates the development of new drugs for the treatment of rare pediatric diseases.¹

Mucopolysaccharidosis type IV is an autosomal recessive disease that affects approximately 1 in every 200,000 individuals and typically appears within the first three years of life.^{2,3} Early physical signs often manifest as kyphoscoliosis (abnormal curvature of the spine), genu valgum (knock-knee), and pectus carinatum (pigeon chest).² Generally, diagnosis is made by physical and ophthalmologic examinations, skeletal radiographs, and urine glycosaminoglycan (GAG) analysis. Confirmation of suspected disease is provided by genetic assay.² Prognosis upon diagnosis is contingent upon severity, as those with milder forms can live into adulthood, while more severe cases may terminate in adolescence.³ The average lifespan of patients living with MPS IV is 40 years.⁴

Mucopolysaccharidosis is a storage disorder caused by the deficiency of lysosomal enzymes.⁴ There are many different types of mucopolysaccharidosis and there are two subtypes of MPS IV: Type A and Type B. One cannot determine the type of MPS IV based on symptomatology. Type A is caused by a mutation in the N-acetylgalactosamine-6-sulfatase (GALNS) gene, and type B by that of the beta-galactosidase (GLB1) gene. These genes are both responsible for the coding of enzymes that break down glycosaminoglycans (GAGs), originally referred to as mucopolysaccharides.³ Without the necessary enzymes coded by these genes, GAG substrates, namely keratan sulfate (KS) and chondroitin-6-sulfate (C6S), accumulate in

the lysosomes of cells of tissues and organs, especially bones, and cause damage.^{5,6}

Patients with MPS IV often experience abnormalities of the ribs, chest, spine, hips, and wrists.³ Some joints may be restricted, while others may be overly flexible or hypermobile. Stunted growth, dwarfism, bone deformities, and gait abnormalities are all part of this disease process. As a result, movement becomes very difficult and patients are frequently confined to a wheelchair as early as their teens.⁶ Furthermore, the odontoid process can be underdeveloped and cause improper alignment of cervical vertebrae, compression of the spinal cord, paralysis, or even death.³ Other complications include vision loss due to clouding of the cornea, frequent ear and upper respiratory infections, hearing loss, thinning tooth enamel, abnormalities of the heart, and hepatomegaly.^{3,6}

Elcosulfase alfa (Vimizim™) replaces the missing GALNS gene in patients with MPS IVA. When the mannose-6-phosphate-terminated oligosaccharide chains of elosulfase alfa bind to mannose-6-phosphate receptors, the drug is taken up into the lysosomes of the cell where it can perform its catabolic actions, namely the breakdown of GAGs KS and C6S.⁴⁻⁶

Elcosulfase alfa is an intravenous infusion dosed at 2 mg/kg and infused over 3.5 to 4.5 hours once weekly.⁵ It is a purified human enzyme formulated via recombinant DNA technology in a Chinese hamster ovary cell line.⁵ As a result, anaphylaxis and hypersensitivity reactions can occur. Patients with febrile or respiratory illnesses may be at a higher risk of developing these reactions and must therefore be evaluated prior to administration.⁵ Also, because sleep apnea is common among patients with MPS IVA, evaluation of airway patency should be performed before initiating the infusion. The use of oxygen supplementation or continuous positive airway pressure in patients with sleep apnea should be noted so that these treatments may be

Mucopolysaccharidosis type IV is an autosomal recessive disease that affects approximately 1 in every 200,000 individuals and typically appears within the first three years of life.

available during the infusion if needed.⁵ The last warning and precaution associated with this medication addresses those with spinal or cervical cord compression. Spinal or cervical cord compression is a serious complication of MPS IV, and patients must be monitored for signs and symptoms such as back pain, urinary and fecal incontinence, and paralysis. However, these complications can occur as a natural progression of MPS IV, and were seen in patients on elcosulfase alfa and patients taking placebo.⁵ Other common and less serious side effects include nausea and vomiting, headache, pyrexia and chills, abdominal pain, and fatigue.^{5,6} To attenuate the possibility of hypersensitivity reactions and side effects, pretreatment with an antihistamine with or without an antipyretic is recommended.⁵

The safety and efficacy of elcosulfase alfa were assessed over 24 weeks in a randomized, double-blind, placebo-controlled trial of 176 patients living with MPS IVA.⁷ Efficacy was shown using a primary endpoint of change in six-minute walking distance after 24 weeks. Patients receiving elcosulfase alfa were able to walk an average of 22.5 meters longer during that time compared to patients on placebo, a statistically significant difference.⁷ While this translates into improved symptomatology, it does not yet say anything regarding long term prognosis, effect on skeletal and non-skeletal features, or anticipated life-span.² Also, statistical significance was not reached in other parameters such as three minute stair climb, measures of respiratory function, or results of a health assessment questionnaire.⁶ Further trials and extension studies based on different patient populations are currently in progress.⁶

Prior to the approval of elcosulfase alfa (VimizimTM), no treatment options existed for patients living with MPS IVA.⁷ Supportive care was the mainstay of therapy, including nonsteroidal anti-inflammatory drugs (NSAIDs) for joint pain, antibiotics for pulmonary infections, and oxygen supplementations when necessary.⁴ Surgical interventions were also often required to aid patient's mobility and improve quality of life.⁴ As said by Jean-Jacques Bienaime, Chief Executive Officer of the developers of VimizimTM, Biomarin, "VimizimTM is the first and only therapy designed to address the condition [MPS IVA] at the cellular level, fulfilling a large unmet medical need for patients and their families."⁷ While no true

cure yet exists, many patients and healthcare providers are hopeful that this drug may open doors to the development of treatments for other types of mucopolysaccharidosis and similar orphan diseases.

Sources:

1. Fisher, A. FDA approves VimizimTM to treat rare congenital enzyme disorder. *US Food and Drug Administration*. February 11, 2014 <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm386008.htm>. Accessed April 4, 2014.
2. Regier DS, Oetgen M, Tanpaiboon P. Mucopolysaccharidosis Type IVA. *GeneReviews*[Internet]. March 13, 2014 <http://www.ncbi.nlm.nih.gov/jerome.stjohns.edu:81/books/NBK148668/>. Accessed April 12, 2014.
3. Mucopolysaccharidosis Type IV. *Genetics Home Reference*. April 17, 2014. <http://ghr.nlm.nih.gov/condition/mucopolysaccharidosis-type-iv>. Accessed April 19, 2014.
4. Endocrinologic and metabolic Drugs Advisory Committee. VimizimTM for the treatment of Mucopolysaccharidosis Type IVA (Morquio A Syndrome). *Biomarin*. November 19, 2013. <http://www.fda.gov/downloads/AdvisoryCommittees/CommitteesMeetingMaterials/Drugs/EndocrinologicandMetabolicDrugsAdvisoryCommittee/UCM375127.pdf>. Accessed April 4, 2014.
5. VIMIZIMTM [package insert]. Novato, CA: Bi-oMarin Pharmaceutical Inc; 2014.
6. Sanford, M. Elosulfase alfa: First Global Approval. *Adis R&D, Insight*. April 4, 2014. http://download.springer.com/jerome.stjohns.edu:81/static/pdf/845/art%253A10.1007%252Fs40265-014-0210-z.pdf?au-th66=1398204573_54501039a9d86929c437ff11d59c104c&ext=.pdf. Accessed April 19, 2014.
7. McCarty, T. BioMarin Announces FDA Approval for VIMIZIMTM (elosulfase alfa) for the Treatment of Patients With Morquio A Syndrome. *Biomarin*. February 14, 2014. <http://investors.bmrn.com/releasedetail.cfm?ReleaseID=825970> Accessed April 19, 2014.

Possible New Prostate Cancer Screening

By: Fatema Elias, Staff Editor

Prostate cancer occurs when abnormal cells form in the tissues of the prostate gland. It often develops in men over the age of 50, and the numbers of estimated new cases and of deaths from prostate cancer in the United States in 2013 are 238,590 and 29,720, respectively.¹

Screening is a form of primary prevention for prostate cancer. Finding abnormal tissue as soon as it is formed allows for easier and more variable treatment options. The American Cancer Society (ACS) recommends that men discuss with their doctors whether or not they choose to be screened for prostate cancer. High risk groups include 50-year-old men at average risk of prostate cancer who are expected to live 10 more years, 40-year-old men at high risk of prostate cancer, African American men who have a first-degree relative with prostate cancer before age 65, or 40-year-old men at higher risk due to having more than one first-degree relative with prostate cancer before age 65.² Patients are currently screened using the Prostate Specific Antigen blood test, the Digital Rectal Examination and the Gleason score.² Once the results of prostate cancer screening come back positive, further testing, such as biopsy, is done to evaluate patient specific treatment.

