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Special Points of Interest:

P&T Update

Formulary Addition/Deletion

- IV Acetaminophen (Ofirmev®) injection- addition- Ofirmev® is the IV formulation of acetaminophen approved for management of pain/fever. The formulary addition was requested by anesthesia/pain management. The potential advantages include the opioid sparing effect in post op patients who cannot take oral or rectal acetaminophen or IV Ketorolac. However, the safety concern for acetaminophen overdosing exists when prescribed by different routes. The cost difference between oral/rectal products vs. IV formulation (< $1/day to $40/day) is significant also. Majority of the members voted against the formulary addition of the product at this time. Formulary addition – Not deemed necessary at present
- Pharmacy initiated magnesium sulfate 2 Gm/50 mL Sterile Water. All code carts have already been updated to stock this formulation.
- Magnesium injectable class review was performed. Recommendations were made to streamline the formulary options and take this opportunity to improve inventory management and process efficiency.
- DELETIONS: magnesium 1G/100mL D5W, 4mEq/mL 10mL and 20mL.
- ADDITIONS: magnesium 2G/50mL SW for code carts and floor stocks.
- STANDARDIZE CONCENTRATION: magnesium 1G/50mL or 2G/100mL in D5W or NS to be batched by pharmacy.
- AUTOMATIC SUBSTITUTIONS: all magnesium runs 1-2g ordered to be automatically substituted to standard concentrations above.
- Revisions to the automatic therapeutic exchange policy were presented for member review and approval.
- The following additions for automatic therapeutic substitution were made:
- All magnesium runs 1-2g ordered to be automatically substituted to standard concentrations of 1G/50mL or 2G/100mL.
- Fluticasone/Salmeterol (Advair®) HFA inhaler to be substituted to budesonide/formoterol inhaler:

Fluticasone/ Salmeterol HFA Inhaler ordered		Budesonide/Formoterol
45 mcg/21 mcg 1 puff BID	substitute to	80 mcg/ 4.5 mcg 2 puffs BID
115 mcg/21 mcg 1 puff BID	substitute to	160 mcg/ 4.5 mcg 2 puffs BID
230 mcg/21 mcg 1 puff BID	substitute to	160 mcg/ 4.5 mcg 2 puffs BID

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P&T Update *(Continued from page 1)*

- Revision of the 707-600-127 Refrigeration units & temperature monitoring policy to reflect twice daily temperature recording required. This policy change is to be consistent with vaccine storage temperature monitoring requirements.
- Revision of the 707-700-108 Medication transcription, administration, standard time schedule policy to standardize the administration of levothyroxine on empty stomach at least 30-60 minutes before breakfast so to optimize absorption. Levothyroxine daily administration schedule is changed to default QAM (6:30) schedule.
- Revision of the 707-400-108 Resuscitation equipment checks & exchanges policy to reflect the new standardized resuscitation equipment contents, checks and exchange process. The changes are:
  1. TPA kit removal - rTPA kits are removed from all units, instead rTPA will be stocked in the Pyxis in select areas as outlined in the policy
  2. Pediatric code cart content list revision
  3. Code cart exchange process to include bringing of the empty cart from pharmacy to central sterile department for code cart cleaning as per the infection control dept
  4. Addition of CPR board/Doppler to the equipment log sheet
  5. Physical updating of the pediatric/neonatal crash cart contents as per the revised list. Changing of calcium gluconate 10%-10ml #3 vials to calcium chloride 10%-10ml #2 Abbojects due to short supply of calcium gluconate in pediatric/neonatal code carts. Prior authorization was obtained through pediatricians/neonatologist staff.
- Requests for Alaris smart pump guardrails data set changes were presented for member review and approval.

The following requests were discussed:

1. Midazolam infusion limits: hard max infusion limit set at 20mg/hr
2. Midazolam palliative care therapy added with no hard max limit
3. Eptifibatide infusion: two therapies created based on weight > or < 125kg. This is to ensure max dose within PI is not exceeded on this weight based medication
4. Propofol bolus dose ranges: bolus maximum/minimum doses were refined based on CQI data. Revision done to reflect clinical practice and literature supports this revision
5. IVF bolus label added to attempt to address the #1 alert generated from CQI data (1506 IVF alerts in Jan-Feb 2011). Distinction from IVF label having soft max of 500mL/hr.

