In recognition of World AIDS Day, the November/December issue of the RxPress focuses on HIV infection. Specifically, this edition provides an overview of 2 new documents from the updated guidelines for antiretroviral agents in pediatric patients. These 2 supplements review adverse effects related to drug therapy in pediatrics and provide an overview of pediatric HIV pain management and nutritional care. The full documents may be viewed at: http://aidsinfo.nih.gov/guidelines/default_db2.asp?id=51.

Updated Guidelines for Antiretroviral Agents in Pediatric Patients: Focus on Adverse Events

Introduction
The Working Group on Antiretroviral Therapy and Medical Management of HIV-Infected Children has developed updated guidelines for the use of antiretroviral agents in pediatric patients. The 2004 guidelines include additional supplements, one of which summarizes the major adverse effects of antiretroviral (ARV) therapy. This supplement will be summarized in the following paragraphs with an emphasis on management of the adverse effects. The adverse reactions are summarized in 4 major categories: mitochondrial dysfunction, metabolic abnormalities, hematologic abnormalities, and allergic reactions.

Mitochondrial dysfunction
Lactic acidosis
Lactic acidosis and hepatic steatosis may result from inhibition of DNA polymerase caused by nucleoside analogue reverse transcriptase inhibitors (NRTIs). Asymptomatic increases in lactate are reported to occur in 15-35% of adults receiving antiretroviral treatment while symptomatic hyperlactatemia is less common, occurring in 0.2-2.5% of those patients. Routine monitoring of serum lactate is not recommended, but patients should be monitored for symptoms associated with lactic acidosis (e.g. weakness, fatigue, myalgias, or gastrointestinal, respiratory, and neurologic symptoms). Management of the patient with lactic acidosis is based on serum lactate levels. Recommendations are shown in Table 1. Following resolution of lactic acidosis, an NRTI-sparing regimen or a regimen that contains an NRTI with less effect on the mitochondria such as abacavir or tenofovir may be resumed.

Hepatic steatosis
Hepatic steatosis associated with the NRTIs is only one form of ARV-associated hepatotoxicity. The non-nucleoside analogue reverse transcriptase inhibitors (NNRTIs) and protease inhibitors (PIs) are also associated with forms of hepatotoxicity. Of the PIs, only ritonavir has been linked with severe hepatotoxicity in patients without viral hepatitis. Liver function tests should be a routine part of care for HIV-infected children. Liver function abnormalities can occur at anytime during therapy. An acute increase in transaminases early in treatment may be caused by hypersensitivity to ARV therapy (e.g. nevirapine or abacavir). If the transaminase elevation occurs after several months of treatment, a more likely cause would be liver steatosis associated with NRTI therapy. Therapy is not typically discontinued for transaminase levels < 10 times the upper limit of normal, but evidence of severe hepatotoxicity or hepatitis may be grounds for ARV discontinuation.
Table 1. Management of ARV-Associated Lactic Acidosis.

<table>
<thead>
<tr>
<th>Lactate level</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2.0</td>
<td>Symptoms are not lactic acidosis; continue ARV therapy</td>
</tr>
<tr>
<td>2.1 to 5.0</td>
<td>May continue ARV, monitor symptoms and serum lactate level OR Discontinue ARV while work-up is completed</td>
</tr>
<tr>
<td>&gt; 5.0</td>
<td>Discontinue ARV and start supportive therapy with IV fluids, sedation, and respiratory support as needed Other anecdotal therapies may be used including bicarbonate, riboflavin and thiamine, or antioxidants</td>
</tr>
</tbody>
</table>

**Metabolic abnormalities**

**Lipodystrophy**
Lipodystrophy, change in fat distribution, is associated with the use of PIs and NRTIs, and the combination results in different effects than those seen with each individual class. The etiology is believed to be multi-factorial and may include genetics and diet as well as drug exposure and duration. Currently no routine monitoring for lipodystrophy is recommended; however, waist circumference, waist-to-hip ratios, and triceps skinfold may be beneficial. Specific treatment regimens for lipodystrophy in children with HIV cannot be recommended, as there are little data. However, switching patients from PIs to efavirenz or nevirapine may help reverse some metabolic abnormalities. With NRTIs, avoiding stavudine and didanosine may help prevent or treat this adverse effect. Other therapies of potential benefit include insulin-sensitizers, hormones, diet, and exercise.