Although screenings can detect the presence of cancer, there has been no way to detect how aggressive a cancer is until now. For example, it may be a slow growing tumor that could not be of any harm, or a tumor that needs priority attention due to its aggressiveness.³ Without a test to detect the prognosis of this cancer, men may take medication or undergo treatments that could have otherwise been avoided. Overdiagnosis and overtreatment are common and result in treatment-related detriment.⁴

A new prostate cancer screening, the Prolaris® test, is a genetic test that can distinguish between aggressive and gradual cancers.⁵ This test utilizes an expression signature that determines the relationship between the genes that are involved in cell cycle progression (CCP) and prostate cancer. The expres-

sion signature is made of 31 cell cycle progression genes and 15 housekeeper genes.⁶ The test measures the level of expression of the 31 genes that are involved in proliferation of cancer cells and therefore detects how quickly the cells are dividing and spreading. Two people with the same PSA level and Gleason score may not receive the same result from the Prolaris® screening test, and therefore would require different treatment regimens than otherwise thought.⁵ A low score tells the physician that they can likely delay treatment if necessary, whereas a high score indicates that doctors should talk to their patients about aggressive management. Prostate cancer, like all cancers, is distressing, and so being able to predict the likelihood of it spreading to other parts of the body is important. With this new test, more men will be appropriately diagnosed, fewer men will receive unnecessary treatment and its result-

ing side effects, and those men who need immediate attention due to rapid growth will receive it.

The research that led to the development of this test included five retrospective

studies. The Prolaris® score was tested at diagnosis in two patient population cohorts (n=337 and n=349), after radical prostatectomy in two cohorts (n=366 and n= 413), and after external beam radiation therapy in the last cohort (n=141).⁶ The five cohort studies were assessed through the CCP signature.⁶ The retrospective studies shows the Prolaris® test proved to be significant in being a strong predictor for prognosis of prostate cancer. The Prolaris® score ultimately demonstrates statistical significance when testing biochemical recurrence (BCR) and multivariate analysis with p=0.0017 and p=0.034 respectively.⁶ The study demonstrates the clinical significance in multiple patient populations in diverse clinical settings.

This new screening test may spare men from needing operations. Though the impact of the novel test developed is being studied prospectively in clinical utility studies, the data seems promising.⁷ Professor Dan Berney of the Queen Mary University of

Although screenings can detect the presence of cancer, there has been no way to detect how aggressive a cancer is until now.

London says, "We need to validate it and we're not there yet, but it is the strongest test we've had so far."⁸ If this test can allow us to determine how far the prostate cancer has progressed, one of the biggest challenges in treating this cancer will be tackled—determining whether surgery is necessary to remove the prostate completely. Currently, the decision to remove the prostate is based on an examination of a tumor sample under the microscope. ProLairs[®] will also allow doctors to effectively monitor patients and provide appropriate medication therapy based on the patient's needs.

Prolaris[®] offers meaningful prognosis data for patients diagnosed with prostate cancer. This novel screening test provides doctors with an effective way to manage their patients' conditions.

SOURCES:

1. Prostate cancer. National Cancer Institute Website. <http://www.cancer.gov/cancertopics/types/prostate> Updated March 1, 2014. Accessed April 30, 2014.
2. American Cancer Society recommendations for prostate cancer early detection. American Cancer Society Website. <http://www.cancer.org/cancer/prostatecancer/moreinformation/prostatecancerearlydetection/prostate-cancer-early-detection-ac-s-recommendations> Published August 28, 2013. Updated February 25, 2014. April 30, 2014..
3. 'False positive' concern over prostate cancer test. BBC News Health. <http://news.bbc.co.uk/2/hi/health/8448147.stm> Published January 11, 2010. Accessed April 30, 2014.
4. Ilic D, Neuberger MM, Djulbegovic M, Dahm P. Screening for prostate cancer. Cochrane Database of Systematic Reviews 2013, Issue 1. <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0012972/> Published January 21, 2013. April 30, 2014.
5. The prolaris test: move forward with confidence. The Prolaris Test Website. <http://www.prolaris.com/information-for-patients/about-prolaris/> Updated March 1, 2014. Accessed April 30, 2014.
6. Berney D, Brawer M, Cooperberg M, Swanson G, Freeland S. CCP Score: A novel genetic test for prostate cancer. 2013 NCRI Cancer Conference Website. <http://conference.ncri.org.uk/abstracts/2013/abstracts/LB4.htm> Updated February 17, 2014. Accessed April 30, 2014.
7. Prostate cancer; myriad's prolaris significantly modifies treatment decisions for prostate cancer patients. *Medical Devices & Surgical Technology Week*. 2014;179. <http://search.proquest.com/docview/1494416822?accountid=14068>. Published February 16, 2014. Accessed April 30, 2014.
8. Gallagher J. Prostate cancer aggression test 'may avoid needless ops'. BBC News Health. <http://www.bbc.com/news/health-24805626> Published November 4, 2013. Accessed April 30, 2014.

Remember, you do not have to be a member of the Rho Chi Honors Society to write for the Rho Chi Post.

Got something interesting to say?

**Want to publish your poster presentation? Want to review a
new drug on the market?**

Then write to us at **RhoChiPost@gmail.com**

Visit our website:

<http://rhochistj.org/RhoChiPost/Topics/>

Rho Chi Society's 90th Annual Meeting: Keynote Address

By: Fawad Piracha, PharmD Candidate c/o 2016

Rho Chi Society held its 90th annual meeting on Sunday, March 30, 2014 at the Hyatt Regency Orlando, paralleling the American Pharmacists Association (APhA) 2014 Annual Meeting and Exposition that took place the same weekend. In attendance were delegates and advisors of Rho Chi chapters from pharmacy schools spanning every region of the United States. The Beta Delta Chapter, St. John's University's chartered establishment, was represented by Dr. Zito, the faculty advisor of the chapter and the Auditing Committee chair of Rho Chi Society, along with the newly elected chapter executive board. In addition to national reports, an awards reception, and a formal election—all of which are common practices in Rho Chi annual meetings—a keynote address was given by a noteworthy affiliate of the Rho Chi Society community, Dr. William E. Evans.

Dr. Evans is an esteemed pharmacist and leader. He serves as the Director and Chief Executive Officer of St. Jude Children's Research Hospital (SJCRH), and is the professor of pediatrics and pharmacy at the University of Tennessee Colleges of Medicine and Pharmacy. An author of many publications, he is a recipient of several notable accolades from entities that include the National Cancer Institute (NCI) and The Institute of Medicine of the National Academy of Sciences. Under his direction, SJCRH was ranked #1 children's cancer hospital by *Parent Magazine* (2009) and *US News and World Report* (2010). Dr. Evans lecture was as rousing as it was memorable.

As Rho Chi Society values excellence in intellectual achievement, Dr. Evans discussed attributes and skill sets that are manifest in intellectual leaders. According to Dr. Evans, leaders such as Kenneth Chenault and Jamie Dimon substantiate this principle. A heightened emotional or executional quotient (EQ) is discernable in leaders of this caliber. EQ is a measure of one's general functionality and social skill sets; it is a broad concept. Dr. Evans defined EQ as "the desire to get things done." While IQ had long been the social standard in measuring one's potential success, Dr. Evans vied that EQ is more important than IQ in this regard. Dr. Evans continued his talk by

discussing additional attributes of successful groups of people.

A superiority complex, insecurity, and impulse control are three traits of successful individuals, according to Dr. Evans. Such qualities lead to a balanced approach in the development of sound processes and the execution thereof. Dr. Evans simplified the complexity of leading the operations of a mammoth entity like SJCRH. He likened operating a billion dollar enterprise to operating a million dollar business but with "three extra zeroes." In principle, according to Dr. Evans, the method is the same: to develop a strategy, to execute a strategy, and to measure progress.

A great deal of time was spent highlighting the significance of having a sound team. As a CEO, Dr. Evans mentioned how he had the opportunity to surround himself with talented individuals. He stressed the importance of building a management team of "smart, committed people with complementary skills," rather than hiring friends and the like. Furthermore, a team must have an invigorating culture, as "culture trumps strategy." In other words, the true values and nature of the entity that is represented is far more important than any operational strategy, as this influences individuals and teams ubiquitously. Dr. Evans concluded his talk with practical advice and a brief summary and interpretation of the context of his findings.

Dr. Evans makes clear that one's degree should not limit an individual from becoming a leader in any capacity; it should not define his or her leadership boundaries. Furthermore, he mentioned that one does not need an MD, an MBA, or an MHA designation to lead. Instead, what is needed is "a good amount of EQ and IQ, and the right amount of EQ and IQ." He concluded his talk by stating that being a part of an institution that provides vast opportunities for those with different backgrounds is very important. For instance, the institution that Dr. Evans leads was accepting of a pharmacist being the CEO, unlike some others that would not be open to the idea.

Rho Chi Society is a growing entity. The vast attendance at the annual meeting and the approval to

open several new chapters in different schools of pharmacy highlight the expansionary phase of the organization at present. Furthermore, projects, affiliations, and recognition by various entities have led to the growing prominence of Rho Chi Society. Dr. Evans' lecture will indeed contribute to the intellectual and professional growth of members who were

present at the meeting. And as a past executive board member of a Rho Chi Society chapter during pharmacy school, Dr. Evans raises hope in Rho Chi Society members and others who were impacted by his speech at the meeting.



