



State University of New York Downstate Medical Center - University Hospital of Brooklyn

Department of Pharmacy Services

Editor-in-Chief: LilyAnn Jeu, PharmD, BCPS

Managing Editors: Tavajay Campbell, PharmD, and Nubriel Hernandez, PharmD

INSIDE THIS ISSUE

News & Noteworthy:

Antimicrobial Stewardship to Manage Outpatient UTI

P & T Committee Updates

Research Corner: Effect on Asthma and COPD Patient Readmissions after Implementation of a Multi-Dose Medication Dispensing for Discharge Program in an Academic Medical Center

Spotlight on Safety: New Standard Medication Administration Times

New Drug Primer: Zoster Vaccine (SHINGRIX)

Nurses Want To Know: Medications to Avoid with Grapefruit Juice

Clinical Pearls: HIV Protease Inhibitor Drug Interactions

Crossword Puzzle: Allergic Reactions

Team Tip of the Day

Contributors

Zakaria Amin, PharmD/MBA
Candidate, Long Island University

Madhavi Gavini, PharmD, BCPS
Ambulatory Care Pharmacist

Christina Graiss, PharmD
Candidate, Long Island University

Nubriel Hernandez, PharmD
Pharmacy Resident

LilyAnn Jeu, PharmD, BCPS
Clinical Pharmacy Manager

CONTACT US

Main Pharmacy: x 2854/2856
IV Laboratory: x 4889
OR Satellite: x 1622
Parenteral Nutrition: x 3072
Oncology Satellite: x 2034
Adverse Drug Events: x 4065

News & Noteworthy: Antibiotic Stewardship to Manage Outpatient Urinary Tract Infection

by Tavajay Campbell, PharmD, and Madhavi Gavini, PharmD, BCPS

Towards the latter part of 2017, research findings suggesting inappropriate antibiotic prescribing in one of the hospital primary care clinics revealed some areas for improvement, particularly with the most commonly seen infection in the clinics - urinary tract infection (UTI). (Abstract published in our February issue!) As a result, guidelines for the outpatient management of UTIs for adults were developed.

The outpatient UTI guidelines draw recommendations from the Infectious Diseases Society of America and utilize data from the hospital UTI outpatient antibiogram. The guidelines provide information about the diagnosis and management of acute uncomplicated cystitis in adult non-pregnant women, complicated cystitis, asymptomatic bacteriuria or acute cystitis in pregnancy, and acute pyelonephritis in patients without catheters. In addition to addressing targeted management strategies, it is recommended to remind patients to complete each antibiotic course and seek medical attention if symptoms persist or return after completing the regimen. Copies of the guidelines have been disseminated throughout the clinics.

The creation of guidelines meets one of the four core elements of outpatient antibiotic stewardship established by the Centers for Disease Control and Prevention. Strategies such as this are vital because antibiotic use is the most important modifiable factor for antibiotic resistance. Antibiotics are also among the top drug classes leading to adverse drug event-related emergency department visits for all ages. With the introduction of these guidelines, the goal is to optimize antibiotic use in the primary care clinics at Downstate and reduce the risk of the aforementioned setbacks in our patient population.

References:

Hernandez N, Gavini M, Moy S, Nakeshbandi M. Evaluation of Antibiotic Prescribing Behaviors in an Outpatient Primary Care Clinic. *Medication Matters: Pharmacy Newsletter*. 2018;4(1):2

Centers for Disease Control and Prevention. Outpatient Antibiotic Stewardship. <https://www.cdc.gov/antibiotic-use/community/improving-prescribing/outpatient-stewardship.html#ref1>. Page updated September 28, 2017. Accessed June 13, 2018.

Pharmacy & Therapeutics Committee Updates

By Nubriel Hernandez, PharmD, Pharmacy Resident

Meeting Months: February through May 2018

Policies and Protocols

- (Updated) Policy "Medicinal Leeches"
- (Updated) Policy "Look-Alike/Sound-Alike Drugs"
- (Updated) Policy "Antibiotic Surveillance, Control, and Review"
- (Updated) Policy "Medication Administration/Documentation"
- (Updated) Policy "CT and MRI Imaging Studies with Contrast"
- (Updated) Policy and Protocol "Adult Prevention and Treatment of Hypoglycemia"
- (Updated) Guidelines "Treatment of Adult Diabetic Ketoacidosis and Hyperosmolar Hyperglycemic State"
- New Policy "Medication Standing Orders, Order Sets, and Protocols"
- New Guidelines "Management of Secondary Hyperparathyroidism in Hemodialysis"
- New Guidelines "Urinary Tract Infection Guidelines for Adults"
- New Guidelines "Outpatient Management of Urinary Tract Infection in Adults"

