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P&T Update

Formulary Addition/Deletion

1. Elvitegravir/cobicistat/emtricitabine/tenofovir (Stribild®) – addition request
Stribild® is a combination of 4 products with 2 NRTIs, one integrase inhibitor (INSTI) and a CYP3A inhibitor. – Formulary addition approved
2. Dolutegravir (Tivicay®) – addition request
Dolutegravir is an integrase strand transfer inhibitor (INSTI). It blocks integrase activity, an enzyme responsible for the integration of HIV DNA into the host genomic DNA, leading to propagation of infection through HIV provirus formation.
Dolutegravir is considered as first line treatment option in combination with emtricitabine/tenofovir or abacavir/lamivudine for HIV-1 infected treatment naïve & experienced patients in age 12 years or older. – Formulary addition approved
3. Pancrease formulary reinstatement
Pancrease (lipase, amylase, protease) was deleted from the hospital formulary in July 2010 following manufacturer discontinuation. The medication is now commercially available again, so a formulary reinstatement was proposed. – Formulary reinstatement approved
4. Pralidoxime chloride (Protopam®) 1g vials
Pralidoxime vials have been discontinued by the manufacturer.
– Formulary deletion approved
5. Erythromycin sulfisoxazole (Pediazole®)
Erythromycin sulfisoxazole oral liquid has been discontinued by the manufacturer.
– Formulary deletion approved

Policies & Procedures/Floor Stock Update

1. Computerized order entry and verification of medication orders, medication administration, standard medication time schedule P&P revision.
– Policy revision approved
2. Patient Care Services reporting of ADR or Medication event P&P revision
831-200-057 Patient Care Services Reporting – Including Adverse Drug Reactions & Medication Errors Policy and Procedure revision to include reporting of device or product adverse event or error and reporting to FDA. – Policy revision approved
3. Investigational Drug Service P&P revision
707-600-117; 831-200-154 Investigational Drug Service Policy and Procedure revision to update the fee schedule. The new fee is more in line with recent University Healthcare Consortium (UHC) hospital list serve benchmark.
– Policy revision approved
4. Alaris smart pump drug library
Alaris smart pump module expansion to include PCA pumps and syringe pumps were rolled-out on September 23rd 2014. Post roll-out, more smart pump drug library revisions were identified.
5. Propofol bolus infusion rate change for ICU and anesthesia from 5mg/min to 500mg/min.



Policies & Procedures/Floor Stock Update

(Continued from page 1)

Morphine PCA standard concentration and HIGH dose concentration four hours max dose limit have been changed in all patient care profiles.

Fentanyl PCA standard concentration and HIGH dose concentration four hours max dose limit have been changed in all patient care profiles.

Hydromorphone PCA standard concentration and HIGH dose concentration four hours max dose limit have been changed in all patient care profiles.

Recuronium syringe built for OR use. – Library revisions approved

6. Guidelines for recombinant factor VIIa (NovoSeven) use at University Hospital – Guidelines approved
7. A P&P revision addressing ordering/scheduling of antibiotic orders made to allow first dose of antibiotic as STAT or NOW. For antibiotics not designed as STAT or NOW by the ordering provider, pharmacists will exercise discretion in adjusting administration time to ensure first dose is given within 2 hours.
8. Potassium chloride single dose and replacement max follow-up 707-600-157: ordering, administration and monitoring of potassium replacements. – policy revision
9. The revised policy sets maximum replacement limits of 120mEq per order (IV or oral) and 40mEq per single oral dose. Serum potassium levels must be obtained before any further replacement can be ordered and administered. The Epic medication

records for potassium chloride will be modified to implement the maximum dose limits and other policy requirements. – Policy revisions approved