- Medication Sample Policy Update- Removal of samples from ophthalmology department-approved.

The U.S. Food and Drug Administrations Changes Pregnancy Category For Fluconazole

As Paracelsus once said, "the dose makes the poison." Similarly high-dose of Diflucan® (Fluconazole), an antifungal drug, is linked to birth defects during the first trimester of pregnancy. Fluconazole is used to treat vaginal candidiasis, yeast infections of the mouth, throat & esophagus, and fungal meningitis.[1]

On August 3rd, 2011 the U.S. Food and Drug Administration announced that the use of long-term, high-dose (400-800 mg/day) fluconazole during the first three months of pregnancy may be associated with rare and distinct birth defects in infants.[2] These birth defects may include congenital heart disease, muscle weakness and joint deformities, oral cleft, short broad head, abnormal looking face, abnormally developed skull, thin ribs and long bones.[3]

Several case reports published in medical literature show congenital anomalies in infants whose mothers used chronic high-dose fluconazole for the treatment of fungal infections during the first trimester of pregnancy. Among these reports, four were involved with the use of chronic high-dose intravenous

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The U.S. Food and Drug *(Continued from page 2)*

fluconazole for coccidioidal meningitis and one report involved a HIV-positive mother who received chronic high-dose oral fluconazole for vaginal candidiasis. All of these cases shared a similar characteristic of the autosomal recessive genetic disorder known as Antley-Bixler syndrome. Even though these birth defects might be rare, high-dose fluconazole may have teratogenic effects in humans and may suggest a possible drug threshold effect for a fluconazole embryopathy.[2] However, the data does not suggest a correlation between low-dose (single dose of 150mg) fluconazole use in the first trimester of pregnancy and birth defects.[4]

Due to these findings, the pregnancy category for high dose fluconazole has been changed from pregnancy category C to category D. On the other hand, the pregnancy category of low-dose fluconazole to treat vaginal candidiasis remains as category C because data from animal studies shows adverse effect on the fetus due to single dose of 150mg fluconazole but available human data does not suggest an increased risk of teratogenicity following a single dose of 150mg during pregnancy. As a result, the FDA recommends that healthcare professionals counsel pregnant patients or those who become pregnant while taking fluconazole about potential fetal risks. All women should notify their healthcare professional if they become pregnant while taking fluconazole.[2]

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Type 3 Diabetes: Brain Diabetes?

Nearly 21 million Americans in the United States suffer from diabetes, a disease that lowers the body's ability to convert sugar to energy.[1] Over time, this can damage multiple organs, including the brain. In the last decade, scientists have been uncovering more evidence displaying a link between diabetes mellitus (DM) and Alzheimer's disease (AD). AD is a fatal brain disorder that gradually eats away at a person's memory and can affect a person's ability to carry out daily activities.[2] Recent studies have shown a connection between DM and AD, and this new disease has been named Type 3 diabetes or Brain Diabetes. The physiological relationship between DM and AD is not completely understood, however insulin deficiency and insulin resistance act as mediators in neurodegeneration. As a result, AD has evolved from merely a neurological disorder, to a neuroendocrine disorder.

The insulin resistance in type 2 DM occurs in the peripheral tissues where insulin is required for glucose uptake. Insulin does not appear to be required for the transport of glucose to the brain; however, insulin-receptor mediated transport processes carry insulin across the blood-brain barrier (BBB).[2] The hippocampus and the hypothalamus are the portions of the brain that deteriorate in Alzheimer's patients.[1]

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Type 3 Diabetes: *(Continued from page 3)*

They are responsible for learning and memory and contain many insulin receptors. Insulin resistance leads to increases in insulin concentration and inhibition of insulin degrading enzyme (IDE). This leads to a decrease in beta-amyloid clearance, and in turn increases beta-amyloid plaques, which are often seen as the cause of advanced AD.[2]

The classes of drugs that are being investigated for their role in the treatment of AD are thiazolidinediones and intranasal insulin. Thiazolidinediones are peroxisome proliferator-activated receptor (PPAR)-gamma agonists, which reduce insulin resistance.[3] In several controlled trials, patients who take rosiglitazone, a PPAR-gamma agonist, showed improved memory and cognitive function. Another treatment that shows promise in improving memory performance in humans is intranasal insulin. In recent studies, intranasal administration of insulin can provide direct access to the central nervous system (CNS) as opposed to traditional insulin, which only works in the periphery.[1]

Intensive study is underway in an attempt to better characterize type 3 diabetes. Thus far, there are no treatment options indicated with proven efficacy in the prevention of AD in patients with DM. However, pharmacists have a crucial role in educating patients on how to prevent the progression of uncontrolled diabetes to AD.