Left to Right: Anthony Nania, Tyler Valente, Tasnima Nabi, Dr. Zito, Joshua Bliss, Fawad Piracha

Brown-Bag Event

By: Hayeon Na, Co-Copy Editor (Content Focused)

On February 26th, 2014, pharmacists, clinical faculty, and pharmacy students from St. John's University College of Pharmacy and Health Sciences gathered at the Freeport Memorial Library for a "Brown Bag," one of the yearly calendar events at the public library. This event was conducted through the joint efforts of Ilene Corina who is the president of Pulse of New York, a patient advocate group, and Dr. Manouchkathe Cassagnol PharmD, CGP, BCPS, who is an Associate Clinical Professor at St. John's University. In previous years, many members of the community attended the brown bag events which featured various clinical pharmacy faculty providing free medication reviews. This year's event was special because the members of the community had actively lobbied for the event, and there was a Drug Information specialist and clinical faculty, Dr. Nicole Maisch PharmD, who is an Associate Clinical Professor at St. John's University. Other clinical pharmacy faculty from St. John's University that participated were Maha Saad, PharmD, BCPS, CGP,

Nissa Mazzola, PharmD, CDE, and Michele Pisano-Krukowski, PharmD, CGP.

A brown bag event is one of the many ways in which pharmacists can reach out to the community to improve the quality of patient care. Members of the community bring in their medications (or a list) and are given the opportunity to ask pharmacists any questions they may have. Pharmacists and pharmacy interns also review and provide information about the prescription or over-the-counter medications, dietary supplements, and lifestyle choices. This way, Pharmacists can evaluate the appropriateness of medication regimens and make recommendations that impact the attendees' daily lives.

Poly-pharmacy—the use of more than one medication by a patient—is likely the result of having multiple doctors who have an incomplete list of patients' medications, and is becoming more commonplace. On top of that, patients often also add vitamins and dietary supplements to their laundry list of medications. An event like this is important to prevent

dangerous drug-drug, drug-food, or drug-supplement interactions. Having a clear grasp of the medications and supplements one uses and the consequences of lifestyle choices (e.g. diet and exercise, or no coffee after 2PM) helps them take better control of their health and disease states. This kind of preventative care and medication review can save money for the patients and the insurance companies, and can also help keep the overall health costs down.

When the event began at 10 AM, there was an air of excitement as patrons piled in. They came in with bags of prescription bottles and dietary supplements in hand patiently waited for their turn. Many had only one or two prescription medications and over-the-counter medications, but took numerous die-

tary supplements. Some of the most popular counseling points were how to differentiate between reliable and unreliable drug information sources and what non-pharmacological changes could be made before initiating drug therapy. Through interventions such as these, pharmacists are often able to save the patients from the burden (e.g. economic burden, pill burden) that comes with poly-pharmacy and to enable the patients to make informed decisions regarding over-the-counter products and non-FDA regulated dietary supplements. After a session, updated medication lists along with a weekly pill organizer were given out to help improve adherence. The event came to a close around 2PM, and many community members left, happy with the service that was provided by the pharmacists.



A Pharmacist (middle: Khilna Patel, Pharm.D, North Shore University Hospital) and St. John's students (from left: Sebastian Choi, James Ghabour) talk with patients



A Pharmacist (middle: John Bellilo, RPh) and St. John's students (from left: Thomas Kim, Zhong Lin) counsel patients on their medications

The Use of Topical Opioid Treatment for Pressure Ulcer Wounds Continued

By: Katharine Cimmino, Editor-in-Chief

One study examined six hospice patients with their treatment of ulcers, averaging a size of 12.8 cm². In a randomized order, the patients were either given morphine sulfate 10 mg in intrasite gelTM or morphine sulfate 10 mg subcutaneous over 4 hours. In this crossover study, each drug was given at least 48 hours apart. Afterwards morphine and its metabolites (morphine-6-glucuronide (M6G) and morphine-3-glucuronide (M3G)) were measured. This study showed that when using the topical formulation, morphine, M3G, and M6G were only detectable in 1 out of 6 patients; however, that patient had the largest ulcer size (60 cm²). In this patient, the calculated morphine and M6G bioavailability was approximately 20%. It should be noted that the patient's bioavailability is still relatively small and the side effects should therefore be negligible. In addition, neither the patients nor the nursing staff reported adverse effects, local or systemic.⁶ If the wound has a large surface area, the study concludes that the absorption of morphine is not significant enough to potentiate systemic side effects.

Many case reports state how patients are admitted to the hospital due to inadequate pain control from oral opioids when they have pressure ulcers. After therapy of topical morphine gel these patients are able to resume functions of daily living such as feeding or bathing. In addition, they report a decrease in pain and most patients even decrease their dose of oral opioids.^{4,7,8} Twillman et al reported eight out of nine patients had a reduction in pain. Most morphine intrasite gelTM compounds are made with a 0.1% w/w composition with the recommendation to start the application twice a day.⁴ Back and Finlay reported that after application of diamorphine intrasite gelTM, pain relief was achieved in three of their morphine patients, no deterioration occurred to the area of application, and one patient continued treatment for over 2 months.⁷ Porzio G, Aielli F, Verna L, et al reported five patients who were uncontrolled on systemic opioids, and after being given 10 mg in 8 g intrasite gelTM (0.125% w/w) three times a day, patients reported prompt relief that was maintained throughout the stay. Prior to the application the ulcers were washed with lactated

ringers and metronidazole solution.⁸ The critical review by Graham T, Grocott P, Probst S, et al examined 27 articles, both controlled studies and case reports, which included 170 patients. Most importantly, pain relief was achieved with topical opioids for patients who had pressure or malignant wounds.⁹ Overall, the use of topical morphine is a very common practice; it yields good pain relief for ulcer wounds without the systemic side effects of nausea, constipation, drowsiness, and sedation.

Very few trials have been conducted on the use of topical opioids in pressure ulcers. However, after the success stories of individual case studies, a randomized, double-blind, placebo-controlled crossover trial was conducted at the St. Christopher's Hospice inpatient unit in the United Kingdom. This study entered 13 patients who had Stage II or Stage III pressure ulcers (which meant that the skin had been affected, but the damage had not yet spread to the bone), of which only seven patients completed the trial. Diamorphine gel (a 0.1% w/w composition containing diamorphine as the active ingredient and intrasite gelTM as the base) was compared to the placebo or just intrasite gelTM.¹⁰ In the UK, diamorphine (also known as heroin) can be legally used for severe pain associated with surgical procedures, pain in the terminally ill, myocardial infarction, and for the relief of dyspnea in acute pulmonary edema.¹¹ In the study, gels were applied once daily and covered with a dressing. Pain was measured using a standardized score. The pain scores that were counted were those that had at least a 2-day washout period to ensure that the active diamorphine gel never influenced the placebo. Pain scores improved significantly in the diamorphine group compared to baseline both after 1 hour ($P = 0.003$) and after 12 hours ($P = 0.005$). No statistical significance was found in the placebo group. The most common side effects were pruritus and skin irritation. One to two patients experience systemic side effects of drowsiness, hallucinations, and nightmares, however it should be noted that their fentanyl dose was changed and the side effects were most likely attributed to this factor. In addition, all patients were receiving some form of oral opioid medicine and non

-steroidal anti-inflammatory medication (NSAIDs).¹⁰ Although this study did not examine morphine gel directly, few controlled trials are conducted using topical opioid creams because these drugs must be compounded. Based upon the case reports, the results from this trial can be extrapolated so that morphine gel can be safely and effectively used in patients with pressure ulcers wounds who do not receive adequate pain control on their conventional regimen.

In another pilot study, the effects of topical morphine were assessed in patients with painful ulcers in a randomized, double-blind, placebo-controlled crossover study where five patients were treated with either 10 mg of morphine sulfate or placebo for two days with a two day wash-out period. Most patients were on scheduled opioid treatment for pain. No local adverse effects could be attributed specifically to morphine. The study found that patients found more relief with topical morphine compared to placebo.²

While the case reports and both of these studies show the efficacy of topical morphine, further studies need to be conducted before clinical guidelines are made. It should be noted that while both studies may be disposed to Type II error (or the error of being too small to detect a difference), significant pain scores were still achieved among patients in the study conducted by Flock.¹⁰ Others may argue that patients were receiving other drugs such as oral narcotics and NSAIDs which could also reduce their pain. While these medications may have reduced the patients' pain scores, the fact is that the placebo gel had little to no effect on the pain score of the patients. In addition, these patients already had uncontrolled pain levels while on oral narcotics, which is why other options were sought out.^{2, 10} Since the drug of choice for pressure ulcers seems to be morphine in a gel base, studies should be done to determine pharmacokinetic parameters such as onset of action, duration of action, absorption, etc... to better help determine dosing intervals and titration methods. In addition, long-term efficacy should be assessed. For now these factors are overlooked since the patient population being treated are general those with terminal conditions, in hospice, or the elderly.

It is also important to note that the side effects could be due to the gel base. Most of the studies and case reports used intrasite gelTM, a gel already commonly used in skin ulcer care management. Intra-

site gelTM is a pre-made gel containing water, propylene glycol, and carboxy methyl cellulose. This gel absorbs excess exudates to produce a moist environment around the wound area.⁶ Common side effects, most likely due to the gel, are local irritation and itching.^{2, 5}

Morphine is not commercially available in a topical gel formulation and must therefore be compounded. Although other opioids can be used, morphine is relatively inexpensive and available in liquid formulation making it easier to compound. Other narcotics such as methadone powder (when mixed with inert powder such as Stomahesive® powder)^{2, 5, 12} or diamorphine (however when mixed with intrasite gelTM has shown to degrade quicker⁶) have been used. Also, other bases such as metronidazole gel and silver sulfadiazine cream have been used.^{2, 5} Most practitioners prefer using morphine in the intrasite gelTM since it has the most evidence surrounding its use.