**Dyslipidemia**
Dyslipidemia is common in HIV-infected adults, especially in PI-treated patients. PI-associated hypertriglyceridemia occurs most with ritonavir, and is least likely to occur with atazanavir. Among the NRTIs, stavudine is most often associated with hyperlipidemia. Children treated with ARV therapy should have a fasting lipid profile prior to initiation and routinely thereafter (at least every 6 months). If fasting levels cannot be obtained, non-fasting levels can be used. Diet and exercise should be the basis for dyslipidemia treatment in children. If the patient is at risk for pancreatitis or 6-12 months of lifestyle changes have failed, then it is reasonable to initiate drug therapy; however, experience with drug therapy is limited to children over age 10. The medications and recommendations for ARV-associated hyperlipidemia are summarized in Table 2. Another option for correcting hyperlipidemia may be to change the regimen from agents that are likely contributing to the adverse effect to agents less likely to cause hyperlipidemia (e.g. from PI to NNRTI). Dietary adjuncts such as stanol ester margarines and psyllium may also be useful.

**Glycemic complications**
ARV therapy, especially PI-containing regimens, has been implicated in causing both hyperglycemia and insulin resistance without associated fasting hyperglycemia. Routine fasting glucose measurements are not indicated unless the child has other risk factors for type 2 diabetes. Studies are currently attempting to determine if changing from a PI to another agent (NNRTI or abacavir) is effective for children with diabetes or hyperglycemia. Treatment with insulin-sensitizers or insulin is appropriate for hyperglycemia if diet and exercise are not effective. There is no recommendation as to whether ARV therapy should be altered in patients with insulin resistance who do not have fasting hyperglycemia.

**Bone mineral density**
Bone mineral density changes (osteopenia or osteoporosis) in HIV-infected patients are commonly associated with PI therapy; however, changes are seen with other regimens and may be a result of NRTI-associated mitochondrial toxicity. Osteonecrosis has also been observed in HIV-infected children, but has not been linked to a particular ARV regimen. At present there are no recommended bone density screening guidelines in HIV-infected children. Prevention of bone mineral density changes in HIV-infected individuals mirrors that of the general population and includes adequate intake of calcium and vitamin D, weight-bearing exercise, and avoidance of alcohol or tobacco. In patients with documented bone density changes, bisphosphonates may be considered; however, they have not been studied in children with HIV.

**Hematologic complications**
Anemia, neutropenia, and thrombocytopenia are common in HIV-infected children. Often these hematologic disorders are a result of HIV or related infection and not a result of drug therapy. Routine blood counts should be performed in HIV-infected individuals. Although other ARVs may cause anemia, it is most common with zidovudine. Children with hemoglobin levels
Medication or Medication Class | Comments
--- | ---
HMG-CoA reductase inhibitors | Pravastatin is preferred agent
Atorvastatin is an alternative
Bile acid sequestering agents | Gastrointestinal side effects
May interfere with ARV absorption
Fibrates | May be useful for elevated triglycerides; limited data in children
Avoid use with statins
Niacin | Not well tolerated
May increase risk of insulin resistance associated with PIs
Ezetimibe | May be used with statins
Has not been studied with PIs

< 7 or 8 should be evaluated. Erythropoietin is recommended for anemia treatment, and usually ARV therapy is not discontinued. As with anemia, neutropenia is often attributed to zidovudine. Non-ARV agents may also cause bone marrow suppression (e.g. trimethoprim-sulfamethoxazole, ganciclovir, rifabutin, hydroxyurea). When the absolute neutrophil count (ANC) remains > 250 cells/mm³ without symptoms of infection it is not necessary to immediately discontinue ARV therapy. If ANC drops below 250 cells/mm³ the ARV regimen may be changed or granulocyte colony stimulating factor (G-CSF) may be initiated. Thrombocytopenia is often a result of HIV infection rather than an adverse reaction to ARV therapy. If platelets number <20,000 or the patient is bleeding, IVIG may be initiated. Other alternatives for thrombocytopenia include anti-D antibody or a course of corticosteroids.

**Hypersensitivity Reactions and Skin Rashes**

**Skin reactions**
Skin reactions are most common with the NNRTIs and can range from simple maculopapular rashes to more severe forms such as Stevens-Johnson syndrome or toxic epidermal necrolysis. Nevirapine may be continued in patients who develop a mild rash, but should be discontinued indefinitely in patients with severe rash. An alternative NNRTI, efavirenz, may be substituted in mild to moderate rash; however, the patient should be monitored as cross-sensitivity may occur. Cutaneous reactions may also occur in regimens containing only NRTIs or NRTIs in combination with PIs. Amprenavir and fosamprenavir should be used cautiously in patients with hypersensitivity to sulfa-containing medications. Enfuvirtide is known to cause injection site reactions that typically clear in less than 1 week. Injecting into the arm rather than the abdomen or thigh may reduce reactions.