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Arcapta Neohaler®: A Breath of Relief for COPD Patients

Arcapta Neohaler® (Indacaterol, Novartis Pharmaceuticals) is the first long term, once daily bronchodilator to be approved by the U.S. Food and Drug Administration. Indacaterol is a beta-2 receptor agonist with an affinity 24 times greater than that of beta-1. It was approved for use in bronchitis, emphysema, and more importantly chronic obstructive pulmonary disorder (COPD).[1]

COPD is the third leading cause of death in the United States, affecting more than 12 million people across the country. Although there is no cure for COPD, there are many medications available to improve a patient's lifestyle and quality of life.[2]

Indacterol has proven to be effective in the treatment of COPD. According to data presented by INLIGHT-2 investigators, indacaterol has superior efficacy in treating COPD versus salmeterol, a commonly dispensed long acting beta-2 agonist. Indacaterol showed a clinically significant increase in trough FEV-1 when compared to placebo and salmeterol. The study also showed that indacaterol

has a similar safety profile compared to salmeterol. Additionally, when compared to salmeterol, patients on indacterol were able to go more days without resorting to albuterol for severe symptoms. However, indacaterol was associated with significantly more cough incidence

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Every Moment Counts In the Fight Against Severe Sepsis

In our fast paced career field, every moment counts as we fight the clock to efficiently and effectively treat our patients. From heart attack to gunshot wounds to stroke, we are constantly challenged to save lives. The management of sepsis requires immediate diagnosis and treatment for improved patient outcome. Known as a systemic inflammatory response to infection, sepsis can be an unpredictable state which may quickly spiral out of control. Among the millions afflicted by this disease every year, sepsis will claim one in four lives.[1] The treatment given to a sepsis patient within the first few hours of diagnosis has a significant impact on morbidity and mortality. In a randomized controlled trial published in The New England Journal of Medicine, early goal-directed therapy involving the regulation of cardiac preload, afterload, and contractility has proven to significantly reduce in-hospital mortality in patients presumed to have sepsis.[2] Despite such vital clinical data, the majority of sepsis patients will require care in the Intensive Care Unit and have a significant risk for mortality. Sepsis is an insidious disease state which may initially present as a simple case of a urinary tract infection or skin abscess. Thus, vigilance is key when fighting such a formidable opponent. Recognizing signs of early sepsis such as fever, chills, altered mental status, tachycardia, and in some cases hypothermia may ultimately decide a patient's prognosis. If early intervention is not initiated, patients can experience hemodynamic instability, tissue hypoperfusion, hypoxia, and elevated lactate levels leading to metabolic acidosis. As the patient deteriorates from sepsis to severe sepsis to septic shock, the risk of morbidity and mortality increases.

Within the first six hours of suspected severe sepsis, early goal-directed resuscitation should be implemented with the following endpoints: central venous pressure (CVP) of 8-12 mmHg, mean arterial pressure (MAP) ≥ 65 mmHg, urine output ≥ 0.5 mL/kg/hr, and central venous or mixed venous oxygen saturation ≥ 70% or 65%, respectively.[1] Such early interventions have proven to reduce the 28 day mortality rate in a randomized, controlled, single-center study for patients admitted to the emergency department presenting with septic shock.[2] In addition to these interventions, thorough assessment and monitoring of the patient is essential to treating sepsis. Careful examination of a patient's medical history, including notation of recent travel, injuries, animal exposure, recent infections, and use of antibiotics, is necessary. Microbiological specimen collection is equally important to identify the causative agent of systemic infection. Cultures should be obtained from suspected site(s) of infection. When obtaining blood cultures, it is recommended to obtain two or more cultures, one via a peripheral site and one from each vascular access placed more than 48 hours prior to diagnosis. If the source of the infection can be pin-pointed, drainage, debridement, or removal of the infected area must be achieved as a process of source control. Such interventions must be completed promptly without delaying subsequent antibiotic or fluid administration.[1]