When prepared under sterile conditions, the morphine and intrasite gelTM combination is stable for up to 28 days, but when compounded under non-sterile conditions, it should not be used for more than 7 days due to concerns about infection control.^{2, 5}

The Journal of Supportive Oncology released a treatment algorithm that explains how to treat a patient with painful ulcers. The general approach is to start a patient on an "as needed" oral pain medication with or without long acting analgesics. Since skin ulcers are extremely painful, the patient either exhibits dose-limiting side effects or has uncontrolled pain which results in higher doses of the medication (and eventually is admitted to the hospital due to inadequate pain control). The next step is to add the morphine gel. It is recommended to apply a concentration of 10 mg morphine sulfate injection with 8g of neutral water-based gel (0.125% w/w) twice daily for Stage 2 – 3 ulcers. For Stage 4 ulcers, it is suggested to apply a concentration of 10 mg of morphine sulfate injection with 10g of neutral water-based gel (0.1% w/w) daily. The practitioner can titrate the gel by increasing the concentration of the mixture or increasing the dosing frequency. It is recommended to titrate up to 10 mg of morphine sulfate injection with 5g of a neutral water-based gel (0.2% w/w) two to three times a day.⁵ The amount of gel depends on the size of the ulcer. It is important to irrigate the wound first before applying

the gel. Make sure enough of the gel is applied to cover the whole surface of the wound.¹³

Therefore, topical morphine can be a safe alternative in patients with pressure ulcers and it often has shown to provide more relief than systemic opioids. Although a larger trial should be conducted to determine clinical guidelines, topical morphine can be applied in a 0.1% w/w concentration two to three times a day under supervision until adequate pain relief is obtained. Proper wound care should always be practiced while applying the drug and changing the dressing. Since pressure ulcers are more prevalent in the bed-bound, hospice patient, and elderly, this drug is a good option. Topical opioids achieve greater pain relief, thus reducing the need for systemic opioids, which have the side effects of constipation, sedation, confusion, respiratory depression, and drowsiness.

SOURCES:

1. Berlowitz, D. Treatment of pressure ulcers. UpToDate web site. April 8, 2013. Accessed January 29, 2013. http://www.uptodate.com/contents/treatment-of-pressure-ulcers?source=search_result&search=pressure+ulcer&selectedTitle=1%7E115.
2. Zeppetella G, Paul J, Ribeiro MD. Analgesic efficacy of morphine applied topically to painful ulcers. *Journal of Pain and Symptom Management*. 2003; 25:555.
3. Berlowitz, D. Pressure ulcers: Epidemiology, pathogenesis, clinical manifestations, and staging. UpToDate web site. May 8, 2013. Accessed January 29, 2013. http://www.uptodate.com/contents/pressure-ulcers-epidemiology-pathogenesis-clinical-manifestations-and-staging?source=search_result&search=pressure+ulcer&selectedTitle=2%7E115.
4. Twillman R, Long T, Cathers C, Mueller D. Treatment of painful skin ulcers with topical opioids. *Journal of Pain and Symptom Management*. 1999; 17 (4): 288- 292
5. Quy T, Fancher T. Achieving analgesia for painful ulcers using topically applied morphine gel. *The Journal of Supportive Oncology*. 2007; 5 (6): 289-293.
6. Ribeiro M, Joel S, Zeppetell G. The bioavailability of morphine applied topically to cutaneous ulcers. *Journal of Pain and Symptom Management* 2004; 27 (5): 434-439
7. Back I, Finlay I. Letter: Analgesic effect of topical opioids painful skin ulcers. *Journal of Pain and Symptom Management*. 1995; 10 (7): 493
8. Porzio G, Aielli F, Verna L, et al. Letters: Topical morphine in the treatment of painful ulcers. *Journal of Pain and Symptom Management*. 2005; 30 (4): 304-305
9. Graham T, Grocott P, Probst S, et al. How are topical opioids used to manage painful cutaneous lesions in palliative care? A critical review. *Pain*. 2013; 154 (10): 1920-1928.
10. Flock P. Pilot study to determine the effectiveness of diamorphine gel to control pressure ulcer pain. *Journal of Pain and Symptom Management*. 2003; 25:547.
11. Diamorphine HCl [package insert]. Maidenhead, UK: ViroPharma; 2014. <http://www.medicines.org.uk/emc/medicine/28259/SPC/>
12. Gallagher R, Arndt D, Hunt K. Analgesic effects of topical methadone. *Clinical Journal of Pain*. 2005; 21 (2): 190-192
13. Gallagher R. Management of painful wounds in advanced disease. *Can Fam Physician*. 2010;56 (9):883-5, e315-7.

For updates like our Facebook page:

<https://www.facebook.com/RhoChiPost>

RHO CHI POST CLINICAL CORNER

Asthma

Four Components of Care

By: Aleena Cherian, Co-Copy Editor (Graphics Focused) and Beatrisa Popovitz, Senior Staff Editor

1. ASSESSMENT AND MONITORING

Obtain lung function: Spirometry every 1-2 years

- Initial Assessment:
 - classify asthma severity
 - identify precipitating factors
 - identify co-morbid conditions
 - assess patient's knowledge and skills for self-management
- Periodic monitoring:
 - instruct patients to monitor asthma control in an ongoing manner & to recognize inadequate asthma control
 - monitor asthma periodically in clinical visits (may be variable over time)
 - assess asthma control, medication technique, written asthma plan, adherence, and patient concerns at every patient visit
 - use spirometry to obtain objective measures of lung function
 - consider measuring biomarkers (minimally invasive markers i.e. sputum eosinophils, Fractional exhaled Nitric Oxide in exhaled breath (FENO), exhaled breath condensate (EBC) analysis)

2. PATIENT EDUCATION

- Integrate at all points of care (clinical, ED, hospital, pharmacy, schools, community)
- Instructions for
 - Daily management (long term medication control, environmental control)
 - Managing worsening asthma (how to adjust medication, when to seek medical care)
- Patient self-management education
 - Self-monitoring to assess level of control and worsening symptoms (peak flow monitoring for patients with difficulty perceiving symptoms)
 - Written asthma action plan (long term controller vs. quick relief)
 - Proper medication use and inhaler techniques
- Avoidance of environmental factors that worsen asthma

3. ENVIRONMENTAL CONTROL

- Identify allergen and pollutant or irritant (tobacco smoke, pet dander, cockroach, dust-mites)
- Reduce exposure to allergens/pollutants
- Multifaceted approach (single interventions generally ineffective)
 - Effective dust-mite & cockroach control methods
 - (add on) indoor air-cleaning devices /HEPA filters
 - Use of humidifiers NOT recommended if patient is sensitive to dust mite/mold
- Subcutaneous allergen immunotherapy for patients with allergies when there are clear relationships between symptoms and allergen exposure (*treat anaphylaxis*)
- Treatment of co-morbid conditions
 - Allergic Bronchopulmonary Aspergillosis (ABPA)
 - Gastro Esophageal Reflux Disease (GERD)
 - Obesity/overweight
 - Obstructive sleep apnea
 - Rhinitis/sinusitis
 - Stress and depression
 - Inactivated influenza vaccine
 - Pneumonia vaccine for patients with persistent asthma

4. MEDICATION THERAPY

- Long term therapy (asthma maintenance, daily use to control persistent asthma)
- Quick relief therapy (treat acute symptoms and exacerbations, PRN use)

Reviewed by: Dr. C. Avena-Woods, Dr. T Jodlowski, Dr. N. Mazzola

LONG TERM THERAPY FOR ASTHMA MAINTENANCE

Inhaled Corticosteroids

Available products	Beclomethasone HFA Budesonide (DPI, nebulizer) Fluticasone (HFA) Fluticasone (HFA/MDI, DPI) Mometasone DPI Triamcinolone acetonide
Pharmacology	Block late-phase reaction to allergen, reduce airway hyperresponsiveness, and inhibit inflammatory cell migration and activation
Place in Therapy	Most potent and effective anti-inflammatory medication currently available (Evidence A). Preferred long term control therapy for all ages.
Warnings/Risks/ Toxicities	Use of low to medium dose ICS shown to have small impact on growth (~1cm during first year, with no progression over time). Use of high doses of ICS over long periods of time shown to cause subcapsular cataracts or reduced bone density <i>Toxicity:</i> Limited by aerosol application - candidal infection, vocal cord changes

Oral Corticosteroids

Available products	Methylprednisolone Prednisolone Prednisone
Pharmacology	Block late-phase reaction to allergen, reduce airway hyperresponsiveness, and inhibit inflammatory cell migration and activation
Place in Therapy	* Short courses often used to gain prompt control of the disease when initiating long-term therapy * long-term use - for severe persistent asthma
Warnings/Risks/ Toxicities	<i>Toxicity:</i> multiple, including: immune suppression, weight gain (side effect), hyperglycemia

