Single Line Stories

- 2012 ASHP Midyear Meeting & Exhibition will be in Las Vegas, NV. Are you attending?
- Interested in joining the Rho Chi Post Editorial Team? Email us to learn more!
- Block schedules and course rankings for 6th year Pharm.D. Candidates are due by November 5

VOL 2 ISSUE 1 2012

OCTOBER 1

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

STUDYING ABROAD: THE PERSPECTIVE OF A PHARMACY STUDENT

BY: SHANNON TELLIER, ASSOCIATE STUDENT EDITOR

When applying to St. John's University College of Pharmacy and Health Sciences five years ago, I never dreamed I would have the opportunity to study abroad twice while obtaining my PharmD degree. At the end of my freshmen year, there were rumors about second year pharmacy students having the opportunity to spend the spring semester abroad. This rumor turned into a reality when I got on a plane flying to Spain in January 2009. That semester, I spent a total of fifteen weeks in Spain, France, and Italy, which is an experience I will never forget. Not only did I learn biochemistry from a professor from Universidad de Salamanca, but I was also able to fully immerse myself in the culture of each city I lived in for five weeks.



St. John's University Pharm.D. Candidates, Class of 2013, at the Trevi Fountain in Rome

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RHO CHI POST (<u>RHOCHISTJ.ORG</u>)

To my surprise, the dean's office announced another chance for pharmacy students to study abroad for four weeks in Rome during sixth year. After studying abroad second year, I seized the opportunity to do it again. This past September, I returned to Rome to take an infectious disease elective with Dr. Etzel. While abroad, I was able to go to pharmacies in Rome, Istanbul, and Prague. In Rome, I saw diclofenac (Voltaren®) gel on the shelves available to the public, but I did have to ask for Vitamin C behind the counter. When in Istanbul, my friend needed pseudoephedrine, but was told by the pharmacist that it requires a prescription. It is always interesting going to other countries and appreciating the similarities and differences between their pharmacies and the pharmacies in the United States.

My experiences abroad enhanced skills and personal qualities that are essential in the pharmacy profession. Living in a foreign country for weeks at a time allowed me to improve my cultural awareness and communication skills. It is important for a pharmacists to express these qualities because we care for patients from different cultures that speak different languages. Becoming culturally aware and finding alternate means of communication are essential in pharmacy practice. Studying abroad also allowed me to become more flexible, adaptable, patient, and organized. These qualities are learned living abroad and planning weekend trips to different countries. Anyone who has ever travelled should know to expect the unexpected planes get delayed, you get lost or lose your wallet, and the list goes on. Being put in these situations for weeks at a time allows you to acquire these skills that are useful in any career. Studying abroad also allowed me to become more independent and confident in taking initiative. When thrown in an unfamiliar situation or environment abroad, you learn quickly to make decisions and problem solve. All of these skills and qualities learned abroad are valuable to a pharmacist and cannot be learned in the classroom.

St John's University College of Pharmacy and Health Sciences gave me the opportunity to explore the world while studying, which is an opportunity not given to other pharmacy students. During my two experiences abroad, I spent nineteen weeks travelling to over twenty cities while enhancing my ability to interact and communicate effectively with people from around the world. Studying abroad promotes cultural awareness as well as personal, professional, and academic growth. I am very grateful I had the opportunity to study abroad twice and gain qualities important in my future career. Studying abroad is not only an unforgettable experience to make memories with friends and take many pictures; it also changes you as a person and makes you a better pharmacist.



Shannon Tellier, Associate Student Editor, in front of a pharmacy in Prague

St. John's University College of Pharmacy and Health Sciences

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LETTER FROM THE EDITORS: WE NEED YOU!

Dear Reader,

We are always looking to engage with each of you. If you are a talented cartoonist or have a passion for art, feel free to contact one of the editors. It is a great way to express yourself and earn a spotlight for your artistic skills while drawing attention to an aspect of the pharmacy profession.

Can't draw? No problem, take pictures instead! We need photographers who can attend campus events and seminars that are related to healthcare or the pharmacy profession. Please feel free to send us the pictures with one or two paragraphs explaining the event. Perhaps you have a passion for writing; if so, feel free to write to us in response to an article you read. Even if it is just a question or a few comments on an article, email us!

Don't like what you see in the newsletter? Then let us know! Tell us what you would like to see in the newsletter, what topics you are interested in, and/or if you wish to read more about a specific topic. The newsletter is for you; so, your feedback is very important to us.

Think you have some clinical knowledge to share? Feel free to send us interesting drug information questions you have answered or share what you have learned through your rotation experiences.

This is a commitment-free way to stay involved with the pharmacy profession. Contributing to our newsletter does not obligate you to contribute to every issue. We are more than happy to have guest authors and talented students work with us whenever they are available or free to do so. If you have any questions, comments, and/or concerns, please do not hesitate to email us at: rhochis@gmail.com.

With much thanks,

The Editorial Team

Image Source: easyvectors.com

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RHO CHI POST (<u>RHOCHISTJ.ORG</u>)

A NEW FRONTIER IN HEALTH CARE: DIGITAL MEDICINE BY: MAHDIEH DANESH YAZDI, ASSOCIATE STUDENT EDITOR



We live in amazing times. Technology does not progress by steps anymore, it grows by leaps. Healthcare has reaped the benefits of these advances just like any other industry. It was not very long ago that pharmacists would look up patient records in a book full of names and drugs and medical journals only came in paper form. To paint a picture: nobody could use the Ctrl+F function of a browser and scrolling to the relevant section involved the literal turning of a page (or several pages).

And the progress continues. Proteus Digital Health[™] recently released a new product which takes medication to the digital age. It is called the Digital Health[™] Feedback System. They have created an ingestible sensor that may be implanted in the medication that the patient has to take. The sensor is 1 mm², made of silicon and does not alter the medication. It is powered by the fluids in the stomach. Once the medication is ingested and the sensor is activated, a signal is sent to a receiver which comes in the form of a patch on the arm. The patch records the time and identity of the medication that was ingested by the patient. It also records heart rate, body temperature, activity, and rest. This receiver then sends the information that it has compiled to a connected mobile device, which has the designated application downloaded on it. According to the manufacturer, the patient has full discretion over who has access to the information obtained by the device. This means that with the

patient's consent, clinicians may also keep track of their patient's compliance.

