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News & Noteworthy:

Introducing the ASP Website

by Erika Chan, PharmD Candidate, Rutgers University

The Antimicrobial Stewardship Program (ASP) has recently launched a website!

ASP is a team dedicated to promoting the appropriate use of antimicrobials, in order to improve treatment outcomes, reduce microbial resistance, and reduce adverse events associated with antimicrobial use. Although antibiotics have transformed the practice of medicine dramatically, misuse and overuse of antibiotics is one of the major public health problems. In fact, up to 20-50% of all antibiotics prescribed in the US may be unnecessary or inappropriate for various reasons. These unnecessary or inappropriate uses of antibiotics may lead to increases in the incidences of multidrug resistant bacteria, *Clostridium difficile* infection, and side effects or increases in hospital length of stay and re-admission rates. ASP consists of a multidisciplinary team to improve antibiotic use by ensuring that patients receive the right antibiotic, at the right dose, at the right time, and for the right duration.

The ASP website offers some useful intra-hospital resources, including:

- Antimicrobial weight-based dosing and rounding guidelines
- ED sepsis guideline
- Procalcitonin guideline
- Adult and pediatric vancomycin dosing guideline
- Adult and pediatric antibiograms
- Pediatric sepsis guidelines

Resources:

1. SUNY Downstate ASP website: <http://www.downstate.edu/stewardship/index.html>
2. APIC: <https://apic.org/Professional-Practice/Practice-Resources/Antimicrobial-Stewardship>
3. IDSA: http://www.idsociety.org/stewardship_policy/
4. CDC: <https://www.cdc.gov/getsmart/healthcare/pdfs/core-elements.pdf>

Pharmacy & Therapeutics Committee Updates

by Tavajay Campbell, PharmD, Pharmacy Resident

Meeting Months: October 2017 through January 2018

Policies and Protocols

- (Updated) Policy "Adult Parental Nutrition Support"
- (Updated) Policy "Drug Return and Disposal Policy"
- (Updated) Policy "Preventing Occupational Exposure to Hazardous Drugs"
- (Updated) Policy "Insulin Infusion Pump Use in the Hospital"
- (Updated) Policy "Medication Storage at School Based Clinics"
- (Updated) Policy "Nursing Station Inspections"
- New Policy "Chemotherapy/Biotherapy Dose Rounding"
- New Policy "Opioid Overdose Prevention Program for Single-Step Nasal Naloxone"
- New Protocol "Pediatric Sepsis Brochure"
- New Protocol "Guideline for Pediatric Skin and Soft Tissue Infections"
- New Protocol "Antibiotic Guide for Common Pediatric Infections in the ED"
- New Protocol "Immune Globulin Dosing Protocol with Rounding Rules"
- New Guidelines "Healthbridge Antibiotic Indications"

Formulary Changes

- Addition of Neulasta Onpro® to formulary
- Change of formulary Octagam® 5% and Gamunex-C® 10% to Gammaked® 10% as the formulary intravenous immune globulin

Research Corner: Evaluation of Antibiotic Prescribing Behaviors in an Outpatient Primary Care Clinic

by Nubriel Hernandez, PharmD, Madhavi Gavini, PharmD, BCPS, Stanley Moy, PharmD, BCPS, and Mohamed Nakeshbandi, MD

Presented at the American Society of Health Pharmacists Midyear 2017 Clinical Meeting. December 2017. Orlando, FL

Background: Antibiotic resistance is a major public health threat today with 2 million estimated infections and 23,000 deaths occurring annually according to the Centers for Disease Control and Prevention (CDC)¹. In response to executive order 13676 set forth by the Obama administration, the White House released the National Action Plan for Combating Antibiotic-Resistant Bacteria which sets a goal of reducing inappropriate antibiotic use in the outpatient setting by 50% by 2020². It is imperative to identify high-priority and common conditions for which antibiotics are inappropriately prescribed³. A retrospective chart review was conducted at SUNY Downstate Medical Center for the purpose of evaluating antibiotic prescribing patterns within a primary care clinic and identifying opportunities to minimize inappropriate prescribing of antibiotics.

Methods: Patients ≥ 18 years old seen at one of the primary care clinics who were prescribed antibiotics from January 2016 to December 2016. The primary outcome was the number of appropriate antibiotics prescribed based on medication, dose and duration.