Long acting β -adrenergic agonists

Available products	Salmeterol Formoterol
Combination Medication(s)	Fluticasone/salmeterol (Advair®) Budesonide/formoterol (Symbicort®)
Pharmacology	Bronchodilators (duration of at least 12 hours of bronchodilation after a single dose)
Place in Therapy	Combination with ICS for long-term control and prevention of symptoms in mod-severe asthma (12yo+) May be used before exercise to prevent EIB (Evidence A)
Warnings/Risks/ Toxicities	Not to be used as monotherapy. Not for symptom relief or for acute exacerbations <i>Toxicity:</i> Tremor, tachycardia +overdose: arrhythmias BBW: increased risk of asthma-related deaths and severe asthma exacerbations Safety/efficacy not established in children under 4 years Duration of protection for EIB may decrease with regular chronic use

Leukotriene Modifiers

*Helpful if patient also has allergic rhinitis

Available products	Montelukast Zafirlukast	Zileuton
Pharmacology	Leukotriene D ₄ receptor antagonist: blocks airway response to exercise and antigen challenge	5-lipoxygenase pathway inhibitor-reduces synthesis of leukotrienes
Place in Therapy	Alternative, but not preferred therapy for the treatment of mild persistent asthma (Step 2 care)	For patients ≥ 12 years of age; alternative but not preferred adjunctive therapy in adults
Warnings/Risks/ Toxicities	montelukast (> 1 year of age) zafirlukast (≥ 7 years of age) Minimal toxicities Zafirlukast: take on empty stomach, monitor for hepatic dysfunction	Liver function monitoring is essential (ALT)

Mast Cell Stabilizers

*Note: must be used consistently and take time to work

Available products	Cromolyn Nedocromil
Pharmacology	Stabilize mast cells and interfere with chloride channel function, inhibiting inflammatory cell activation and preventing acute bronchospasm
Place in Therapy	Alternative, but not preferred for mild persistent asthma (Evidence A). Can also be used as preventive treatment prior to exercise or unavoidable exposure to known allergens
Warnings/Risks/ Toxicities	Cough <i>Toxicity:</i> Minimal toxicities since not absorbed, generally well tolerated

Methylxanthines

Available products	Sustained release theophylline
Pharmacology	Mild to moderate bronchodilator Mild anti-inflammatory effects
Place in Therapy	Alternative, not preferred adjunctive therapy
Warnings/Risks/ Toxicities	Monitor serum levels: concentration may be altered with food, metabolism, viral illnesses, age, and other concomitant medications Target serum concentration: 10-20 mcg/ml ADRs: CNS, tremors, seizures,

Immunomodulators

Available products	Omalizumab
Pharmacology	monoclonal antibody that prevents binding of IgE to the high-affinity receptors on basophils and mast cells; reduces frequency of exacerbations
Place in Therapy	adjunctive therapy for patients ≥ 12 years of age who have allergies and severe persistent asthma
Warnings/Risks/ Toxicities	<i>Toxicity:</i> injection site reaction and anaphylaxis (be prepared to identify and treat)

Reviewed by: Dr. C. Avena-Woods, Dr. T Jodlowski, Dr. N. Mazzola

QUICK RELIEF THERAPY FOR ASTHMA SYMPTOMS

treat acute symptoms and exacerbations (PRN use)

Short acting β -agonists

Available products	Albuterol (CFC, HFA, nebulizer solution) Levalbuterol(HFA, nebulizer solution) Pirbuterol (CFC)
Pharmacology	Bronchodilators that relax smooth muscle
Place in Therapy	Treatment of choice for relief of acute symptoms and prevention of EIB
Warnings/Risks/ Toxicities	Not recommended for long-term daily treatment <i>Toxicity:</i> Tremor, tachycardia, overdose: arrhythmias

Anticholinergics

*Note: used for rescue if patient is on non-specific Beta Blocker

Available products	Ipratropium bromide HFA Ipratropium with albuterol (Duoneb®)
Pharmacology	Inhibit muscarinic cholinergic receptors and reduce intrinsic vassal tone of the airway
Place in Therapy	Additive benefit to SABA in mod-severe exacerbation Alt. bronchodilator if SABA is not tolerated (*has not been compared)
Warnings/Risks/ Toxicities	Anticholinergic side effects, paradoxical bronchospasms, hypersensitivity

Oral systemic corticosteroids

Available products	Methylprednisone Prednisolone Prednisone Methylprednisolone acetate injection
Pharmacology	Block late-phase reaction to allergen, reduce airway hyperresponsiveness, and inhibit inflammatory cell migration and activation
Place in Therapy	in addition to SABA for mod-sev exacerbation to speed recovery and prevent recurrences
Warnings/Risks/ Toxicities	<i>Toxicity:</i> multiple

Reviewed by: Dr. C. Avena-Woods, Dr. T Jodlowski, Dr. N. Mazzola

COPD

Modifiable Risk Factors

Cigarette smoking
Occupational exposure
Outdoor air pollution
Pulmonary infections
Other airway related conditions

Non-modifiable Risk Factors

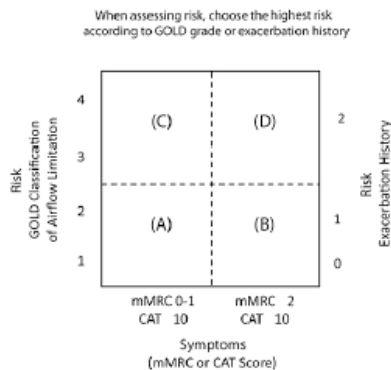
Genetics
Advanced age
Men
Family History of COPD
Impaired lung growth / Pre-existing decreased lung function

Symptoms

- Progressive and persistent dyspnea
- Chronic cough
- Chronic sputum production
- History of exposure to risk factors

Diagnosis

- Consider diagnosis for those over the age of 40 and with any of the above symptoms
- positive **spirometry test** required for diagnosis: measures amount of air a person can breathe out and the time taken to do so. $FEV_1/FVC < 0.7$ confirms presence of persistent airflow limitation and thus of COPD.



Patient Category	Characteristics	Spirometric Classification	Exacerbations Per Year	mMRC	CAT
A	Low Risk, Less Symptoms	GOLD 1-2	1	0-1	<10
B	Low Risk, More Symptoms	GOLD 1-2	1	2	10
C	High Risk, Less Symptoms	GOLD 3-4	2	0-1	<10
D	High Risk, More Symptoms	GOLD 3-4	2	2	10

Combined COPD Assessment

Using the Combined Assessment tool to identify patient's categorical COPD classification:

- Firstly, assess patient's symptoms with CAT scale (or dyspnea with mMRC) and determine if patient falls into the boxes on the left side or right side
LEFT → less symptoms (CAT < 10) or less breathlessness (mMRC grade 0-1)
RIGHT → more symptoms (CAT ≥ 10) or more breathlessness (mMRC grade ≥ 2).
- Next, assess risk of exacerbations by determining if patient falls into the lower (low risk) or upper (high risk) part of the box. There are three methods to do so.
 - 1) Determine GOLD grade of airflow limitation
 - 2) Assess number of exacerbations patient has had within the past 12 months: 0-1 (low risk), ≥ 2 (high risk)
 - 3) Determine whether or not patient has had ≥ 1 hospitalization within the past 12 months for COPD exacerbation

****note:** in some patients, the three methods will not yield the same level of risk and in such cases, risk should be determined by method indicating High Risk.

Treatment Of COPD

Combined assessment of COPD is based on:

- Symptoms (mMRC or CAT score)
- Classification of severity of airflow limitation
Based on post-bronchodilator FEV_1

In patients with $FEV_1/FVC < 0.7$

(forced expiratory volume in one second to forced vital capacity ration)

GOLD 1	Mild	$FEV_1 \geq 80\%$ predicted	(A) or (B)
GOLD 2	Moderate	$50\% \leq FEV_1 < 80\%$ predicted	
GOLD 3	Severe	$30\% \leq FEV_1 < 50\%$ predicted	(C) or (D)
GOLD 4	Very Severe	$FEV_1 < 30\%$ predicted	

- Exacerbations
- Comorbidities

Rubric determines pharmacologic therapy by stratifying risk

Reviewed by: Dr. C. Avena-Woods, Dr. T Jodlowski, Dr. N. Mazzola

Pharmacologic Therapy for Stable COPD (Gold Algorithm)

Patient Group	FIRST CHOICE	ALTERNATIVE CHOICE	OTHER POSSIBLE TREATMENT OPTIONS
A	SA anticholinergic prn Or SA β_2 agonist prn	LA anticholinergic Or LA β_2 agonist Or SA β_2 agonist + SA anticholinergic	Theophylline
B	LA anticholinergic or LA β_2 agonist *may also use have short acting agents PRN	LA anticholinergic + LA β_2 agonist	SA β_2 agonist and/or SA anticholinergic
C	ICS + LA β_2 agonist or LA anticholinergic *may also use have short acting agents PRN	LA anticholinergic + LA β_2 agonist	PDE4 inhibitor SA β_2 agonist and/or SA anticholinergic Theophylline
D	ICS + LA β_2 agonist or LA anticholinergic *may also use have short acting agents PRN	ICS and LA anticholinergic or ICS + LA β_2 agonist + LA anticholinergic or ICS + LA β_2 agonist + PDE4 inhibitor or LA anticholinergic + LA β_2 agonist or LA anticholinergic + PDE4 inhibitor	Carbocysteine SA β_2 agonist and/or SA anticholinergic Theophylline