This technology has been on the market in Europe for the past two years. And on July 30, 2012, the FDA approved the use of the Digital HealthTM Feedback System as a medical device. The company touts the product as the next step in trying to reduce non-compliance with medications. It is estimated that about fifty percent of patients do not take their medications properly. This not only includes patients who simply do not take their medications, but also patients who take their medications inappropriately.

Everybody either has or will most likely see the clip of Dr. Gregory House on the popular TV drama "House" asking a patient to demonstrate how she uses her inhaler. (If you have not seen it, I suggest looking it up immediately). We have all heard stories of suppositories being swallowed or antibiotic suspensions being poured in the ear instead of taken orally for an ear infection. Even the more subtle forms of non-compliance, such as taking a medication that should be taken with food on an empty stomach or taking the medication at the wrong time of day could impact the patient. Noncompliance in all of its forms has the potential to worsen clinical outcomes.

Healthcare has long benefited from advances in technology and digital medication seems to be the next step. While this product does not completely eliminate non-compliance, it is hoped that it would be another tool in a clinician's arsenal to improve patient outcomes.

For more information regarding this product, please visit: <u>http://proteusdigitalhealth.com/</u>

Learned something new? Share with us!

Email us at rhochis@gmail.com

St. John's University College of Pharmacy and Health Sciences



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QUOTE OF THE MONTH BY: ALEENA CHERIAN, STUDENT CO-COPY-EDITOR



St. John's University College of Pharmacy and Health Sciences

RHO CHI- Beta Delta Chapter

MY EXPERIENCES AT NEWYORK-PRESBYTERIAN HOSPITAL BY: ADDOLORATA CICCONE, STUDENT COPY EDITOR

As a fifth-year pharmacy student researching and ranking advanced pharmacy practice experience (APPE) sites, I felt excited at the prospect of taking the knowledge and skills I obtained in the classroom and applying it to real world patients and scenarios. My years of work in community pharmacies were beneficial in learning not only about medications, but also about properly interacting with patients and other health care professionals; however, I had an unsatisfied urge to be on the front lines of medication therapy in the critical care setting. During my introductory pharmacy practice experiences (IPPEs), I felt most interested and motivated when on the floors viewing actual patient charts and trying to identify what is wrong with a specific patient and how to help that specific patient get better; it inspired me to become more competent in the clinical setting. I wanted to fully immerse myself in the inpatient setting and gain clinical experience. I wanted to push myself to learn about as many different aspects of pharmacy as possible during this year of internships as you only get one APPE year and you only get out what you put in. Upon hearing about NewYork-Presbyterian's (NYP) special five-month bundle of APPEs offered to St. John's University's Doctor of Pharmacy students, I recognized this as a once-in-a -lifetime opportunity, and as quickly and surely as I did with studying abroad, I felt a strong need to take advantage of this unique learning experience. The prospect of learning from and interacting with the best in their fields among a wide range of specialties all in one institution at such a reputably high level is unique and excited me.

My months at NYP allowed me to grow professionally at a quick pace. Spending five consecutive months in one institution rather than in five different settings allowed me to take the first few weeks to get comfortable with the hospital setting, electronic medical records, and basic inpatient policies and procedures, and then spend the rest of my time at NYP to focusing on patient care and learning and applying evidence-based medicine rather than learning new systems monthly. Throughout my five rotations at NYP learning the role of a clinical pharmacist, patient care always came first. At this large institution, I was exposed to a variety of different patient populations, rounding on neonates, children, adults, and the elderly throughout my time there. It was interesting going to work in the morning not knowing exactly what to expect and working with diverse patient cases.

My rotations at NYP included: Key Concepts in the Provision of Pharmacist-Delivered Care, General Inpatient Care, and three electives in Critical Care: Cardiac Intensive Care Unit (ICU), Critical Care: Neonatal ICU, and Specialized Nutrition Support. My classmates' elective options included: critical care, pediatrics, geriatrics, transplant (lung, kidney, heart, or pancreas), oncology, research, and drug information. New electives were also created for students to better suite their interests, such as nuclear pharmacy, administration, and ambulatory care. There really is something for everyone at NYP, and no matter the elective, it is sure to be a great learning experience as you are working with knowledgeable professionals in their fields.

"Pharmacists are able to tap into a solid drug information foundation and apply pertinent facts along with clinical experiential knowledge to an individual's case..."

No matter the rotation, I was involved in daily rounds and learned what being an active part of the health care team making care plans for patients is like. I realized that Pharmacists are hardwired as drug information specialists (focusing four years on studying medications rather than the one semester medical students get of pharmacology in their rigorous curriculum) and take on that role within the health care team. Pharmacists are able to tap into a solid drug information foundation and apply pertinent facts along with clinical experiential knowledge to an individual's case, interacting with both the doctors and the patient, and thus

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make a difference in that patient's life; being able to think and apply myself this way everyday was satisfying. There were numerous opportunities to make medical interventions and provide in-services to the medical team on rounds.

Besides daily patient care activities, common experiential rotation projects at NYP include: journal clubs, topic discussions, drug information questions, drug monographs, and optional research projects. Student Common Hours are organized for presentations to fellow students and preceptor pharmacists. Student Seminars are also scheduled for pharmacist presentations in various pharmacy specialties, for example: presenting skills, SOAPing, CV writing, literature evaluation, mentoring, networking, residency training, research, publication, public health, anticoagulation, antibiotics, pain management, and drug shortages. Students are also able to attend hospital Grand Rounds that usually highlight innovative topics such as extracorporeal membrane oxygenation (ECMO), continuous positive airway pressure (CPAP) in pediatrics, controlled substance regulation, bariatric surgery for Diabetes Mellitus treatment, pain management in pediatrics, and delirium in the ICU. Having longterm and short-term goals, schedules, and assignments improved my time management skills.