Once the possibility of severe sepsis has been recognized, empiric antibiotic therapy must be administered within the first hour to control the infection. Choosing the correct anti-microbial agent(s) is dependent on several factors. One must consider the source of infection, presentation of symptoms, possible previous infection(s), patient history, resistance patterns of the community and institution, and the presence of vascular access. It is recommended that anti-microbial agents be given to cover likely bacterial and/or fungal organisms. Recent antibiotics taken by a patient should be avoided, and empiric coverage against MRSA and *Pseudomonas* species should be considered depending on the patient's clinical picture. Appropriate anti-microbial dosages must be given to ensure penetration to the suspected areas of infection. Route of administration and duration of infusion are other important considerations as certain antimicrobials may be infused as a bolus initial dose; whereas other agents require longer infusion time. Culture and sensitivity results must be evaluated to de-escalate therapy to a more tailored regimen; duration of therapy will depend on the site of infection and clinical response. The use of narrow spectrum

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anti-microbial regimens will prevent superinfection with different organisms, such as *Candida* species, *Clostridium difficile*, and vancomycin-resistant *Enterococcus faecium*.[2] In a study examining 904 patients with microbiologically confirmed severe sepsis or septic shock, a 28 day mortality was noted in 39% of the patients who received inappropriate antibiotic treatment versus 24% who received appropriate therapy.[3] To facilitate early administration of antibiotics within the first hour of suspected sepsis, a stock of select premixed antibiotics are kept in the Pyxis machines of the Emergency Department. The Pharmacy Department is responsible for maintaining the supply of antibiotics in the Pyxis machines as well as efficiently delivering medications (including antibiotics) to the patient floors.

Another important intervention which must be quickly initiated is fluid replacement. To correct hypovolemia, initial fluid challenges of 500-1000mL of crystalloid solution or 300-500 mL of colloid solution should be administered and repeated based on response in blood pressure and urine output.[2] According to the SAFE trial, the use of crystalloid therapy (normal saline) has similar safety and efficacy compared to colloid (albumin) therapy for fluid replacement.[4] The use of crystalloid solutions, such as normal saline, are generally encouraged given their widespread availability and lower cost compared to colloid solutions.[2, 4] Fluid resuscitation should be titrated to achieve a central venous pressure ≥ 8 mmHg (≥ 12 mmHg in mechanically ventilated patients). Although numerical outcomes are important in the clinical setting, the clinician must also base therapy on the general hemodynamic improvement and clinical response of the patient.

If fluid challenge fails to correct hypovolemia and hypotension, more aggressive treatment with vasopressors and inotropic therapy should be considered. When commencing vasopressors, mean arterial pressure (MAP) should be maintained at ≥ 65 mmHg (may differ according to comorbidities and age of patient).[1] Unfortunately, MAP may not give the complete clinical picture, thus physicians may turn to blood pressure, regional and global perfusion, blood lactate concentrations, and urine output for greater detail.[1] Norepinephrine or dopamine are the drugs of choice for vasopressor therapy to correct hypotension in septic shock. Epinephrine is an alternative agent when the previous choices are not achieving pressure control.[5] Low doses of vasopressin may be effective in patients refractory to other vasopressors. Furthermore, vasopressin may be given concomitantly with norepinephrine to achieve more adequate pressure control.[6] Inotrope therapy may also be considered along with vasopressor therapy when cardiac output is suboptimal. With respect to inotrope therapy, dobutamine is the first choice for patients with measured or suspected low cardiac output in the presence of normal left ventricular function and adequate MAP. If poor response to fluid resuscitation and vasopressor therapy occurs, steroid therapy may be considered for quicker resolution of septic shock. Although researchers of the recent CORTICUS trial have shown no mortality benefit with steroids, faster resolution of septic shock occurred in patients treated with steroids.[7] Hydrocortisone is the preferred corticosteroid agent in the treatment of septic shock. Prolonged use of corticosteroids can increase the risk of infection and myopathy, alter blood pressure and blood sugar, decrease bone density, and cause fluid retention and weight gain, thus risk versus benefit analysis must be performed before commencing steroid therapy.[1]