Pharmacologic Management of COPD

BRONCHODILATORS	<p>Beta₂ agonists (short acting) Fenoterol (combination product only, in Duovent®*note: not available in USA) Levalbuterol, Albuterol Terbutaline Vilanterol (combination product only, in Breo Ellipta™ and in Anoro Ellipta™)</p> <p>Beta₂ agonists (long acting) Formoterol (Foradil®) Arformoterol (Brovana®) Indacaterol (Acrapta™ Neohaler™) Salmeterol (Servent® Diskus)</p> <p>Anticholinergics (short acting) Ipratropium (Atrovent®) (long acting) Tiotropium (Spiriva®)</p> <p>Methylxanthines Aminophylline Theophylline (SR)</p> <p>Combination Products Fenoterol/ipratropium (Duovent® UDV* not available in USA) Albuterol/ipratropium (Combivent Respimat®) Fluticasone/vilanterol (Breo Ellipta™) Umeclidinium and vilanterol (Anoro Ellipta™)</p>	<ul style="list-style-type: none"> •Inhaled therapy is preferred <ul style="list-style-type: none"> •Less systemic side effects •Long acting > short acting •Can consider beta₂ agonist (SA or LA) with anticholinergics if symptoms do not improve on single agent •symptom control •Methylxanthines <ul style="list-style-type: none"> •Less effective and more side effects •Modest bronchodilator and some symptomatic relief •Low dose theophylline reduces exacerbations •Theophylline can be considered in cases when other bronchodilators are unavailable
INHALED CORTICOSTEROIDS	<p>Beclomethasone (Beconase, Qnasl, QVAR) Budesonide (Entocort, Pulmicort, Rhinocort) Fluticasone (Flovent, Flonase)</p> <p>Combination Products Formoterol/budesonide (Symbicort®) Formoterol/mometasone (Dulera®) Salmeterol/fluticasone (Advair®)</p>	<ul style="list-style-type: none"> •Beneficial for COPD patients with FEV₁ <60% predicted •Long term monotherapy is not recommended •Combine inhaled corticosteroid with LA bronchodilator is recommended for patients with moderate to severe COPD (Patient group C & D) •May increase risk for pneumonia *Note: If stopped, also have a higher risk of exacerbation
PDE-4 INHBITORS	Roflumilast (Daliresp®) 500 mcg oral	Combination with ICS or LABA reduces exacerbations in GOLD 3 & 4 patients with a history of exacerbations and chronic bronchitis/severe airflow limitations not adequately controlled by long acting
VACCINES	<ul style="list-style-type: none"> •Influenza vaccine reduces risk for serious illness and death •Pneumococcal vaccine : although target population is ≥65, indicated and beneficial in patients younger. CDC recommends those between 2-64 yrs of age w/lung disease to receive the vaccine 	

Reviewed by: Dr. C. Avena-Woods, Dr. T Jodlowski, Dr. N. Mazzola

Treatment of COPD Exacerbations

Oxygen : Titrate supplemental oxygen to treat hypoxia until O2 saturation reaches 88-92%

Bronchodilators : Short acting beta2 agonists are preferred (inhaled>oral)

Systemic CS : Shortens recovery time and improves FEV1 and arterial hypoxemia in exacerbations

Prednisolone 30-40mg per day for 7-14 days**if >14 days, usually taper, if 7-14 days, sometimes taper

(available agents: Prednisone 50-60 mg oral, Methylprednisolone 4, 8, 16 mg oral)

*Recommended: Prednisone 40mg QD x 5 days

Antibiotics: Not recommended for exacerbations unless exacerbation is caused by a bacterial infection

- Only if symptomatic with all three cardinal symptoms of increased sputum purulence, increased dyspnea, increased sputum volume, OR at least two of the three with one being increased sputum purulence. Only if patient requires mechanical ventilation

Nonpharmacologic Management of COPD

- Smoking cessation
 - Counseling
 - Nicotine replacement therapy
- Smoking prevention
- Elimination or reduction of environmental contaminants
 - Recognize irritants and emphasize primary prevention
 - Occupational exposure
 - Air pollution

Physical activity (Beneficial to all COPD patients)

Reviewed by: Dr. C. Avena-Woods, Dr. T Jodlowski, Dr. N. Mazzola

References

- Barnes PJ. Chapter 36. Pulmonary Pharmacology. In: Chabner BA, Brunton LL, Knollmann BC, eds. *Goodman & Gilman's The Pharmacological Basis of Therapeutics*. 12nd ed. New York: McGraw-Hill; 2011. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease. Available at: http://www.goldcopd.org/uploads/users/files/GOLD_Report_2011_Feb21. Accessed January 22, 2013.
- WILLIAMS DM, Bourdet SV. Chapter 34. Chronic Obstructive Pulmonary Disease. In: Talbert RL, DiPiro JT, Matzke GR, Posey LM, Wells BG, Yee GC, eds. *Pharmacotherapy: A Pathophysiologic Approach*. 8th ed. New York: McGraw-Hill; 2011.
- Global Initiative for Chronic Obstructive Lung Disease (GOLD): Guide to COPD Diagnosis, Management and Prevention. 2013
- Global Initiative for Chronic Obstructive Lung Disease (GOLD): Guide to COPD Diagnosis, Management and Prevention. 2014
- National Asthma Education and Prevention Program. Expert Panel Report 3 (EPR3): Guidelines for the Diagnosis and Management of Asthma. 2007. National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health
- Van De Kant KD, Klaassen EM, Jobsis Q, et al. "Early Diagnosis of Asthma in Young Children by Using Non-invasive Biomarkers of Airway Inflammation and Early Lung Function Measurements: Study Protocol of a Case-control Study." *National Center for Biotechnology Information*. U.S. National Library of Medicine, 29 June 2009. Web. 12 May 2014.
- Hendeles PharmD, L., and Weinberger MD M. "Theophylline Use in Asthma." *UpToDate*. 4 Oct. 2013. Web. 12 May 2014. <http://www.uptodate-com.ezproxy.med.nyu.edu/contents/theophylline-use-in-asthma?source=search_result&search=theophylline&selectedTitle=5-150#H10..for serum conc>.

Now available at our NEWLY RE-DESIGNED website:

<http://rhochistj.org/RhoChiPost/>

Check out our new options under the "For Authors" tab:

To sign up for a topic visit <http://rhochistj.org/RhoChiPost/article-signup/> and click sign up.

If you want to write an article that is not on our topic list, suggest the topic by visiting <http://rhochistj.org/RhoChiPost/suggest-articles/>

BACK TO COVER

RHO CHI POST CLINICAL CORNER

CLINICAL

1. All of the following are inhaled corticosteroids used in the treatment of asthma except:

- Triamcinolone
- Mometasone
- Metaxalone
- Betamethasone
- Ciclesonide

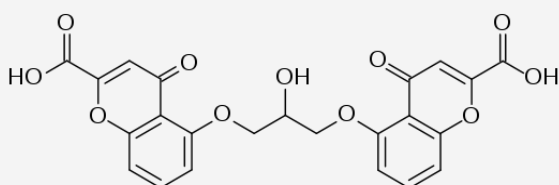
2. Which of the following asthma treatment medications has the potential to cause oral candidiasis?

- Albuterol
- Tiotropium
- Salmeterol
- Fluticasone
- Formoterol

3. Which of the following statements is true regarding the treatment of croup?

- Tea kettle steam can be used to relieve spasms
- After a child is given dexamethasone he/she must be monitored for 2 to 3 hours for a rebound effect causing increased obstruction
- Corticosteroids are given to decrease subglottic edema of laryngeal mucosa
 - I only
 - II only
 - I and III only
 - II and III only
 - I, II, and III

4. The following structure belongs to what class of asthma medication?



- Beta 2 adrenergic agonist
- Leukotriene modifier
- Corticosteroid
- Methylxanthine
- Mast Cell Stabilizer

5. The father of a 3 year old child comes to your pharmacy asking for help with cough and cold products. The father tells you that the child has a dry cough and no other symptoms. The child has no past medical history and is taking no medication. Which product is most appropriate to treat the child's cough?