Although I had a daily commute of about three hours and my rotations were work-intensive at times, my time at NYP was so worth it as a hopeful future pharmacy resident. I was rewarded greatly in taking initiatives by being involved in relevant projects in clinical research, including writing up a case report for journal submission and performing a longitudinal medication use evaluation research project. My Curriculum Vitae (CV) was really able to blossom through my activities performed through NYP. I also had networking opportunities within the "small world" that is the Pharmacy profession. I was exposed to post-graduate year one (PGY-1) and post-graduate year two (PGY-2) residents,

I had wonderful learning opportunities and experiences with each one of my preceptors at NYP. They were all great role models in their own way and some became mentors to me and facilitated the great strides I made in five short months. I enjoyed my time learning and growing with each of these pharmacists. My preceptors were all readily available as coaches and facilitators. They arranged learning opportunities to meet my individual objectives (i.e. observing an interventional procedure, visiting relevant outside facilities, scheduling common hours for presentations). They regularly gave feedback to help improve my clinical skills and showed great enthusiasm and dedication to teaching and displaying interest in me as a student.

them as resources for advice.

Reflecting back on my time at NYP, I feel indebted to this top-notch institutional program for the myriad of aspects of pharmacy I was exposed to. As Oliver Wendell Holmes, Jr. once said: "A mind that is stretched by a new experience can never go back to its old dimensions." This great program did just this for me; it challenged me to grow each day and permanently changed me for the better as a health care professional; it stretched me closer to achieving my potential as not only an excellent clinical pharmacist, but also a more well-rounded individual. I witnessed firsthand as advertised on commercials, billboards, and banners that "amazing things are happening here [at NYP]." I feel honored and grateful for my chance to learn and grow during my time at NYP.

I wholeheartedly recommend this program to upcoming APPE interns and am more than happy to answer any readers' questions about interning at NYP. Feel free to email me at: addolorata.ciccone07@stjohns.edu.

Share your Rotation Experience!

Email us at rhochis@gmail.com

St. John's University College of Pharmacy and Health Sciences

THE ROLE OF NMDA IN ELECTROCONVULSIVE THERAPY BY: NEAL SHAH, CO-EDITOR-IN-CHIEF

Electroconvulsive therapy (ECT) is a last-line procedure in the treatment of refractory depression, among other neuropsychological disorders.¹ By inducing a seizure, neurotransmitters are released and the disease state may feature a modest mitigation in symptoms.¹ Seizure medications such as benzodiazepines and barbiturates are prescribed to increase or heighten the seizure threshold, making it harder for the electric currents to trigger action potentials in the brain via hyperpolarization activities.² These negatively impact ECT and are discontinued before the procedure. Interestingly, an agent known as imidazenil has been shown to reverse the sedation induced by benzodiazepines, but not affect the seizure level, which may prove beneficial in patients who present with benzodiazepine toxicity. This is in contrast with a traditional benzodiazepine "antidote" known as flumazenil, which will also reverse benzodiazepine sedation but concomitantly lower seizure threshold. This would benefit ECT by allowing sedation during set up with reveral prior to the procedure.³ Additionally, some traditional antipsychotic agents such as haloperidol, fluphenazine and risperidone were not shown to influence seizure activity despite possessing potent calming effects.⁴ Therefore it became difficult to find a sedative agent that could concomitantly lower seizure threshold levels.

Ketamine is an older drug used traditionally in animal work protocols to sedate in combination with xylazine.⁵ Ketamine works as an antagonist of the N-methyl-D-aspartate (NMDA) receptor, allowing effect analgesic and anesthetic activity⁶ while simultaneously lowering the seizure threshold.7 Caffeine and theophylline have also been reported to lower the seizure threshold in higher doses.^{7,8} Ketamine works predominantly in the hippocampus and pre-frontal cortex NMDA receptors, which may have positive effects in depression therapy.^{9,10} Indeed, ketamine and agents that target the NMDA receptor have been emerging as a fastacting alternative agent in treatment resistant depression or where fast-acting antidepressant activity is needed, and in a slew of other neuropsychological disorders.¹¹ Ketamine itself has also been tested with ECT in the treatment of seizures.¹² An analogue of ketamine, methoxetamine, is reported to have NMDA receptor antagonism, as well as dopamine, serotonin, mu-opioid and cholinergic activities, and is hypothesized to be beneficial in depression.¹³

Memantine, a NMDA receptor antagonist approved in the US for use in Alzheimer's disease, is in trials for various psychological ailments. In one trial, memantine is found to clinically reduce anxiety symptoms and improve sleep.¹⁴ A review paper lists memantine trials for schizophrenia, major depressive disorder, and an adjunct to bipolar disease, though did not find significant results for the latter two debilitations.¹⁵ A trial for attention deficit hyperactive disorder concluded that memantine shows improvement in symptoms and neurological performance.¹⁶

The NMDA receptor is a versatile host for augmenting or reversing a myriad of neurological and psychological conditions and procedures. As ongoing research and clinical trials provide new evidence, the expansion of indications for NMDA antagonists is sure to follow.

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ECT is a form of treatment for certain severe psychiatric disorders that involves using electrical shock. In ECT, a physician applies a mild electrical shock (20 to 30 milliamps) to each side of the patient's skull near the area of the temples. The procedure is done under anesthesia or sedation is used, and the patient is monitored carefully.