For patients with multiple organ dysfunction and an Acute Physiology and Chronic Health Evaluation (APACHE) II score ≥ 25, recombinant human activated protein C (rhAPC, drotrecogin alfa, Xigris®) may be one of the final options left for the treatment of severe sepsis. This product is only indicated for patients with high risk of death, APACHE II score ≥ 25, and no contraindications to therapy; use of rhAPC in patients with APACHE II score < 20 and low risk of death can increase the risk of mortality.[2, 8, 9] Researchers of the PROWESS trial involving 1,690 patients with severe sepsis documented a 6.1% absolute total mortality reduction and relative risk reduction of 19.4% with rhAPC therapy in patients at high risk of death.[8] The ENHANCE trial also suggested that early administration of rhAPC was associated with better outcomes in high risk patients.[9] It must be noted that drotrecogin alfa increases the risk of bleeding and is contraindicated in patients with recent hemorrhagic stroke, recent intracranial or intraspinal surgery, severe head trauma, presence of an epidural catheter, intracranial neoplasm, or evidence of cerebral herniation.

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Arcapta Neohaler: *(Continued from page 4)*

following inhalation than salmeterol. The cough observed was not associated with bronchospasm or loss of bronchodilator efficacy.[3]

Overall, indacaterol offers much hope for COPD patients. Aside from offering increased efficacy compared to other twice-daily long-acting bronchodilators, indacaterol also allows for convenient once daily usage. This dosing regimen is likely to greatly increase patient compliance thereby reducing COPD symptom onset.

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Antibiotic Stewardship

Antibiotics were once known as the miracle drugs that dramatically changed the course of many fatal illnesses, but today many antibiotics have become less effective because of antibiotic resistance. Resistant organisms are a serious issue because they often extend the patient's length of treatment and stay at the hospital, increase healthcare costs, and increase the risk of patient death.[1] Evidence shows a direct link between the inappropriate use of antimicrobials and an increase in resistance patterns. Due to the problem with antibiotic resistance, many clinicians are forced to prescribe older antibiotics such as polymixins and other second line agents that are less efficacious and are often associated with greater toxicities.[2]

Some reasons for the increase in antibiotic resistance are the overuse and misuse of antibiotics, the lack of education about antibiotics and misconceptions among patients and clinicians. Another important issue is the decreased development of new antibiotics. Unlike maintenance medications, antibiotics are only used to treat acute bacterial infections and are thus less profitable and less attractive to pharmaceutical companies. Also, because of the nature of bacterial infections, it is difficult to find patients to participate in clinical studies. Only two novel classes of antibiotics, the oxazolidinones (linezolid) and lipopetides (daptomycin) have been developed in the last 40 years.[2]

In the past decade, new guidelines have been published that advocate the addition of a clinically trained infectious disease pharmacist to the core clinical team to ensure the appropriate use of antibiotics.[2] According to the 2007 guidelines published by the Infectious Disease Society of America and the Society for Healthcare Epidemiology of America, there are two proactive strategies that should be implemented for antibiotic stewardship.[1] The first is "prospective audit with direct intervention and feedback" where the pharmacist actively evaluates the appropriateness of the prescribed antibiotics and notifies the prescriber of any issues or recommendations. The second is "formulary restrictions and preauthorization requirements" which helps to limit the use of certain antimicrobials to certain patient populations and disease states.[1] The responsibility of antibiotic stewardship should not only fall on clinical pharmacists, but on pharmacists in all practice settings. For example, pharmacists in the community setting can actively participate in preventing antibiotic resistance by educating their patients about the proper use of antibiotics (not skipping doses, completing the full course), educating the public about general hygiene and encouraging vaccinations.[2,3] Vaccines have been proven to decrease primary and secondary infections and decrease the use of antibiotics.[2] Pharmacists need to take ownership of their role and be an active part of the solution to decreasing antibiotic resistance.