Results: Out of 266 antibiotic prescriptions prescribed in 2016, 40.6% (108/266) were prescribed appropriately. The most common infection treated in the clinic was urinary tract infection (N = 111, 41.7%). Azithromycin was prescribed in 31.3% (30/97) of cases that may not have required antibiotic therapy, and it was dosed incorrectly in 24% (6/25) of cases. Ciprofloxacin was prescribed in 37% (17/47) of cases where an antibiotic with a narrower spectrum of activity may have been more appropriate.

Conclusion: The results of the study show that less than half of the antibiotic prescriptions analyzed were prescribed appropriately. This shows that there are areas of improvement in our outpatient settings. Future directions to consider of areas for improvement include assessment of antibiotic use when it is not indicated, utilization of another antibiotic with a narrower spectrum of activity and educating providers about antibiotic stewardship in order to prevent antibiotic resistance.

References:

1. CDC. Antibiotic resistance threats in the United States, 2013. Atlanta, GA: US Department of Health and Human Services, CDC; 2013. <http://www.cdc.gov/drugresistance/threat-report-2013/index.html>
2. Fleming-dutra KE, Hersh AL, Shapiro DJ, et al. Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits, 2010-2011. JAMA. 2016;315(17):1864-73.
3. Parente DM, Timbrook TT, Caffrey AR, et al. Inappropriate prescribing in outpatient healthcare: an evaluation of respiratory infection visits among veterans in teaching versus non-teaching primary care clinics. Antimicrob Resist Infect Control. 2017;6:33.

Drug Shortage Updates

by Dhivya Olamana, PharmD Candidate 2018, Long Island University

Recently, there has been a shortage of various medications and medical supplies due to the inability to produce the products. Manufacturing in Puerto Rico, which houses several vital pharmaceutical plants, slowed or stopped after the devastating effects of Hurricane Maria that hit the island last fall. According to an article published in the *New York Times*, "U.S. Hospitals Wrestle with Shortages of Drug Supplies Made in Puerto Rico," nearly 10 percent of drugs that are in the United States come from Puerto Rico. With the majority of the plants affected by the hurricane, it has been very difficult to receive both medications and medical supplies. Baxter, a manufacturer whose pharmaceutical plants are based on the island, has been unable to produce IV bags, leading to a nationwide shortage. Although there are other manufacturers that produce IV bags, they have not been able to keep up with the large volume of requests in the wake of Baxter's absence.

Another, more indirect cause of drug shortages is the ever-growing problem of opioid abuse. Since the Drug Enforcement Association created stricter regulations to keep opioids off the streets, resources for opioid production have been reduced. With the shortages of both medication and medical supplies, healthcare professionals have been forced to find alternatives methods to treat their patients.

CRITICAL DRUG SHORTAGES	
Morphine 2 mg, 4 mg injectable Current hospital supply is low with no predictable return date.	Epinephrine 1mg/10mL syringe With no predictable return date, the emergency cart supply has been decreased from 9 syringes to 6 syringes.
Fentanyl 100 mcg, 250 mcg, 1000 mcg, 2500 mcg injectable Current hospital supply is low with no predictable return date.	Norepinephrine 4mg/4mL vials Adult crash cart supplies are reduced to one vial per cart. Alternatives include phenylephrine or epinephrine.
Diazepam 10mg/2mL injection Pharmacy is <u>out of stock</u> . Midazolam and lorazepam may be considered as alternative agents.	Small Volume IV Bags (50mL, 100mL, 250mL) D5W and NS To conserve stock, medications that the pharmacy commonly batched and placed into Pyxis® machines are now made on demand.

References:

- <https://www.nytimes.com/2017/10/23/health/puerto-rico-hurricane-maria-drug-shortage.html>. Published October 23, 2017
<http://www.modernhealthcare.com/article/20180224/NEWS/180229970>. Published February 24, 2018.

Technology Updates: Changes to Medication Alerts

by Nubriel Hernandez, PharmD, Pharmacy Resident, and Laurie Ferguson, PharmD, MHA, Informatics Pharmacist

In an attempt to reduce alert fatigue for prescribers when ordering medications, 233 of 300 drug-diagnosis alerts were deactivated in the HealthBridge order-entry system in the Spring of 2017. In response, the number of total visible alerts in January 2017 decreased from 16,090 to 11,587 when compared to January 2018.