Right: http://academicdepartments.musc.edu/psychiatry/research/bsl/ect.htm

Top: http://www.humanillnesses.com/Behavioral-Health-Br-Fe/Electroconvulsive-Therapy.html



PUZZLE: CROSSWORD BY: MAHDIEH DANESH YAZDI, ASSOCIATE STUDENT EDITOR



ACROSS

2. Database which includes Drugdex and Poisondex as references

4. Primary author on the book considered to be the golden standard of information for infectious disease

7. Resource used for IV compatibility information which is utilized on Lexi-Comp ${}^{\textcircled{B}}$

10. Handbook of antimicrobial drug therapy also available as an application for mobile devices

13. Resource used for information on herbals and other forms of complementary medicine connected with Harvard Medical School

16. Database maintained by the National Institute of Health where abstracts, citations, and full-text articles can be found

17. Database which comes in print as the Drug Information Handbook

 Contains information on available formulations and average wholesale prices

19. Book of drug interactions which is organized by therapeutic class

20. Book/online source used for information regarding neonatal dosing prepared by Thomson Reuters $^{\mathsf{TM}}$

DOWN

1. Book of drug interactions which rates interactions on a scale of 1-5

3. Book/online source often used to identify foreign drug names

5. Handbook of pediatric drugs published by The Johns Hopkins University

6. Resource used for information on immunizations and available as part of Facts & Comparisons $\ensuremath{\mathbb{B}}$

8. Therapeutics book oriented towards medical professionals

9. Resource used for information on injectable drugs which is utilized on $\operatorname{Micromedex}\nolimits ^{\textcircled{\operatorname{B}}}$

11. Database maintained by the FDA listing bioequivalent products

12. Website by the National Institute of Health in which package inserts may be found

14. The primary author referred to when talking about "Drugs in Pregnancy and Lactation"

15. Therapeutics book oriented towards pharmacy professionals

View Answers on Page 18

St. John's University College of Pharmacy and Health Sciences

RHO CHI- Beta Delta Chapter

MATCHING CHALLENGE: LOOK-ALIKES, SOUND-ALIKES BY: ADDOLORATA CICCONE, STUDENT COPY EDITOR

RHO,

The following medications are easily confused. Try to match each one with its corresponding fun fact.

If you need help, please view the answers on page 22.

- 1. This benzodiazepine is indicated for the management of anxiety disorders, alcohol withdrawal symptoms, and preoperative anxiety. It is a Schedule IV controlled substance which may impair mental or physical abilities to perform tasks, thus patients should avoid activities requiring mental alertness until the effects of this drug are realized.
- 2. This benzodiazepine is indicated in various seizure and panic disorders. Its off-label uses include: restless leg syndrome, neuralgia, bipolar disorder, and schizophrenia. Patients should not suddenly discontinue this Schedule IV controlled substance to avoid symptoms of withdrawal.
- 3. This antipsychotic agent is indicated for manic bipolar disorder, schizophrenia, severe behavioral problems, and preoperative apprehension, along with intractable hiccoughs. It is associated with a wide range of adverse effects, including: sun sensitivity, impaired heat regulation, visual disturbances, orthostatic hypotension, anticholinergic effects, agranulocytosis, and abnormal neuromuscular movements.
- 4. This tricyclic antidepressant is indicated for obsessive-compulsive disorder and used off-label for depression and panic attacks. Gastrointestinal adverse effects can be avoided by taking doses with meals, especially when initially titrating this agent. Patients should be counseled that symptomatic improvements on this agent may take up to two to three weeks.
- 5. This broad-spectrum antibiotic is used as an adjunct in the treatment of tuberculosis. Alcohol should be avoided by patients using this medication, as ethanol may increase CNS depression.
- 6. This immunosuppressant is indicated for prophylaxis of organ rejection in kidney, liver, and heart transplants in conjunction with azathioprine and/or corticosteroids, and severe rheumatoid arthritis and plaque psoriasis. Besides weakening the immune system, which puts patients at risk for infection, there is a potential for multiple significant drug-drug interactions with this agent.
- 7. This skeletal muscle relaxant is not intended for long-term use; symptoms should improve within two to three weeks of therapy. This medication causes drowsiness; concomitant intake of alcohol can augment this effect.
- This sulfonylurea is indicated for type 2 diabetes mellitus. There is a risk of hypoglycemia with this agent, especially in elderly or debilitated patients with glycemic control difficulties, thus patients should be counseled on the signs and symptoms of hypoglycemia (i.e. flushing, sweating).
- 9. This alpha-2 adrenergic agonist is indicated for the management of hypertension, and is available as both immediate and extended release tablets and a transdermal patch. There is a risk of rebound hypertension with sudden discontinuation of the drug or concomitant beta-blockers due to unopposed alpha.
- 10. This gonadotropin is indicated for female infertility, initiating ovulation without progestational, androgenic, or antiandrogenic effects. It is important to note that this medication may cause multiple pregnancies, and must be taken exactly as directed as administration is very time-sensitive.

- A. Chlordiazepoxide
- B. Chlorpromazine
- C. Chlorpropamide
- D. Clomiphene
- E. Clomipramine
- F. Clonazepam
- G. Clonidine
- H. Cyclobenzaprine
- I. Cycloserine
- J. Cyclosporin

RHO CHI POST (<u>RHOCHISTJ.ORG</u>)

NATURAL LANGUAGE PROCESSING TO IMPROVE CLINICAL PRACTICE BY: MOHAMMAD A. RATTU, PHARM.D. [PGY-1 RESIDENT AT VA NYHHS]

"Pharmacists are responsible for patient safety throughout the medication-use process, and need to take on a leadership role in medical informatics at all levels of healthcare to ensure that health information technology supports safe medication use."1 Over the last 50 years, our healthcare system significantly evolved from the complete dependence on paper records to hybrid systems of electronic and paper charting.^{1,2} Although many technologies contributed to this trend, two of the extremely instrumental elements were computerized physician order entry (CPOE) and clinical decision-support (CDS) systems.³ From the Centers for Medicare & Medicaid Services' (CMS) Meaningful Use efforts to the Pharmacy e-Health Information Technology Collaborative's Roadmap for Pharmacy Health Information Technology Integration, it is clear that CPOE and CDS technologies are pertinent for improving the medication-use process.²⁻⁴

Specifically, the most exciting potential in CDS is natural language processing (NLP) - an underlying technology presented by IBM when its expensive-but-efficient Watson computer system played and won Jeopardy!© games.⁵⁻⁸ NLP dates back to the 1950s and journeys beyond our current CPOE systems' knowledge-based CDS.⁵ It offers the potential for drastic improvements and transformations in health-system pharmacy practice.⁵ With the ability to examine and aggregate every clinical note, lab result, and medical order ever placed into a CPOE system, NLP technology provides us with differential diagnoses, medication uses for other conditions, and profound evidence-based decision-support.⁵⁻⁷ While there are many foreseen physical and financial barriers to complete CPOE and CDS implementation, NLP's evident advantages are impetuses to improve patient outcomes and safety.⁵

Before we leap into NLP and its vast applications, it is important for us to examine the history of informatics, our current CPOE implementation status, and new applications in computing.