Formulary Changes

- Addition of Etelcalcetide (Parsabiv®) to formulary
- Addition of Esclicarbazepine (Aptiom®) to formulary
- Addition of Zoster Vaccine Recombinant (SHINGRIX) to formulary
- Change of Zoster Vaccine Live (Zostavax®) from formulary to non-formulary
- Change of Darunavir/Cobicistat (Prezcobix®) status from non-formulary to formulary

Research Corner: Effect on Asthma and COPD Patient Readmissions after Implementation of a Multi-Dose Medication Dispensing for Discharge Program in an Academic Medical Center

by *Tavajay Campbell, PharmD, Pharmacy Resident, and LilyAnn Jiu, PharmD, BCPS, CPHQ, Clinical Pharmacy Manager*
Presented at the Eastern States Conference for Pharmacy Residents and Preceptors. May 2018. Hershey, PA

Background: Access to medications remains one of the several barriers to effective transition of care for patients with chronic disease.¹ According to Medicare claims data from 2006 to 2010, approximately 1 in 5 chronic obstructive pulmonary disease (COPD) patients were rehospitalized within 30 days of discharge.² Data from the Healthcare Cost and Utilization Project's Nationwide Readmission Database show a 14.2% readmission rate for patients with asthma exacerbation.³ Multi-dose Medication Dispensing for Discharge (MMDD) is the practice of providing multi-dose medications initiated as inpatient therapy (e.g., inhalers, creams, eye drops) to patients upon discharge. The American Society of Health-System Pharmacists have encouraged implementation of MMDD services to assist in transition of care and reduce medication wastage.⁴ The objective of this study was to determine if discharging patients with their inpatient inhaler(s) may be associated with a reduction in 30-day hospital readmission.

Methods: This was a two-phase quality improvement study completed at an urban community-based hospital. Patients were identified through a computer-generated list of inhalers dispensed for inpatient use from the institution's electronic medical record system. The intervention was implementation of a MMDD policy targeting these inhalers. Admitted patients on inhaler therapy were discharged with the remainder of their multi-dose inhaler container for continuation after hospital discharge. For the pre-policy implementation phase, a retrospective chart review was performed for patients with a history of asthma or COPD who were dispensed an inhaler for inpatient use between October 2016 and February 2017. For the post-policy implementation review, a second retrospective chart review was conducted between November 2017 and February 2018. The primary outcome measure for the study was the rate of hospital readmission within 30 days of discharge. Readmission rates were compared before and after implementation of the policy. Secondary outcomes included reason for readmission.

Results: For the pre-implementation phase 24% (40/165) patients with asthma and/or COPD who received inpatient inhaler treatment experienced hospital readmission within 30 days of discharge. For the post-implementation phase 21% (7/33) patients with asthma and/or COPD who were discharged with their inpatient inhaler experienced hospital readmission within 30 days of discharge, representing a difference of 3%. There were 31% (13/42) total readmissions in the pre-implementation phase where the reason for readmission was asthma/COPD exacerbation as compared with 71% (5/7) in the post-implementation phase.

Conclusion: There was a minimal difference in 30-day readmissions before and after implementing the MMDD protocol. A combination of having a smaller sample size in the post-implementation phase and this season's flu epidemic could bear some responsibility. Future studies should be prospective in nature to help control for such factors.

References:

1. Mansukhani RP, Bridgeman MB, Candelario D, Eckert LJ. Exploring transitional care: Evidence-based strategies for improving provider communication and reducing readmissions. *Pharmacy and Therapeutics*. 2015;40(10):690-694.
2. Shah T, Churpek MM, Coca Perrailon M, et al. Understanding why patients with COPD get readmitted: A large national study to delineate the Medicare population for the readmissions penalty expansion. *Chest*. 2015;147(5):1219-1226.
3. Veeranki SP, Sharma K, Ohabughiro MU, et al. 30-Day readmissions in hospitalized adults with asthma exacerbations: Insights from the Nationwide Readmission Database. *Chest*. 2016 Nov;150(5):1162-1165.
4. ASHP. Multidose medication dispensing for discharge how-to webinar. <http://www.wapatientssafety.org/wp-content/uploads/2012/03/Smith-BoyerWebinarSlides.pdf>. March 2012. Accessed November 2017.