- 1/2 teaspoonful of honey
- Dextromethorphan
- Guafenesin
- Loratadine
- None of the above are appropriate for a 3 year old child

6. Which of the following statements are true regarding smoking cessation?

- Varenicline is contraindicated in patients with seizure disorder
- Bupropion SR is contraindicated in patients with a current or prior diagnosis of anorexia or bulimia nervosa
- Both varenicline and bupropion SR require dose tapering when being discontinued
 - I only
 - II only
 - I and II only
 - II and III only
 - I, II, and III

7. Which of the following medications has a warning of suicide risk and ideation?

- Varenicline
- Bupropion
- Montelukast
 - I only
 - II only
 - I and II only
 - II and III only
 - I, II, and III

8. Oral decongestants are contraindicated in which of the following disease states?

- Narrow Angle Glaucoma
- Asthma
- Benign Prostatic Hyperplasia
- Hypertension
- Epilepsy

9. Which of the following cough and cold medications can cause a Phencyclidine or "PCP" like high?

- Guafenesin
- Dextromethorphan
- Pseudoephedrine
- Promethazine
- Honey

10. Which of the following is a first-line agent used to treat moderate to severe persistent allergic rhinitis?

- NasonexTM
- Claritin[®]
- Flonase[®]
 - I only
 - II only
 - I and II only
 - I and III only
 - I, II, and III

Answers

Asking Questions

By: Bharat Kirthivasan, Co-Copy Editor (Content-focused)

It's graduation season and some students are moving from academics to professional life. Others are taking a step in that direction. I myself am wrapping up my Ph.D. and working full time in the pharmaceutical industry as a formulation scientist. During my Ph.D., I've served as a Teaching Fellow; I've taught Pharmaceutics and Compounding labs to the students of the Pharm.D. program—an engaged and industrious set of people. Also, in many students, I have observed a curiosity that—when combined with youthful irreverence to time-honored axioms—is fertile ground for research. Some people simply yearn to know how something works and why something else doesn't.

If you're one such student, research might be the field for you. Scientific research is more than lab coats, beakers and antibody titers, though there's plenty of that. It's a mindset—of questioning everything. In the realm of research, you get to wonder about esoteric concepts and everyday occurrences, and maybe, if you're lucky, you get to provide an answer or two. But mostly what you will do is make it a little easier for the next person, as many have done for you.

During my experience in St. John's University, I have come across highly motivated undergraduate students working on research projects under the

guidance of professors. The benefits to one's résumé need not be pointed out. What I believe they also gained is a surer understanding of statistics and logic—a gift that will keep on giving. Performing research makes you scour reams of literature and teaches you to tease out causation from observed correlations, but, mainly, it affords you an uncanny talent for detecting fallacious logic as you critique others' research and your own. Many students have benefited this way and I hope that many more will in the years to come.

"It's a mind-set—of questioning everything. In the realm of research, you get to wonder about esoteric concepts and everyday occurrences, and maybe, if you're lucky, you get to provide an answer or two."

Don't get into research because you are looking for a breakthrough. The odds are overwhelmingly against any particular one of us delivering insulin orally or curing a deadly disease, but if we all work and keep fighting what seems like a losing battle, someday, somebody will hit that breakthrough. And on that day we will all have won. Therefore, to the curious among you, I highly recommend research, either on the side during your undergraduate studies or as a profession. Happy Graduation everyone!

Want to receive email updates when one of our issues comes out?

Join our Google Group!

Join our email subscription!

<https://groups.google.com/group/rhochipost/>

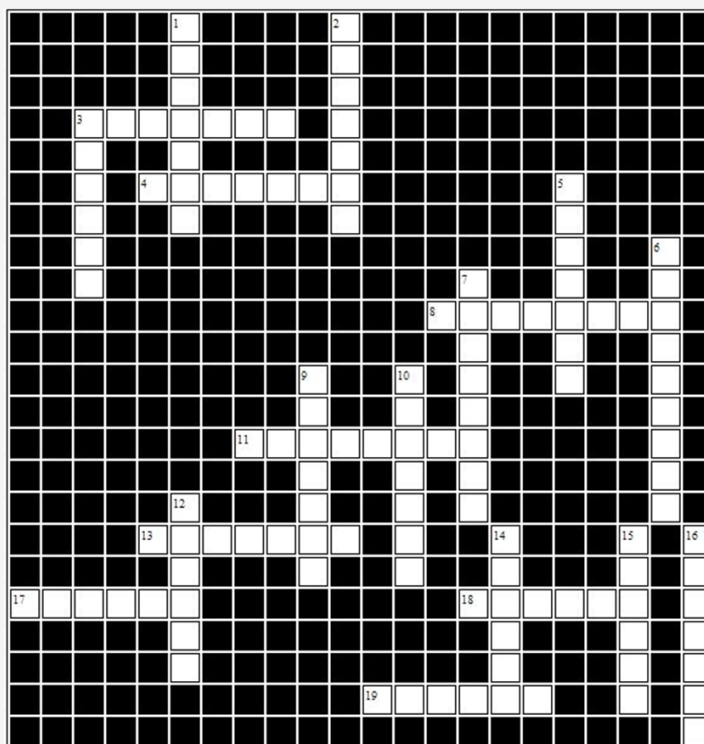
RHO CHI POST

Are You Smarter than a 6th Year?

Crossword Puzzle: Drug Top 200 Challenge

By: Davidta Brown Senior Staff Editor

How well do you know the Top 200? For each generic name listed below, find the corresponding brand name in the puzzle. Note: This puzzle contains brand names only. Good luck!



Across

- 3. METHOCARBAMOL
- 4. CHLORHEXIDINE GLUCONATE
- 8. BUTALBITAL + APAP + CAFFEINE
- 11. CLOBETASOL
- 13. INSULIN ASPART
- 17. BISOPROLOL
- 18. CLARITHROMYCIN
- 19. ONDANSETRON

Down

- 1. NABUMETONE

- 2. OLANZAPINE
- 3. ROPINIROLE
- 5. IRBESARTAN + HCTZ
- 6. NITROGLYCERINE
- 7. LIDOCAINE PATCH
- 9. INSULIN LISPRO
- 10. VARENICLINE
- 12. OMEGA-3/FISH OIL
- 14. RALOXIFENE
- 15. DICYCLOMINE
- 16. MEMANTINE

Answers



By Sherine Jaison
PharmD Candidate
Class of 2015

Many drugs
LOOK – ALIKE
OR
SOUND– ALIKE

causing them to be
easily mixed up in
practice.

Can **YOU** match these
facts with the correct
medication?

Answers

Matching Column: Look-Alike Sound-Alikes

1. A fluoroquinolone derivative that should not be taken within 2 hours of food or any antacids containing zinc, magnesium, or aluminum
2. A pregnancy category B medication that is used for the prevention of nausea and vomiting and has dose dependent QT prolongation as a major side effect
3. Medication used for the treatment of moderate to severe persistent allergic asthma in people with a positive skin test to perennial aeroallergen and whose symptoms are inadequately controlled with inhaled corticosteroids
4. An antineoplastic agent used for the treatment of acute lymphocytic leukemia and Hodgkin and non-Hodgkin lymphomas
5. A schedule II opioid used for the treatment of moderate to severe pain
6. A somatostatin analog used to treat watery diarrhea in patients with metastatic tumors
7. An angiotensin receptor blocker that can cause sprue-like enteropathy
8. A third generation cephalosporin that can lead to bacterial or fungal superinfection, including C diff, with prolonged use
9. An anti-seizure medication for which the labeling was recently changed to include a warning about developing Stevens Johnson Syndrome and toxic epidermal necrolysis
10. Medication used to treat overactive bladder which may be inappropriate in the geriatric population because of its anticholinergic side effects

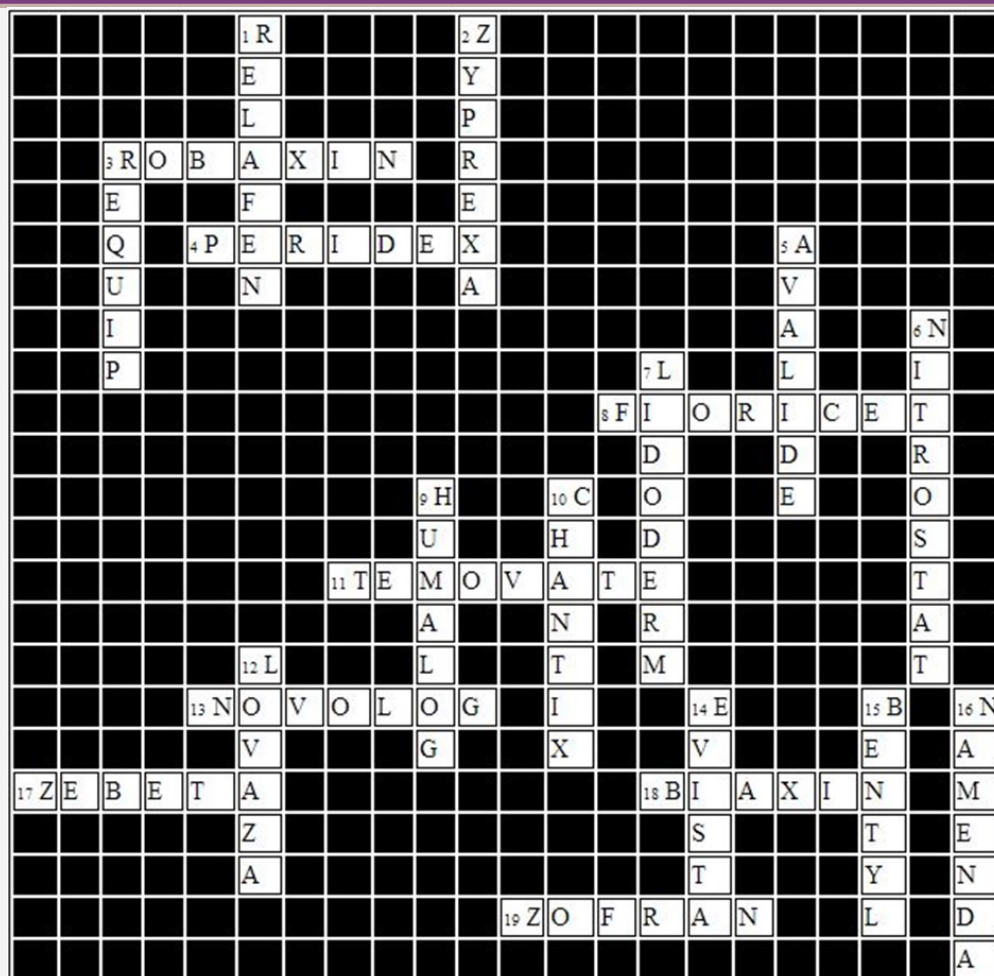
- A. Ocreotide
- B. Omnicef
- C. Onfi
- D. Oxybutynin
- E. Ofloxacin
- F. Ondansetron
- G. Olmesartan
- H. Oxymorphone
- I. Oncovin
- J. Omalizumab

How Did You Do???