Medical informatics is the "field of information science concerned with the analysis, use, and dissemination of medical data and information through the application of computers to various aspects of health care and medicine."⁹ It is a broad term that encompasses pharmacy informatics, which ASHP defines as "the use and integration of data, information, knowledge, technology, and automation in the medication-use process for the purpose of improving health outcomes."¹

RHO.

"Medical informatics is the field of information science concerned with the analysis, use, and dissemination of medical data and information through the application of computers to various aspects of health care and medicine."

Although electronic documentation and automation are important elements for providing better care, their implementation has been quite gradual.^{3,10} In the United States, less than 10% of inpatient institutions have CPOE systems, and 14% only meet Stage 1 requirements of Meaningful Use.^{2,3,10,11} In CPOE, there are prevailing issues with the time needed to re-enter paper-based data, the complexity of user interfaces, popup / alert fatigue, order entry times, and device selection.³ Indeed, it is challenging to utilize automation and information technology to efficiently provide patient care.¹² As inferred from our current CPOE implementation status, tools themselves can be inadequate and distracting.¹² "When this happens, we defer the promise of recouping caregiver time and forfeit many intended patient care improvements."12 Therefore, informatics pharmacists consistently aim to "apply [their] talents to achieve the promise of saved time and deliver full value from [our] information tools."12

Just over one year ago, International Business Machines (IBM) publicly demonstrated the potential for machines to "understand" human language.⁶ It built a supercomputer (named Watson) that combined the power of 10 server racks, and each rack contained the equivalent of 90 POWER7 servers with 3.2 GHz CPU cores (~2.88 THz).⁶⁻⁸ Watson competed with Brad Rutter and Ken Jennings on Jeopardy![™] for three straight matches.⁶⁻⁷ Jeop-



ardy![™] questions are notorious for their extensive focus on cultural references and various elements of the human language, including but not limited to metaphors, puns, and similes.¹³ Although Watson did not have internet access and was limited to 200 million pages of content, it was able to produce the correct answers on most, if not all, questions, and Jeopardy![™] effectively won the matches against its human competitors.^{6,14}

IBM's David Ferrucci explained that computer programs, such as Microsoft Word® and other electronic word processors, currently have the ability to separate text into syntactic frames (like subject, verb, and object) and form generalizations ("fluid is a liquid" and "liquid is a fluid"), but not to the point of NLP.⁶ These programs do not venture deep enough into the human language to simulate comprehension or artificial intelligence.⁶ In contrast, Watson utilizes IBM's proprietary and resource-intensive DeepQA and NLP technologies to formulate tons of hypotheses or possible answers.⁶ It achieves this feat via deep keyword evidence and logic, such as temporal reasoning, statistical paraphrasing, and geospatial reasoning.⁶

"...Informatics pharmacists consistently aim to apply [their] talents to achieve the promise of saved time and deliver full value from [our] information tools."

After Watson's global recognition, managed healthcare companies, such as WellPoint, became interested in the computer's potential applications.¹⁵ WellPoint, a part of the Blue Cross and Blue Shield Association, wished to use Watson to "help physicians identify treatment options that balance the interactions of various drugs and narrow among a large group of treatment choices, enabling physicians to quickly select the more effective treatment plans for their patients."16 Well-Point also aimed to streamline the communication between patients' physicians and their health plans, as well as improve efficiency in the clinical review of complex cases.¹⁶ The company strives to incorporate computerized guidance into patient care, and truly inspires CPOE and CDS vendors to tackle these challenges.¹⁵ Only six months have elapsed since the contract between WellPoint and IBM, and

we have yet to see this technology in action.^{15,16}

For the meantime, institutions with CPOE frequently utilize knowledge-based CDS for determining drug-drug interactions.⁵ This type of CDS is restrictive, as it primarily looks for trigger keywords and special codes to display search results.¹⁷⁻¹⁹ For instance, if a patient is taking sulfamethoxazole-trimethoprim (Drug_X) and warfarin (Drug Y), a knowledge-based CDS should be able to determine and describe the interaction between Drug_X and Drug_Y by comparing two columns of data and using conditional logic. Pseudocodes to describe the database query within the program would be: (1) result = QUERY("SELECT unique_ID, alert_message FROM interactions WHERE drug1 LIKE 'Drug_X%' AND drug2 LIKE 'Drug_Y%';"); and - (2) $IF(COUNT(result) \ge 1)$ ALERT (alert_message); };.²⁰ While simplistic and useful for most purposes, the algorithms contained within this code do not "comprehend" human language or thinking.⁵ These simply output a predefined message if a there is a match between two or more columns in a table.⁵

Furthermore, humans regularly communicate with structured sentences, and not with keywords. If a patient is taking sulfamethoxazoletrimethoprim (Drug_X), and a physician does not document a sulfa allergy in the designated allergy input field in the CPOE program (but types, "patient is allergic to sulfa" in his clinical note), the knowledge-based CDS would fail to determine that Drug_X is a poor choice in this patient.