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Further Advances in HIV Therapy

The FDA recently approved rilpivirine (*EDURANT*™, Tibotec Therapeutics) in May 2011 for the treatment of HIV-1 infection in treatment-naïve patients. Antiretroviral therapy (ART) for HIV infections has improved since the beginning of the use of effective combination therapy in 1996[1], and this has allowed HIV to transition from an acute to chronic illness which

can be successfully managed long-term. However, no new non-nucleoside reverse transcriptase inhibitor (NNRTI) has been compared to efavirenz for ART-naïve patients since its approval in 1998 until now[2]. Standard of care for ART-naïve patients includes regimens based on NNRTI, protease inhibitors (PI), or integrase strand transfer inhibitors, with a combination of efavirenz, tenofovir, and emtricitabine as the preferred therapy for NNRTI-based regimens.[1]

Rilpivirine is a diarylpyrimidine NNRTI that is specific for HIV-1 and non-competitively inhibits HIV-1 reverse transcriptase. It is manufactured as a 25mg white tablet with a recommended dose of one 25mg tablet taken orally once daily preferably with a meal. Some of the advantages of rilpivirine as compared to efavirenz are decreased incidence of teratogenicity, less lipid level elevations, and fewer CNS side effects that efavirenz is notorious for.[3,4] However, rilpivirine may have a higher risk of virologic failure and resistance, especially in patients with an initial viral load of ≥ 100,000 copies/mL. In addition, a risk of cross-resistance with etravirine was found when patients obtained resistance to rilpivirine.[5]

A 96-week, phase 3, randomized, double-blind trial known as the THRIVE trial was undertaken in 98 hospitals in 21 countries. Their main objective was to assess the non-inferiority of rilpivirine to efavirenz when used in combination with common nucleoside or nucleotide reverse transcriptase inhibitors (N(t)RTIs). They enrolled 678 ART-naïve adults who had a plasma viral load of ≥ 5,000 copies/mL and were viral sensitive to N(t)RTIs. Patients were randomly assigned to receive oral rilpivirine 25mg once daily or efavirenz 600mg once daily. All patients also received investigator-selected regimens of background N(t)RTIs (tenofovir plus emtricitabine, zidovudine plus lamivudine, or abacavir plus lamivudine). The primary outcome measured was non-inferiority in the intent-to-treat population at 48 weeks with a confirmed response (viral load < 50 copies/mL). At 48 weeks, 86% of rilpivirine group responded while 82% of the efavirenz group responded (difference 3.5% [95% CI -1.7 to 8.8]; $CD4^+$ cell count increases were similar between the two groups, but 7% of patients who received rilpivirine had virologic failure compared to 5% in the efavirenz group. Adverse events such as rash, dizziness, and increases in lipid levels were experienced in 16% of the rilpivirine group, while the efavirenz group had 31% ($p < 0.0001$).[5]

The ECHO trial was a phase 3, randomized, double-blind, active-controlled trial studied in 112 sites in 21 countries. They aimed to assess the efficacy, safety, and tolerability of rilpivirine versus efavirenz. HIV-1 infected treatment-naïve adults with plasma viral load ≥ 5,000 copies/mL and viral sensitivity to all study drugs were enrolled. The investigators randomly assigned 690 patients to receive 25mg rilpivirine once daily or 600mg efavirenz once daily, each with tenofovir and emtricitabine. At week 48, they evaluated the primary endpoint of non-inferiority of rilpivirine to efavirenz by assessing the percentage of patients with confirmed response (viral load <50 copies/mL). Both treatment groups had 83% confirmed response at week 48, which showed non-inferiority. The rilpivirine group had a 13% incidence of virological failures, while the efavirenz group had a 6% incidence. Adverse events were lower for rilpivirine (16%) than for efavirenz

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Further Advances in HIV Therapy

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(31%) as were discontinuations due to adverse reactions such as rash, dizziness, or abnormal dreams nightmare (2% for rilpivirine and 8% for efavirenz). Plasma lipid levels were found to be higher in the efavirenz group.[6]

Overall, rilpivirine is found to be a safe alternative to efavirenz in treating ART-naïve patients who are HIV-1 positive. It has been shown to be associated with less side effects than efavirenz, but because of its higher incidence of virological failure at higher viral loads, more trials must be undertaken to assess its safety and the possibility of switching from PI-based or efavirenz-based regimens to rilpivirine in virologically-suppressed patients.