Answers to Look Alike and Sound Alike, Trivia Questions and Crossword Puzzle

Trivia Questions

1. C 2. D 3. C 4. E 5. A 6. B 7. E 8. D 9. B 10. D



A. 6 B. 8 C. 9 D. 10 E. 1 F. 2 G. 7 H. 5 I. 4 J. 3

Look Alike Sound Alike

Do you enjoy our puzzles?

Send us a suggestion for a brainteaser at

RhoChiPost@gmail.com

We will feature your work in our next issue!

RHO CHI POST: TEAM MEMBERS



@ Katharine Cimmino (6th Year, STJ; Editor-in-Chief)

I have always been an avid reader and writer. As a member of the Rho Chi Post I am able to merge my passions with the professionalism that comes with aspiring to be a healthcare provider. I am eager to be a part of a publication that promotes my interests and vocation.



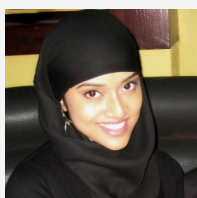
@ Bharat Kirthivasan (PhD, Co-Copy Editor [Content-Focused])

I am a doctoral candidate in Industrial Pharmacy researching nanoparticles for delivery to the brain. The only thing I enjoy more than reading a well-written piece of work is writing it. I am glad to work for the Rho Chi Post, and I encourage others to do the same.



@ Hayeon Na (6th Year, STJ; Co-Copy Editor [Content-Focused])

Hello! My name is Hayeon Na. I am a 2015 PharmD Candidate and one of the Copy Editors for the Rho Chi Post. I hope the information I present will be helpful, or at least interesting. If you have any comments regarding my contribution, feel free to contact me at any time!



@ Tasnima Nabi (5th Year, STJ; Co-Copy Editor [Content-Focused])

Writing has always been my greatest outlet for experience and knowledge, through which I hope to keep you engaged and informed. It is imperative to keep up with our changing profession and community, and I look forward to bringing pertinent information to the newsletter.



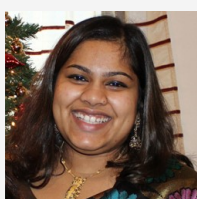
@ Erica Dimitropoulos (6th Year, STJ; Co-Copy Editor [Content-Focused])

As busy student pharmacists, we often fail to keep current with healthcare developments. My aim is to sort through the news and provide quick updates that are important to our profession. Feel free to contact me if there are any topics you would like to see covered in the next issue!



@ Aleena Cherian (PharmD, STJ; Co-Copy Editor [Graphics-Focused])

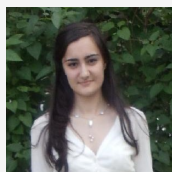
The Rho Chi Post has been a source of current information and great advice to students and professionals in this evolving profession. After years of experience in media and graphics-related work, it is now my privilege to be a part of this endeavor as a Co-Copy Editor. I hope you learn as much from future editions of the newsletter as I have, and I welcome your feedback!



@ Melissa Roy (6th Year, STJ; Co-Copy Editor [Graphics-Focused])

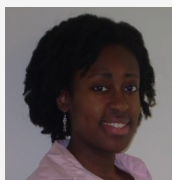
We as future healthcare professionals owe it to our patients and ourselves to become aware and current on the events affecting our profession. The Rho Chi Post is our way to learn new things and stay in touch with the pharmacy world, on- and off-campus. I have gained so much from reading previous publications and feel privileged to have the opportunity be a part of the team. Feel free to reach out to me with suggestions and comments.

RHO CHI POST: TEAM MEMBERS



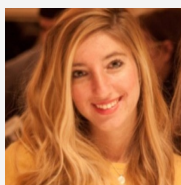
@ Tamara Yunusova (4th Year, STJ; Senior Staff Editor)

My name is Tamara Yunusova, and I am a 3rd year Pharm D candidate at St. John's University. I enjoy articulating information in a captivating and insightful way. I hope to make this publication more informative, student-friendly, and innovative.



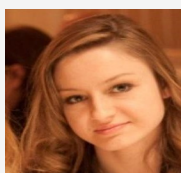
@Davidta Brown (4th Year, STJ; Senior Staff Editor)

My two great loves are innovative science and quality writing, and the Rho Chi Post is an insightful combination of both. As an editor, I look forward to bringing relevant information and fresh perspectives to the student and faculty of St. John's University, as well as to making the Rho Chi Post a newsletter that offers something new to every reader.



@ Beatrisa Popovitz (6th Year, STJ; Senior Staff Editor)

I am eager to relay current information on interesting topics making waves in the world of healthcare pertinent to the advancement of our profession. As student pharmacists, we are molding the future of our profession, and the Rho Chi Post facilitates the cultivation of a relationship (between students, faculty, and other members of the healthcare community) to share ideas and spread awareness of various issues.



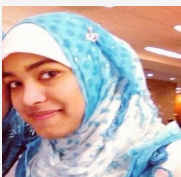
@ Ada Seldin (6th Year, STJ; Staff Editor)

I am thrilled to have become a new member of the Rho Chi Post team. I hope to further strengthen the goals of this newsletter and make a lasting contribution. It is important, as future pharmacists, to collaborate with our peers, as well as accomplished professionals in the field. Rho Chi Post provides a vehicle to voice our opinions and share relevant news.



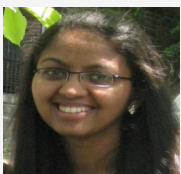
@ Sang Hyo Kim (3rd Year, STJ; Staff Editor)

Advancements of technology and developments of new medicines, prolonging the lifespan and improving the quality of life, have increased the geriatric population. In years to come, pharmaceutical industries and healthcare systems will persistently work to find solutions to changing demands and new problems of the society. Through the Rho Chi Post, I wish to learn, educate, and prepare myself and others for the future.



@ Fatema Elias (5th Year, STJ; Staff Editor)

I am honored to be a part of the Rho Chi Post team. In this age of technology and the continuously changing healthcare profession, I hope to engage like-minded students and professionals. Writing is something that I hold dear to my heart and I hope with this newsletter we can all stay well informed, interested, and educated.



@ Sherine Jaison (6th Year, STJ; Staff Writer)

I find the Rho Chi Post extremely informative and am eager to join the team. I hope my articles will enlighten you about the recent developments in the field of pharmacy and will help you to be a well-informed healthcare provider.



@ You!

We are always looking for creative and motivated students to join our team!

If you are interested in becoming an editor for the Rho Chi Post, please visit:

<http://rhochistj.org/RhoChiPost/EditorApplication>

RHO CHI

The Rho Chi Society encourages and recognizes excellence in intellectual achievement and advocates critical inquiry in all aspects of Pharmacy.

The Society further encourages high standards of conduct and character and fosters fellowship among its members.

The Society seeks universal recognition of its members as lifelong intellectual leaders in Pharmacy, and as a community of scholars, to instill the desire to pursue intellectual excellence and critical inquiry to advance the profession.

THE RHO CHI POST

MISSION

The Rho Chi Post is a 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

1. To provide the highest quality student-operated newsletter with accurate information
2. To maintain a healthy, respectful, challenging, and rewarding environment for student editors
3. To cultivate sound relationships with other organizations and individuals who are like-minded and involved in like pursuits
4. To have a strong, positive impact on fellow students, faculty, and administrators
5. To contribute ideas and innovations to the Pharmacy profession

CURRENT EXECUTIVE BOARD



Anthony, Tyler, Sara, Tasnima, Joshua, Fawad at the 2014 Induction Ceremony

President: **Tyler Valente**
 Vice President: **Fawad Piracha**
 Secretary: **Tasnima Nabi**
 Treasurer: **Anthony Nania**
 Historian: **Sara James**
 Media Relations Coordinator **Joshua Bliss**
 Faculty Advisor: **S. William Zito, PhD**

UPCOMING EVENTS

Jun 5-8: PSSNY Annual Summer Conference
 East Elmhurst, New York

Jun 12-13: NYSCHP Pain Management Practice Based Program
 St. John's University

Jun 15-19: DIA Annual Meeting
 San Diego, California

Aug 20-22 National Pharmacy Preceptors Conference
 Washington D.C.