CPOE and CDS vendors may already be developing technologies to make clinical notes and lab values searchable. Of course, a major challenge would be to overcome any possible data disconnections (or compatibility concerns) between any two unique vendors. For example, CPOE vendor "A" may allow searchable clinical notes and lab values, but CDS vendor "B" may not have the appropriate algorithms to detect the significant issues. In addition, primarily due to the massive computing power required to find and/or relate words from non-coded fields (recall that Watson required the equivalent of 900 computers at 3.2 GHz CPU speed to produce a Jeopardy![™] answer in under five seconds), most current CPOE systems disallow searching through freely written clini-

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cal notes or lab values.6-8

Fortunately, several investigators have recently analyzed novel architectures for NLP in the healthcare setting. In 2005, NLP was used to encode and extract medical events: it associated these events with formalized temporal (past versus present) data.²¹ Five years later, MedEx (a Medication information Extraction system) was developed using discharge summaries and outpatient clinic visit notes; it successfully identified drug names, strengths, routes, and frequencies.²² Eight months after that, another group of researchers developed an open-source NLP system called clinical Text Analysis and Knowledge Extraction System (cTAKES).23 They noted that the cTAKES annotations were the foundation for its methods and modules for higher-level, semantic processing of clinical free-text.23

"...MedEx (a Medication information Extraction system) was developed... it successfully identified drug names, strengths, routes, and frequencies."

Although many of the aforementioned NLP systems examined clinical text, they were only useful in particular settings or contexts. Taking advantage of this fact, in late 2010, researchers published a knowledge intensive methodology for mapping clinical text to Logical Observation Identifiers Names and Codes (LOINC).^{24,25} This NLP system took published case reports as input and mapped vital signs, body measurements, and reports of diagnostic procedures to fully specified LOINC codes.^{24,25}

Last year, the American Medical Informatics Association (AMIA) received numerous articles from researchers with unique NLP approaches. Since NLP did not fulfill its promise of enabling robust clinical encoding, clinical use, quality improvement, and research, one group of researchers described systems capable of managing very large data sets.^{26,27} Similar to what social media websites (e.g. Facebook®) utilize, one NLP system leveraged cloud-based approaches, such as virtual machines and Representational State Transfer (REST) to "extract, process, synthesize, mine, compare/ contrast, explore, and manage medical text data



in a flexibly secure and scalable architecture."²⁶⁻²⁸ In addition, a general NLP system called Medical Text Extraction, Reasoning and Mapping System (MTERMS), encoded clinical text using different terminologies and simultaneously established dynamic mappings between them.²⁹ As in 2005, researchers focused on temporal expressions and analyses of drug and medical device adverse events.^{30,31}

Within each NLP system, there are common themes of data extraction, sorting, and annotation.⁵ Alas, with the various approaches that each group of researchers take, we expect major interoperability issues with record formatting/ syntax.⁵ Standardization is very necessary as we progress into the future of NLP in CDS and CPOE, but typographical errors, misspellings, abbreviations, and a lack of punctuation in clinical notes will make the annotation process more difficult.⁵ Indeed, by correctly extracting and annotating readable sentences or structures from physicians' clinical narrations (and combining them with objective medication, lab, and reference data), we truly can achieve better connections between medical information and enhance our ability to make evidence-based decisions.⁵

"Standardization is very necessary as we progress into the future of NLP in CDS and CPOE, but typographical errors, misspellings, abbreviations, and a lack of punctuation in clinical notes will make the annotation process more difficult."

In closing, I wholly agree with Allen Flynn, Chair of the ASHP Section of Pharmacy Informatics and Technology, when he states:

"we have humanized drugs in the past by sharing insights, listening, advising, and caring for patients. We will humanize healthcare information technology similarly with wise, pragmatic, elegant, patient-focused work that consciously recognizes and promotes the human qualities of the caregiver-patient relationship.



Pharmacy informatics matters because the promise of safer, more effective, efficient, and properly informed pharmaceutical care offered directly by pharmacists to their patients. Sustained caregiver relationships are the necessary and intended future of pharmacy practice."¹²

Although our healthcare system has noticeably transformed into a hybrid system (of paper and electronic documentation), there are still many challenges and advances on the horizon. CPOE implementation is far from complete within the United States, and CMS will continue promoting the Meaningful Use criteria.^{2-4,10-11} As IBM's Watson supercomputer demonstrated, NLP technology has the potential to provide us with rich and relevant information for safer and improved health-system pharmacy practice.^{5-8,13-16} Regardless of the resources needed to incorporate and standardize NLP into CDS, we need to remember that the purpose of our technological advances is to improve the quality of our patients' care, safety, and overall health outcomes.^{5,12}

"As IBM's Watson supercomputer demonstrated, NLP technology has the potential to provide us with rich and relevant information for safer and improved health-system pharmacy practice."

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and we will feature your article in our next issue!

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MEDICATIONS CAUSING BODY TEMPERATURE FLUCTUATIONS BY: ELSA THOMAS, PHARM.D. C/O 2013

The Human body uses various complex mechanisms to maintain its temperature within a narrow range despite extreme environmental temperature changes as well as physiological changes. Several factors can affect body temperature, such as disease states, growth, exercise, hormonal changes, and medications. Hypothermia occurs as a result of peripheral vasodilation, decreased metabolic activity, or exposure to cold environmental conditions, whereas hyperthermia is a condition that can result from excessive heat generation from seizures, muscle rigidity, increased metabolic rate, decreased sweating, or from drugs that alter hypothalamic activity. There are numerous drugs that affect body temperature, including barbiturates, cyclic antidepressants, hypoglycemic agents, opiods, antihistamines, anticholinergics etc.¹

Metformin is a biguanide oral hypoglycemic agent used to treat type 2 diabetes mellitus. Although hypoglycemia is a major adverse effect associated with most agents used to treat diabetes, metfomin is not one of them. One of the important, yet rare, adverse effects associated with even therapeutic doses of metformin is lactic acidosis, a condition where metformin accumulates in the intestine leading to an increased production of lactate faster than it can be removed. This condition is usually seen in patients with renal impairment and presents with hypoglycemia, hypothermia, hypotension, and resistant bradyarrhythmias.²