Alert Summary

Acknowledged	Viewed	Docume ...	Alert	Created	Priority	Type	Comment	Scope
	✓		Drug Interaction	03-02-2018 13:28	HIGH	WARNING		Chart

Alert: Drug Interaction

Message:

Details for HYDROmorphone Injectable-food

GENERALLY AVOID: Alcohol may potentiate the central nervous system (CNS) depressant effects of opioid analgesics including hydromorphone. Concomitant use may result in additive CNS depression and impairment of judgment, thinking, and psychomotor skills. In more severe cases, hypotension, respiratory depression, profound sedation, coma, or even death may occur.

GENERALLY AVOID: Consumption of alcohol while taking sustained-release formulations of hydromorphone may cause rapid release of the drug, resulting in high systemic levels of hydromorphone that may be potentially lethal even in opioid-tolerant patients. Alcohol appears to disrupt the extended release mechanism, causing 'dose-dumping' into the bloodstream. In 48 healthy volunteers, coadministration of a 12 mg dose of sustained-release hydromorphone with 240 mL of 40% (80 proof) alcohol resulted in a mean peak hydromorphone concentration (C_{max}) approximately six times greater than when taken with water. One subject had a 16 fold increase in hydromorphone C_{max} with 40% alcohol.

Status: Unacknowledged By: Acknowledged When:

Further efforts to curb the dangers of alert fatigue will focus on drug-food alerts. Of 480 alerts reviewed, 122 alerts were deemed significant in which medications were required either to be taken with meals or to be spaced from meals. In order to reduce alerts while still addressing the significant interactions, all drug-food alerts that appear upon medication entry and medication verification will be removed in favor of notifications in the nursing instructions. More medication sentences with appropriate spacing of medications and foods will be added to HealthBridge, as well, potentially by Spring 2018.

Featured
patient-
care
question

Nurses Want To Know ...

Tavajay Campbell, PharmD, Pharmacy Resident

Q: Are nurses allowed to give inhalers to patients at discharge?

A: Under the Multi-dose Medication Dispensing for Discharge hospital policy, patients may go home with the inhaler(s) they were prescribed as inpatients if their providers planned to continue the inhalers upon discharge and the products were labeled for outpatient use. Upon notification or identification of such a patient, a pharmacist will review the medical record for continuation of the medication, counsel the patient on proper inhaler use, and affix the appropriate prescription label on the device. The American Society of Health-System Pharmacists endorses the practice as a way to avoid unnecessary medication waste and close the gap in transition of care between hospital discharge and pharmacy pick up. If you are unsure whether a patient qualifies to receive at discharge, check with the Pharmacy.

Spotlight on Safety: Hazardous Waste

by LilyAnn Jeu, PharmD, Medication Safety/Internal Medicine Clinical Pharmacist

The Environmental Protection Agency (EPA) has classified a limited list of pharmaceuticals as "hazardous waste" for pharmaceuticals possess any of the following properties: ignitability, corrosivity, reactivity, or toxicity. In some cases, the formulation or amount were taken into account for the designation.

As pharmaceuticals with these characteristics may pose hazards to the environment upon disposal, medications identified as "hazardous waste" must be disposed of according to EPA requirements outlined in the Resource Conservation and Recovery Act (RCRA). Besides chemotherapy, affected hospital formulary medications are identified in the HealthBridge electronic health record or Pyxis® dispensing cabinets as "Hazardous Waste" or with the symbol "HW". These shall be discarded in an appropriate hazardous waste container, as listed below:

- **Bulk chemotherapy:** Rigid, black hazardous waste container
- **Trace chemotherapy:** Rigid, yellow chemotherapy containers for SHARPS with chemotherapy (Yellow bags for non-SHARPS items)
- **Non-chemotherapy hazardous waste:** Opened or partially used medications returned to the Main Pharmacy for disposal in appropriate containers. Common non-chemotherapy products include inhalers, aerosolized products, warfarin, and insulin vials (due to the preservative meta-cresol).