10. 707-500-122 Automatic therapeutic exchange – policy revision. The policy now allows pharmacists to automatically interchange rapid acting insulin products (Novolog, Humalog) based on hospital availability. A physician may override such a substitution if they specifically write “do not exchange/substitute” in the medication order entry field. – Policy revision approved
11. 707-800-103 Multidose vial policy update Revisions to the multidose vial policy include discarding of the multidose vial (MDV) after a single time use once brought to the patient bedside. This update supersedes the older version of the policy which indicated to discard all the multidose vials after single use in certain areas of the hospital including ER, OR, PACU and areas without a medication room, or whenever a MDV was brought outside the medication room. – Policy revisions approved
12. 707-400-108 Code Cart policy update The Code Cart policy has been updated to remove vasopressin from the adult and pediatric code cart content list. – Policy revisions approved
13. 601-100-1162 Enteral Nutrition Policy Update The Enteral Nutrition Policy has been revised by the PCS, nutrition and pharmacy department. – Policy revisions approved



Vancomycin and Zosyn®: Is there increase in risk of acute renal toxicity when used together?

Vancomycin is a glycopeptide antibiotic which is used for treatment of gram-positive infections, including methicillin-resistant *Staphylococcus aureus* (MRSA). Vancomycin is known to cause nephrotoxicity especially when used concomitantly with other antibiotics that are nephrotoxic (like aminoglycosides). The dose is adjusted based on the trough levels and kidney function, to avoid acute renal failure. The nephrotoxicity caused by vancomycin varies widely, however, in recent years there has been an increase in the incidence of nephrotoxicity. The increase might be due to an increase in MRSA infections or other severe infections with higher MIC (minimum inhibitor concentrations). The risk of vancomycin-associated nephrotoxicity increases when the trough level is $\geq 15\text{mg/L}$ ¹.

Zosyn® (piperacillin and tazobactam) is an extended spectrum β -lactamase inhibitor. It is used to treat infections that are caused by β -lactamase producing microorganisms and organisms that are susceptible to Zosyn®. It is commonly used for *Pseudomonas aeruginosa* infections. Zosyn® also is known to cause nephrotoxicity, however, the incidence of nephrotoxicity is not very common (<1% based on package insert). Dose adjustment is recommended when creatinine clearance <40mL/min².

Vancomycin and Zosyn® are commonly used empirically to treat severe infections. The data on vancomycin and Zosyn® induced acute nephrotoxicity is still limited. A retrospective cohort study done by Burgess et al. evaluated the incidence of nephrotoxicity in patients who received vancomycin with or without Zosyn® and had normal baseline renal function. The results of that study showed that nephrotoxicity was higher in patients who received vancomycin and Zosyn® as a combination (16.3%) than in patients who had received vancomycin as monotherapy (8.08%) ($p=0.041$)³. The study also showed that the risk of nephrotoxicity is higher when vancomycin trough levels are $\geq 15\text{mg/L}$. Another retrospective matched-cohort study done by Gomes et al. evaluated the incidence of acute kidney injury in adults who received either vancomycin and Zosyn® or vancomycin and cefepime. The patients had normal baseline renal function at the time of antibiotic administration. The incidence of acute kidney injury in vancomycin-Zosyn® group was higher (36.4%) than vancomycin-cefepime



group (10.9%). Both of these cohort studies suggest that when vancomycin and Zosyn® are used together the risk of acute kidney injury is higher compared to using monotherapy⁴.

Based on the provided data it can be concluded that the concomitant use of vancomycin and Zosyn® increases the risk of nephrotoxicity in patients; however there are more studies which need to be conducted to validate the results. The mechanism of injury with this combination is unknown. Patients need to be monitored for kidney injury when vancomycin and Zosyn® are used together.