Goldfrank's Toxicologic Emergencies provides the same information on metformin. The book also adds that 'insufficient evidence supports the concept that metformin-associated hypoglycemia can develop in a patient who is not critically ill without lactic acidosis', suggesting that hypoglycemia associated with the use of metformin is solely the characteristic of an overdose.³ The mechanism by which lactic acidosis directly causes hypothermia is not defined as it is for hypoglycemia causing hypothermia. One case study involving the successful treatment of severe lactic acidosis caused by a suicide attempt of a 43 year old women with a metformin overdose lists hypoglycemia and hypothermia as symptoms presented by the patient⁴ while an article published in 'Haematologica'', the hematology journal, explains that 'hypoglycemia causes peripheral vasodilatation, sweating, and inhibits shivering, commonly resulting in hypothermia'.⁵ This leads to the conclusion that metformin causes hypoglycemic symptoms under conditions of overdose defined by lactic acidosis and the resultant hypoglycemia leads to symptoms of hypothermia.

Trazodone is a serotonin reuptake inhibitor that is used as an antidepressant. One of its side effects is significant sedation that leads to its offlabel use as a sedative/hypnotic to treat insomnia. Another one of its less frequent and non-preferred side effects is night sweats.⁶ One study on 12 healthy volunteers looking at the effect of trazodone on core body temperature shows that trazodone decreases the highest rectal temperature (P<0.05), the lowest temperature (P<0.05), and the average temperature (P<0.01) but did not change the amplitude compared to placebo; this study is inconclusive of the hyperthermic nature of trazodone.⁷ The possibility is supported by The American Psychiatric Publishing Textbook of Psychosomatic Medicine by stating that serotonergic agents including trazodone can cause an elevation in body temperature.⁸ Furthermore, such drugs can cause a life-threatening condition resulting from increased CNS serotonergic activity called serotonin syndrome; its manifestations include hyperthermia and diaphoresis.⁹ Similar to that of metformin, trazodone also causes changes in body temperature characterized mostly by acute toxic conditions.

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PUZZLE: CROSSWORD (SOLUTION) BY: MAHDIEH DANESH YAZDI, ASSOCIATE STUDENT EDITOR

St. John's University College of Pharmacy and Health Sciences

NYS LEGISLATURE TO BAN THE SALE OF TOBACCO IN PHARMACIES BY: MAHDIEH DANESH YAZDI, ASSOCIATE STUDENT EDITOR

The views expressed in this article are solely those of the author and do not reflect the views of the Rho Chi Post, Rho Chi Beta Delta Chapter, or St. John's University College of Pharmacy and Health Sciences.

For the past few months, I have been on rotation at NewYork-Presbyterian Weill Cornell Medical Center. Every day for the past few months I have passed by Memorial Sloan-Kettering Cancer Center on my way to the hospital. I often think about this experience. What seems like a routine trip to rotations to me, is probably the most arduous and devastating trip another has to make. And then I see something else: a person in a white lab coat or scrubs standing a few feet away from the door and smoking. Quite frankly, the irony never fails to make me angry. I wonder whether that person realizes that they are smoking in front of one of the most famous cancer treatment facilities in the United States. And then, just as my sense of selfrighteous outrage is reaching its peak, I think to myself, that person could have bought those cigarettes from any of the dozen pharmacies in the area. In fact, a pharmacy would probably be the most convenient location to grab a pack of cigarettes.

On the day that pharmacists graduate they take an oath to make "welfare of humanity" their primary concern. That does not imply that pharmacists infringe on people's freedom to inhibit their self-harming habits, but they do not need to be catalysts for that kind of behavior either. The fact that community chains that function primarily under the title of a "pharmacy" sell a profoundly carcinogenic substance should be outrageous to any health care professional. It is hard to give effective smoking cessation counseling when the patient sees that the same people who encourage him to quit are also selling tobacco products.

One aspect of pharmacy is a business; but, it is not only a business. It is a community's first line of defense on public health issues. Health care professionals should hold themselves to a higher standard. Health care professionals should not sell products that serve absolutely no useful purpose and only cause harm. Cigarettes not only harm the individual but the second-hand harm is inhaled by all individuals within proximity of the smoker.

The New York State Legislature seems to agree that tobacco products have no place in pharmacies. In February 2012, Assemblymen Titone and Weprin and Senator Lanza introduced a bill to their respective legislative chambers that would ban pharmacies from selling cigarettes and other tobacco products. This prohibition includes stores that include a pharmacy as a department as long as there is only one corridor or hallway that allows access to the pharmacy. This bill, currently labeled as S6506 in the Senate and A8839 in the Assembly, was referred to the public health committee in each respective chamber after introduction and is currently under review.

Also, another concern of the lawmakers was that minors, who are allowed to work in community pharmacy establishments, would have access to tobacco products. They may use their employment at the pharmacy to purchase cigarettes for themselves or sell the product to their friends who are also minors. This bill will hopefully eliminate the role that pharmacies are playing in the sale of tobacco and return pharmacists to their rightful roles as promoters of public health.

For more information regarding this bill, please



visit the following websites:

OR

http://open.nysenate.gov/legislation/bill/S6506-2011 http://open.nysenate.gov/legislation/bill/A8839-2011

DULOXETINE'S EFFECT ON BLOOD GLUCOSE LEVELS BY: NEAL SHAH, CO-EDITOR-IN-CHIEF

Duloxetine is a serotonin (5HT) and norepinephrine (NE) reuptake inhibitor (SNRI) introduced to the US market in 2004, indicated for the treatment of diabetic neuropathic pain.¹ A chemical figure of duloxetine is shown below.²



It was developed in an effort to mimic tricyclic antidepressant mitigation of neuropathic pain without the extensive systemic side effects that limit their use.¹ Though duloxetine is not shown to have any true neuroprotective effects, its combined SNRI effects contribute to pain cessation along the pain tracts in the central nervous system.¹ An interesting finding during trials is that duloxetine slightly worsened both glucose control and raised hemoglobin A1c (HbA1c), a marker of average blood glucose over a three-month period.¹

The package insert reports an average glucose increase of 12 mg/dL and an increase of HbA1c by 0.5% compared to placebo in a 41 week study.³ A division of Novartis found in a metaanalysis of seven trials that while impairment of glucose control was significant, at the end of a 52 week trial, changes in plasma glucose and A1c were statistically insignificant.⁴ Another metaanalysis done by Abbott laboratories found that these changes indicated no enhanced disease progression.⁵

In conclusion, when counseling a diabetic patient about the effects of duloxetine, inform them that they may see a slight increase in their blood glucose and/or A1c, and that the benefits of possible neuropathic pain relief may outweigh this slight increase.