Clinical Pearls: Direct Oral Anticoagulants and Obesity

by Nubriel Hernandez, PharmD, Pharmacy Resident

Dosing of direct oral anticoagulants (DOACs) is uncertain in the face of obesity (defined by the National Institutes of Health as a body mass index [BMI] > 30 kg/m²) and extreme obesity (BMI > 40 kg/m²) due to limited pharmacokinetic and pharmacodynamic studies.¹

As per Martin *et al.*, decisions regarding the use of DOACs in the obese population may be limited to subgroup analysis of the phase III trials. However, none of these trials reported the number of patients enrolled with a BMI > 40 kg/m² nor their clinical outcomes.² Clinicians may refrain from use of DOACs in patients with a BMI > 40 kg/m² or weighing > 120 kg, while using standard dosing for other patients.¹ Otherwise, dose-adjusted warfarin should be used.³ The chart below shows the number of obese patients in major venous thromboembolism studies.

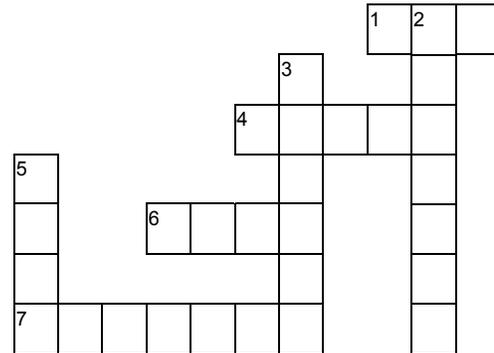
Drug Name	Weight Category	No. of Patients	Trial Reference
Rivaroxaban (Xarelto®)	≥ 100 kg	245/1731 (14.2%)	EINSTEIN-DVT: <i>N Engl J Med.</i> 2010; 363(26):2499-510.
	≥ 100 kg	345/2419 (14.3%)	EINSTEIN-PE: <i>N Engl J Med</i> 2012; 366(14):1287-1297.
	≥ 100 kg	85/602 (14.1%)	EINSTEIN-EXT: <i>N Engl J Med.</i> 2010; 363(26):2499-2510.
Apixaban (Eliquis®)	≥ 100 kg BMI ≥ 35	522/2691 (19.4%) 349/2691 (13.0%)	AMPLIFY: <i>N Engl J Med.</i> 2013;369(9): 799-808.
Edoxaban (Savaysa®)	≥ 100 kg	611/4118 (14.8%)	Hokusai-VTE: <i>N Engl J Med.</i> 2013; 369(15):1406-1415.
Dabigatran (Pradaxa®)	≥ 100 kg BMI ≥ 35	502/2539 (20%) 306/2539 (12%)	RECOVER-I: <i>N Engl J Med.</i> 009;361(24): 2342-2352.
	≥ 100 kg BMI ≥ 35	438/1280 (34.2%) 302/1280 (23.6%)	RECOVER-II: <i>Circulation.</i> 2014; 129(7):764-772.
	≥ 100 kg	299/1430 (20.9%)	RE-MEDY: <i>N Engl J Med.</i> 2009; 361(24):2342-2352.
	≥ 100 kg	122/681 (17.9%)	RE-SONATE: <i>N Engl J Med.</i> 2013;368(8):709-718.

References:

1. *J Thromb Haemost.* 2016;14:1308-1313.
2. *Expert Opin Drug Safety.* 2016;15(1):65-74.
3. *J Thromb Thrombolysis.* 2016;41(1):206-32.

Crossword Puzzle: Influenza

by Rudra Dasari, PharmD Candidate, Long Island University



Down

2. _____ hands is the most preventable way of spreading flu.
3. How often should you get a flu shot?
5. True or false: Getting vaccinated can also protect a baby after birth from flu.

Across

1. Antivirals work best when started in the first ____ days of the flu.
4. Flu vaccines cause antibodies to develop in the body about two ____ after vaccination
6. Quadrivalent flu vaccine protects against ____ strains of influenza viruses.



Team Tip of the Day

SMART PUMP INFUSION LIBRARY UPDATE

Please upload the latest infusion pump library.

1. Bring pump to Wi-Fi accessible location.
2. Check for Wi-Fi signal.
3. Turn pump OFF, then ON.
4. Select YES for "New patient."
5. Check for Version 22.



Answers to Crossword Puzzle:

- Down:** 2. Washing 3. Yearly 5. True
Across: 1. Two 4. Weeks 6. Four 7. Elderly