Spotlight on Safety: New Standard Medication Administration Times

by *LilyAnn Jiu, PharmD, BCPS, CPHQ, Clinical Pharmacy Manager*

| NEW Standard Times for Inpatient Medication Orders (Except Rehab Unit) | |
|---|--|
| Once daily | 10 AM |
| Twice daily | 10 AM - 10 PM |
| Three times daily | 6 AM - 2 PM - 10 PM |
| Four times daily | 6 AM - 12 PM - 6 PM - 10 PM |
| Hourly intervals (e.g., IV antibiotics) | <ul style="list-style-type: none"> ▪ Keep hourly intervals ▪ Time based on time of first dose on eMAR |
| Additional Standardized Times | <ul style="list-style-type: none"> ▪ Medications with meals ▪ Spaced to avoid drug interactions ▪ Time-critical medications ▪ Nitrates (6 AM, 12 PM, 6 PM) ▪ Diuretics (6 AM, 6 PM) |

As of June 26th, standard medication administration times at University Hospital of Brooklyn were redefined to address clinical, operational, and patient safety concerns.

Several clinical improvements should be readily apparent. For example, dosing intervals optimized to every 12 hours for twice daily doses and every 8 hours for doses due three times per day can provide more consistent drug levels and therapeutic effects. Some blood pressure lowering medications would now be spaced between 6 AM and 10 AM without explicit orders to stagger doses or attempts to reschedule doses. In addition, defaulted times for diuretics (such as furosemide) no later than 6 PM can help reduce nighttime diuresis and risk for falls.

Finally, fewer evening doses previously due at 6 PM may be missed with staff shift changes between 7 and 8 PM with reassignment of the last evening dose of the day to 10 PM.

New Drug Primer: Zoster Vaccine (SHINGRIX)

by Christina Graiss, PharmD Candidate, Long Island University

Zoster vaccine recombinant (SHINGRIX) is a vaccine indicated for prevention of herpes zoster (HZ), also known as shingles, in adults aged 50 years and older. Shingles is a viral infection caused by the varicella zoster virus, the same type of herpes virus that causes chickenpox. Shingles is characterized by blisters on one side of the face or body. SHINGRIX stimulates active immunity, thereby protecting against the infection and complications such as postherpetic neuralgia and vision loss.

There are quite a few disparities between the new vaccine and its predecessor, Zostavax[®]. SHINGRIX is stored refrigerated rather than frozen, with a much longer beyond-use time after reconstitution of 6 hours rather than 30 minutes. SHINGRIX has been shown more efficacious and with longer-lasting immunity (90% efficacious in the prevention of shingles and postherpetic neuralgia), while immune response with Zostavax[®] will have waned to below 4% by 9 years. Most significantly, as a recombinant rather than live vaccine, SHINGRIX can be used for immunosuppressed populations not eligible for Zostavax[®].

Indication and Dose:

- ◆ **Indication:** Herpes zoster prevention in adults aged 50 years and older
- ◆ **Dose:** 2 intramuscular doses (0.5 mL each) at 0 and 2 to 6 months

Contraindications:

- ◆ History of severe allergic reaction, such as anaphylaxis, to any component of the vaccine

Precautions:

- ◆ Lack of evidence to support use of SHINGRIX in pregnancy, lactation, and pediatric patients
- ◆ Not indicated for prevention of primary varicella infection (consider varicella vaccine if patient tested negative for immunity to varicella zoster virus)
- ◆ Active shingles infection: Wait until resolution of infection (e.g., rash)

Adverse Reactions:

- ◆ **Local:** Pain, redness, and swelling at the site of vaccination
- ◆ **General:** Myalgia, fatigue, headache, shivering, fever, and gastrointestinal symptoms.



Unfortunately, due to high demand, inadequate manufacturer production, and current recommendations from the Centers for Disease Control and Prevention to use SHINGRIX instead of Zostavax[®], supplies are limited and SHINGRIX is currently on backorder status for the hospital at this time.

Featured
patient-
care
question

Nurses Want To Know ... Zakaria Amin, PharmD/MBA Candidate, Long Island University

Q: Which medications should be avoided with grapefruit juice?

A: Some statins such as atorvastatin and simvastatin, calcium channel blockers such as nifedipine and verapamil, anxiety medications such as buspirone, and antiarrhythmics such as amiodarone are broken down (metabolized) by the enzyme CYP 3A4 in the small intestine. When chemicals in grapefruit juice bind to and block CYP3A4 receptors, metabolism of these medications is rendered impaired or limited, and thus more medication can enter the blood stream.