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PUZZLE: WORD SEARCH BY: MARIE HUANG, ASSOCIATE STUDENT EDITOR

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FIND THE FOLLOWING WORDS:

STREPTOZOCIN CISPLATIN VINCRISTINE PENTOSTATIN METHOTREXATE DACARBAZINE CARMUSTINE PEMETREXED CYTARABINE FLUOROURACIL

NOTICE A THEME?

TRIVIA: Of these drugs, which ones behave as alkylating agents? Find one other well-known chemotherapy agent in the word search that is not listed above.

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MATCHING CHALLENGE: LOOK-ALIKES, SOUND-ALIKES (ANSWERS) BY: ADDOLORATA CICCONE, STUDENT COPY EDITOR

Go back to <u>Page 11</u>?

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

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Top: Always a popular destination, 2012 ASHP Midyear Meeting and Exhibition is heading to Las Vegas and is set to be a record breaking meeting! This year's meeting will be held at the Mandalay Bay Hotel with many affiliate events also taking place at the MGM Grand, the co-headquarter hotel. Not only does this new venue offer more to our attendees, but as the "entertainment capital of the world", Vegas offers something for everyone and we are sure after sessions conclude there will be lots of thrilling activities.

The conference is for pharmacy students of all years to make connections and learn more about the unique opportunities within the pharmacy world. Discover the path for your future today, book now at: http://connect.ashp.org/midyear2012/Home/

Image Credit: Presbyterian College of Pharmacy - http://pharmacy.presby.edu/organizations/the-midyear-meeting/

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RHO CHI POST: EDITORIAL TEAM

RHO



💶 💶 🥘 Steve P. Soman (6th Year, STJ)

Previously known as Ebey P. Soman, I really enjoy writing very opinionated articles. I strongly encourage all readers of our newsletter to respond with their own literary pieces. I look forward to hearing from you, and welcome your comments and constructive criticisms!

@ Neal Shah (6th Year, STJ)

I frequently assist several professors on campus, with their research. My goal is to provide my fellow students with researchbased information that correlates with clinical pharmacotherapy. If you have any topics of interest or comments on currently-published articles, please do not hesitate to email me!



STUDENT EDITORS





CO-EDITORS-IN-CHIEF

(2) Mahdieh D. Yazdi (6th Year, STJ)

I like to stay current with all the changes in our profession, both legal and clinical. I hope to keep you informed with all that I learn. Please enjoy Rho Chi Post, and provide us detailed feedback so that we may improve our newsletter.

@ Marie Huang (6th Year, STJ)

am in a continuous process of self-definition, and constantly testing the boundaries of this world. I enjoy channeling my inspiration through words and photographs. As a witness to an evolving profession, I look forward to keeping you updated! Who knows where we will be tomorrow?

(a) Addolorata Ciccone (6th Year, STJ)

I am thrilled to serve as a Co-Copy Editor of Rho Chi Post. Whether you are brand new to the world of pharmacy, a seasoned veteran of this profession, or anywhere in between, I hope you find our work engaging, relatable, and informative. I look forward to reading your comments and feedback.

(2) Aleena Cherian (5th Year, STJ)

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!

(2) Mohamed J. Dungersi (6th Year, STJ)

I am enthusiastic about promoting the pharmacy profession, and what better way to do this than by being a part of the Rho Chi Post? Should you have any comments or concerns, feel free to contact me!



(2) Shannon Tellier (6th Year, STJ)

I believe it is important for students and everyone else in the profession to stay informed about current pharmacy events. Rho Chi Post is a great way to continue learning information about what is happening on our campus and in the nation.



CO-COPY EDITORS



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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.

CURRENT EXECUTIVE BOARD



Bethsy, Albana, Yining, Elizabeth, and Aleena at the 2012 Induction Ceremony

President: Yining Shao Vice President: Albana Alili Secretary: Elizabeth Mo Treasurer: Aleena Cherian Historian: Bethsy Jacob

Faculty Advisor: S. William Zito, PhD

UPCOMING EVENTS

Oct 28: SNPhA Health Fair Student National Pharmaceutical Association (SNPhA) Chinese Church of Iowa City, North Liberty, IA

Oct 29 – Nov 1: Joint Forces Pharmacy Seminar (CME) Hilton San Diego Bayfront, San Diego, CA

Sept 6 – Dec 6: FREE Speech and Hearing Screenings St. John's University, Seton Complex 152-11 Union Turnpike, Flushing, NY

- Nov 3: St. John's University Chemistry Symposium Frontiers of Nano and Bioanalytical Chemistry Room 277 A and B, Bent Hall, Queens Campus, NY
 - Nov 7-12: ASCP 2012 43rd Annual Meeting Gaylord National Resort & Convention Center National Harbor, Maryland

Promote your event through us!

Submit the name, location, date, and time of your venue to our editors at:

rhochis@gmail.com

We welcome all pharmacy-related advertisements

THE RHO CHI POST

MISSION

The Rho Chi Post 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 is the most exciting and creative studentoperated newsletter within the St. John's University College of Pharmacy and Health Sciences. Our newsletter is known for its relatable and useful content. Our editorial team members are recognized for their excellence and professionalism. The Rho Chi Post sets the stage for the future of student-run 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
- 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

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