References:

1. Meany C J, Hunicka L M, Tsoukleris M G. Vancomycin-associated nephrotoxicity in adult medicine patients: incidence, outcomes, and risk factors. *Pharmacotherapy* 2014; 34(7):653-661.
2. Zosyn® [package insert]. Philadelphia, PA: Pfizer; 2012
3. Burgess L D and Drew R H. Comparison of the incidence of vancomycin-induced nephrotoxicity in hospitalized patients with and without concomitant piperacillin-tazobactam. *Pharmacotherapy* 2014; 34(7):670-676
4. Gomes D M, Smotherman C, Birch A, et al. Comparison of acute kidney injury during treatment with vancomycin in combination with piperacillin-tazobactam or cefepime. *Pharmacotherapy* 2014; 34 (7): 662-669

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Hydroxyurea for the treatment of Sickle Cell Disease



Sickle cell disease is an inherited disease that affects 1 in 12 African Americans and an estimated total of 90,000 to 100,000 Americans. People with sickle cell disease have c-shaped red blood cells that have shorter life spans. These cells often obstruct blood vessels and cannot flow easily because they do not have a normal round disc shape.¹ The sickle shape of the red blood cells also decreases their ability to carry oxygen. This obstruction in blood flow due to sickle cell aggregation can cause pain, stroke, or even infection. In many cases, patients with sickle cell disease have severe pain syndromes (acute pain crises) that can cause permanent damage.²

Hydroxyurea is an anti-metabolite, anticancer drug that was initially synthesized in 1869 and has been used to treat melanoma, ovarian cancer, and leukemia. In sickle cell patients, hydroxyurea is able to decrease sickle cell production due to its cytotoxic effect. The net effect is that hydroxyurea increases fetal

hemoglobin and decreases sickle cell hemoglobin. Hydroxyurea also increases red blood cell water content and decreases platelets and white blood cells which protects the body's arteries and veins.^{2,3}

The strongest evidence for the use of hydroxyurea is in adults with moderate to severe sickle cell disease. In these patients, the use of this drug is disease modifying. Ever since the use of hydroxyurea for treatment of sickle cell disease, quality of life and life expectancy have improved. The use of hydroxyurea has also been seen to reduce pain crises, hospitalizations and blood transfusion therapy. Efficacy for use in other age groups has not been well established. While treating patients some short term dose related effects may be seen including leukopenia (which increases risk of infection), thrombocytopenia (which increases risk of bleeding), and anemia. Patients should be monitored for these adverse events and the hydroxyurea dose should be decreased or discontinued if needed. Birth defects, growth delays and cancer are potential long term risks due to the drug's cytotoxic effects. Therefore, like all treatment options, clinicians should consider the risks and benefits of hydroxyurea.^{2,3}

References:

1. Centers for Disease Control and Prevention. Sickle Cell Disease. <http://www.cdc.gov/ncbddd/sicklecell/index.html> (accessed 2015 Mar 1).
2. Platt O. Hydroxyurea for the Treatment of Sickle Cell Anemia. *New England Journal of Medicine*. 2008; 358:1362-9
3. Segal JB, Strouse JJ, Beach MC, et al. Hydroxyurea for the Treatment of Sickle Cell Disease. Rockville (MD): Agency for Healthcare Research and Quality (US); 2008 Feb. (Evidence Reports/Technology Assessments, No. 165.)

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No Goodbyes Between Friends, Just See You Later-Joe Licata and Paul Ko

Joe Licata, RPh

We are sad to announce that our longest tenured Pharmacist, Joe Licata retired on 2/27/15 after 31 years of service at the UH Hospital Pharmacy Department. Joe saw countless changes here at UH as well as in Pharmacy as a profession during his employment at our hospital. His career began in Oct of 1984, and coincided with the release of newly approved medications such as Catapres (Clonidine Transdermal Patch) and Zantac IV (Ranitidine). Since that time he has seen 4 different directors head the department, as well as monumental changes in the way we delivered medications to our patients.

From humble beginnings of paper patient charts, where each medication was hand recorded after being ordered, to the usage of fax machines to send orders to pharmacy, to the launch of EPIC CPOM, Joe was a part of countless pharmacy department changes. Everyone at UH will miss Joe's presence on our overnight shift, and we all wish him continued happiness and success in his next phase of life.

Thanks Joe for some incredible memories and God Bless!