**Rash**
Rash may be one presentation of hypersensitivity to ARV therapy; however, other symptoms may occur. Abacavir is associated with a hypersensitivity reaction that may be fatal. It can present with symptoms such as fever, rash, gastrointestinal symptoms, respiratory symptoms, fatigue, or with muscle or joint pain. Hypersensitivity typically occurs early in therapy and discontinuation of abacavir is warranted. Following a reaction, patients should not be rechallenged. Hypersensitivity to nevirapine is associated with fever, joint or muscle pain, hepatitis, or eosinophilia. Nevirapine should likely be discontinued and other NNRTIs should be avoided. Corticosteroids have not been shown to be beneficial for managing either reaction.

**Conclusion**
Data surrounding management of adverse events associated with antiretroviral use in children are limited and often extrapolated from adult data. Although this supplement serves as a guide to the general management of these adverse events, specific recommendations should be sought from a pediatrician experienced in HIV management.

**Updated Guidelines for Antiretroviral Agents in Pediatric Patients: Pain Management and Nutritional Care**

**Pain Management**
A reduction in quality of life and an increase in mortality are 2 consequences of inadequate pain management in HIV-infected pediatric patients. Pain in this patient population may be the result of neural inflammation, systemic manifestations of acquired immunodeficiency syndrome (AIDS), drug reactions, secondary infections, invasive procedures, or non-AIDS-related conditions. However, the exact source of pain for some
conditions such as neuropathic pain may never be identified. The existence of pain has been reported by approximately 60% of HIV-infected pediatric outpatients managed at the National Cancer Institute and 20% of children enrolled in a pediatric AIDS clinical trial (e.g. PACTG 219); therefore, optimal pain management is an important component of inclusive HIV care for many children with the disease.

The initial step in managing pain in HIV-infected children is to identify and treat any underlying medical conditions which may be the source of the pain such as opportunistic infections or pancreatitis. Management of pain should include both nonpharmacologic and pharmacologic measures. A listing of nonpharmacologic interventions for HIV-infected children experiencing pain is provided in table 3.

A variety of pharmacologic agents may be used to treat pain in this patient population including opioids, gamma-aminobutyric acid (GABA) agonists (e.g. baclofen, midazolam), mixed agonists (e.g. methadone), clonidine, non-steroidal anti-inflammatory drugs (NSAIDs), anticonvulsants, selective serotonin reuptake inhibitors (SSRIs), and tricyclic antidepressants. Dosing of analgesics should be individualized to optimize therapeutic benefit while minimizing possible adverse effects; realizing that an effective pediatric analgesic dose may not be clearly established for some of the available agents such as SSRIs, tricyclic antidepressants, and anticonvulsants. Some opioids, sedative, and anticonvulsants are metabolized through the cytochrome P450 isoenzyme system and may therefore interact with antiretroviral medications. Clinicians should be aware of the potential for drug interactions in HIV-infected children and conservative dosing of analgesics is recommended. Comments regarding specific analgesic medications for the treatment of pain in pediatrics infected with HIV are summarized in table 4; however, for most pediatric patients experiencing pain traditional opioids (excluding meperidine) remain the analgesic of first choice. The updated guidelines contain recommendations for using opioids effectively in this patient population including dosing concerns, management of common side effects, switching therapy to methadone, and weaning from long-term opioid use.

Nutritional Care
Malnutrition remains the most common cause of immunodeficiency worldwide. In patients with existing immunodeficiency due to HIV, the existence of malnutrition can further impair immune function. When assessing the nutritional status of pediatric patients with HIV, clinicians not only monitor appropriate growth, but also manage weight and identify adverse effects related to antiretroviral therapy such as lipodystrophy and insulin resistance. The updated guidelines recommend that the growth of children with HIV be monitored regularly using the Centers for Disease Control and Prevention growth curves. In addition, body composition studies should be performed in order to identify any changes in lean and fat tissue. The guidelines also recommend that an assessment of nutritional status include an evaluation of any clinical symptoms, a review of physical activity and food intake, and the ordering of any appropriate laboratory parameters (e.g. albumin, prealbumin, cholesterol).