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The Search for a Superior Oral Anticoagulant

Over the years, preventing venous thromboembolism (VTE) has proven to be a difficult task, due to the delicate risk benefit ratio encountered when administering medication prophylaxis. Warfarin, a vitamin K antagonist, has been the primary oral anticoagulant used to prevent VTE for many years. Warfarin is by no means an ideal agent, taking into consideration its narrow therapeutic index, difficulty in dosing, risk of bleeding, and high incidence of drug and food interactions.

Only in recent years have new oral anticoagulants been approved by the FDA. Dabigatran (Pradaxa®), an oral direct thrombin inhibitor, was approved in October of 2010 to reduce the risk of stroke and systemic embolism in patients with non-valvular atrial fibrillation.[1] The most recent new oral anticoagulant put on the market, rivaroxaban (Xarelto®), an oral factor Xa inhibitor, was approved on July 1st, 2011 to reduce the risk of blood clots, deep vein thrombosis (DVT), and pulmonary embolism (PE) following knee or hip replacement surgery.[2]

So far, both these agents appear to be attractive alternatives to warfarin for numerous reasons. In fact, both these agents have been compared to warfarin in clinical trials of patients with atrial fibrillation, proving to be safe as well as noninferior to warfarin in preventing stroke or systemic embolism.[3,4] With a fixed dosing scheduling, dabigatran and rivaroxaban do not require routine blood monitoring. Also, the high degree of clinically relevant drug interactions seen with warfarin has not been recognized with either of these agents. As the safety and efficacy of these new oral anticoagulants become recognized, the question rises of how these agents not only compare to the standard of therapy, but to each other. Currently their indications direct their use towards seperate patient populations, yet the debate is still at hand.

The search for an ideal oral anticoagulant continues. Hopefully with time, as more randomized controlled trials are performed and more post marketing surveillance is completed, we will have a better grasp on the true safety and efficacy of potential candidates to phase out warfarin, such as dabigatran and rivaroxaban.

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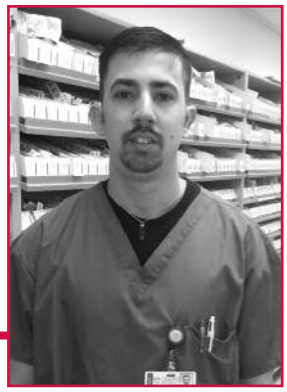
Employee of the 3rd Quarter

Alberto Santiago



The Pharmacy Department is pleased again not only to introduce, but honor another employee with the Employee of the Quarter Award for the third quarter of 2011. The Essential Piece Award this time around goes to Alberto Santiago, whom from day one has demonstrated to be a remarkable employee who continues to reveal his abilities. Alberto Santiago joined UMDNJ in December of 2010, and from that point on, the department has been very fortunate to have him on staff. It is evident that he indeed is very passionate about what he does. Alberto puts in a lot of effort when completing any one of his duties; such extreme detail is clearly seen on any given task which Al easily finishes in both a timely and neatly manner. His colleagues agree that "Alberto is a hard worker that takes on extra responsibilities, is easy to approach when needed for help, and does everything with initiative and a smile!" Alberto is both a pleasant and respectable gentleman with a true noble nature. Not too long ago we were welcoming Alberto to UMDNJ, this time lets all join in congratulating him for his hard work, dedication and efforts in providing UMDNJ with his best, a taste of what he is made of. Congratulations Alberto, your enthusiasm and passion continue to motivate us all.

Contributed by
Harry Cuartas, CPhT
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Every Moment Counts In the Fight Against Severe Sepsis *(Continued from page 6)*

Early goal-directed protocols for severe sepsis are designed to give the health care professional a blueprint for treating such a serious disease. As the leading cause of death in critically ill patients in the United States, sepsis must be systematically treated in an efficient yet comprehensive manner. Research has led to the discovery that early goal-directed resuscitation guided by continuous monitoring and specific therapeutic interventions can reduce mortality as well as the economic implications of the disease for any institution.[10] In the fight against sepsis, we are racing the clock to control the infection and inflammatory response which afflicts our patients; every moment counts when battling such an aggressive disease.

Contributed by: Mary Soliman, RPh

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