Drug accumulation can cause an increase in unwanted adverse effects inflicted by the medications. For example, if a patient were to drink grapefruit juice while on atorvastatin therapy, too much of the drug may accumulate in the patient's body, placing the patient at risk for atorvastatin's adverse effects on muscle or liver cells. The effect of chemicals in grapefruit juice may last more than 24 hours, so separating the affected medications from grapefruit juice may not avoid the interaction. In most cases, the recommendation is to avoid grapefruit juice altogether for the affected drugs. (For more information, see <https://www.fda.gov/forconsumers/consumerupdates/ucm292276.htm> or https://www.medicinenet.com/grapefruit_juice_and_medication_interactions/views.htm)

Clinical Pearls: HIV Protease Inhibitor Drug Interactions

by Nubriel Hernandez, PharmD, Pharmacy Resident

Infection with the human immunodeficiency virus (HIV) is managed with multiple medications from varying drug classes used to suppress viral replication. Due to this management strategy, the possibility of drug interactions has increased as people living with HIV are now living longer and require multiple medications for other comorbidities (e.g., diabetes, atrial fibrillation, hypertension, and hyperlipidemia) that may interact with antiretroviral therapy. With the increasing number and complexity of regimens, drug interactions may be overlooked by medical professionals including pharmacists.

The use of protease inhibitors (PIs) for HIV management has become more prominent with the relatively lower risk of viral resistance to PIs. However, as PIs may be substrates, inducers, or inhibitors of the metabolic isoenzyme CYP3A4, drug-drug interactions may result with concurrent use of acid-suppressing agents, corticosteroids, anticoagulants, antiplatelets, statins, and antiarrhythmics, to name a few drug classes.¹

For example, several case reports of iatrogenic Cushing's syndrome secondary to corticosteroids (e.g., fluticasone, mometasone, budesonide) with ritonavir or cobicistat (protease inhibitor boosting agents) have been reported.² Instead, preferred corticosteroids may be beclomethasone, flunisolide or hydrocortisone, which have not been associated with this effect. Boosted PI-based regimens may also be associated with increased bleeding risk with direct oral anticoagulants or antiplatelet agents such as apixaban, rivaroxaban, or ticagrelor.³ Thus, for anticoagulation, warfarin remains the drug of choice in people living with HIV on these antiretrovirals. Finally, atorvastatin, rosuvastatin, simvastatin, and lovastatin may require dose adjustments or may even be contraindicated with different protease inhibitor-containing regimens.³

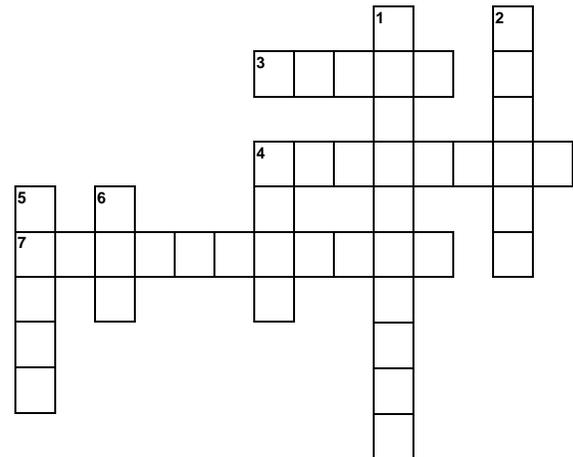
For more information on drug interactions, the AIDS Info Panel on Antiretroviral Guidelines for Adults and Adolescents¹ provides a summary of key interactions. To check interactions for specific drug pairs, consult the University of Liverpool website for up-to-date information and recommendations for management.³

References:

1. Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents Living with HIV. Department of Health and Human Services. Available at <https://aidsinfo.nih.gov/guidelines/brief-html/1/adult-and-adolescent-arv/0> (Accessed May 30, 2018)
2. Valin N, De castro N, Garrait V, Bergeron A, Bouche C, Molina JM. Iatrogenic Cushing's syndrome in HIV-infected patients receiving ritonavir and inhaled fluticasone: Description of 4 new cases and review of the literature. *J Int Assoc Physicians AIDS Care (Chic)*. 2009;8(2):113-21.
3. Liverpool HIV Interactions. *Hiv-druginteractions.org*. 2018. Available at: <https://www.hiv-druginteractions.org/>

Crossword Puzzle: Allergic Reactions

by Tavajay Campbell, PharmD, Pharmacy Resident



Down

1. A skin test can be done to confirm this common drug allergy
2. Most common food allergy
4. This food allergy should not be confused with lactose intolerance
5. The sting of these insects can cause anaphylaxis
6. Some allergies are seasonal, like ___ fever

Across

3. 1-6% of people are allergic to this natural rubber product
4. Cause of the most allergy-related deaths
7. Severe, life-threatening allergic reaction



Team Tip of the Day

STAY COOL WITH MEDICATIONS

Medications that require refrigeration are dispensed in blue bags from the Pharmacy.

Keep these medications (and bags) under refrigeration, including medication returns for Pharmacy pick up.



Answers to Crossword Puzzle

Down: 1. Penicillin 2. Peanut 4. Milk 5. Wasps 6. Hay

Across: 3. Latex 4. Medicine 7. Anaphylaxis