Paul Ko, RPh

A great man with a humble heart; Paul Ko was a treasured member of our pharmacy department. Paul was a staff pharmacist for over 10 years at University Hospital. His generosity and service to our department was endless throughout his tenure. Often times he provided a bagel breakfast for the staff on the weekends. Furthermore, he was always there to lend a helping hand. His kindness and generosity will be missed.

Good luck Paul and enjoy your retirement!





Welcome Two New Pharmacy Technicians



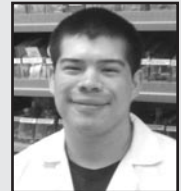
Alberto Santiago, New Lead Pharmacy Technician

It is a pleasure to welcome Alberto Santiago to the position of Lead Pharmacy Technician on the first shift. Alberto has been a pharmacy technician since December of 2010 at the University Hospital and has worked on all three shifts. With the experience and his enthusiasm for the new role I am certain Alberto will be a great asset to our team. CONGRATULATIONS Alberto!!!

Ruben Funez, CPhT

Ruben is happy to say that he started working at University Hospital since December 2014. He is a proud father of a one year son and planning to fulfill his dream by finishing school and becoming a Pharmacist.

Contributed By: Norma Innamorato, CPht Lead Pharmacy Technician



Welcome Two New Pharmacists



Mohammed ALY-KAMEL, RPH

Mohammed graduated from Cairo University in 2009. He practiced as a Tech for 2 years before joining University Hospital as a staff Pharmacist in 2015. He enjoys reading and is a big fan of soccer.

Richa Shah, Pharm. D. , RPH

Dr. Shah graduated from Temple University School of Pharmacy in 2011 and practiced in community pharmacy for 3 years before joining University Hospital in December 2014. In her spare time, she loves listening to music, traveling, cooking, and spending time with family and friends.



Meet Our Three New Clinical Pharmacy Specialists



Dr. Gregory Eilinger , IRB Clinical Pharmacy Specialist

Investigational Drug Services allow our patients access to new and innovative pharmaceutical interventions, while other patients are enrolled in studies designed to evaluate existing therapies. These studies help clinicians around the world have a better understanding of how different patients respond to different medications. Dr Gregory Eilinger will work with physicians and nurses of all disciplines as we evaluate exciting new pharmaceutical products designed to improve our patient's lives. In addition to his responsibilities as an IRB Pharmacist, Dr Eilinger will also work closely with other members of the University Hospital Clinical Pharmacy Team to improve outcomes for all of our patients at UH.



Dr. Merlin Punnoose, Liver Transplant Clinical Pharmacy Specialist

The Division of Transplantation Surgery supports the first liver transplant center in New Jersey, one of the busiest in the nation. Offering expertise in treating adult patients with liver failure requiring liver transplantation, the Division also provides comprehensive multi disciplinary team management of other complex hepatobiliary disorders, such as liver tumors, Hepatitis C, biliary strictures, and portal hypertension. In the Liver Transplant team, various disciplines such as physicians, physician assistants, nurse coordinators, financial coordinators, nutritionists and pharmacists come together to provide the highest level of patient care. Dr. Punnoose strives to provide clinical pharmacy services in both the inpatient and outpatient setting.



Dr. Mary Soliman, DSRIP Clinical Pharmacy Specialist

The DSRIP Pharmacist - Working hand in hand to improve outcomes and reduce readmissions, one patient at a time.

Delivery System Reform Incentive program (DSRIP) is a multidisciplinary initiative designed to offer our patients the highest level of medical attention throughout the continuum of care. The DSRIP Clinical Pharmacist, Dr. Mary Soliman, aims to improve access to care, quality of care, and patient education in order to reduce the 30 day readmission rate of our heart failure patients. It is the clinical pharmacist's goal, along with the DSRIP team's initiative, to create a medical home specifically geared towards our Cardiac Patients. Working hand in hand with physicians, nurses, dieticians, social workers and patients, Dr. Mary Soliman will reduce readmissions and improve outcomes one patient at a time.