The replacement of vitamins or micronutrients is a key component in the nutritional care of the HIV positive pediatric patient. Deficiencies of vitamins B12, E, A, and beta-carotene have been associated with the acceleration of HIV disease; supplementation of these vitamins is warranted in deficient patients. Children with HIV who are not achieving growth milestones should be evaluated for deficiencies in vitamin A, carnitine, and iron. Pediatric patients with HIV also have an increased incidence of compromised bone mineral accrual; therefore, assuring adequate calcium and vitamin D intake is imperative.

Data on the use of appetite stimulants (e.g. dronabinol) in children are limited. One study of dronabinol in children, at a dose of approximately 8 mg/kg/day, revealed a significant weight gain associated with use; however, the investigators did not evaluate changes to body composition with the weight gain nor was linear growth observed among enrolled children. In addition, the psychological side effects of dronabinol may limit its use in this population including dosing concerns, switching therapy to methadone, and weaning from long-term opioid use.

Table 3. Nonpharmacologic Pain Management Interventions.

| Relaxation techniques and behavior modification |
| Environmental management (e.g. scheduled medical interventions, structured rest periods) |
| Gentle handling and supportive positioning |
| Nutritional support, adequate hydration, and electrolyte replacement |
| Optimized tissue perfusion and oxygenation |
| Transcutaneous electrical nerve stimulation, massage, whirlpool baths, physical therapy |
| Acupuncture |
patient population. Another therapy which may be beneficial in children with decreased linear growth or reduced lean body mass is growth hormone. However, the guidelines recommend that controlled clinical trials be undertaken in pediatric HIV patients before this intervention is routinely recommended.

In addition to the topics noted above, this new supplement to the pediatric HIV guidelines also discusses enteral supplements, tube feeding, parenteral feeding, and weight management for children with HIV.

**Conclusion**

Pain management and nutritional care are 2 important components of comprehensive pediatric HIV care. This new supplement to the pediatric HIV guidelines provides clinicians with the needed information to effectively manage patients experiencing pain and malnutrition, thereby improving quality of life and reducing associated mortality.

**Depo-Provera® contraceptive injection – new warnings regarding bone mineral density loss**

Medroxyprogesterone acetate injectable suspension (Depo-Provera®) inhibits ovulation through the suppression of follicle stimulating hormone (FSH) and luteinizing hormone (LH) and also results in an elimination of LH surge. As a contraceptive, Depo-Provera® is extremely effective, with a 0.3% probability of pregnancy within the initial year of use. Recently, the Food and Drug Administration (FDA) mandated a revision to the product labeling of Depo-Provera® that included a black box warning regarding a reduction in bone mineral density (BMD) observed with prolonged use. This new warning was instituted after the results of 2 post-marketing studies, one in adults and one in adolescents, revealed a significant reduction in BMD with continued administration of the drug.

Beyond the insertion of a black box warning, other sections of the product labeling of Depo-Provera® were updated including the Warnings, Indications and Usage, Precautions – Pediatric Use, and Postmarketing Experience sections. The Warnings sections was revised to state additional information regarding the risk of BMD loss with use including:

- The significant reduction in BMD with Depo-Provera® is caused by a decrease in serum estrogen levels with administration of the drug. The loss of BMD is of particular concern to patients in early adolescence and late adulthood.

- The reduction in BMD is at least partially reversible upon discontinuation of Depo-Provera®, as ovarian estrogen production increases.

- Depo-Provera® should not be a first choice birth control method, rather the medication should only be used for long-term (> 2 years) birth control after other methods have been proven inadequate. Evaluations of BMD should be considered when a woman of any age continues to use the medication chronically. An interpretation of BMD results should take into account patient age and skeletal maturity.

Table 4. Specific Analgesic Medications for the Treatment of Pain in Pediatric Patients with HIV.

<table>
<thead>
<tr>
<th>Medication</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meperidine</td>
<td>Avoid use if possible&lt;br&gt;Metabolism through CYP2D6 to normeperidine; normeperidine is a potent central nervous system stimulant associated with seizures, agitation, and insomnia&lt;br&gt;Metabolism via CYP2D6 may result in changes to the pharmacokinetics of PIs</td>
</tr>
<tr>
<td>Clonidine</td>
<td>Avoid in children with depression, hypotension, bradycardia, or unresolved sepsis syndrome&lt;br&gt;Transdermal administration results in effective maintenance of steady-state levels</td>
</tr>
<tr>
<td>Dextromethorphan and Ketamine</td>
<td>N-methyl-D-aspartate (NMDA) agents with substantial adverse effects that limit use&lt;br&gt;High doses of dextromethorphan are associated with ataxia and dizziness&lt;br&gt;Ketamine may induce hallucinations and has been associated with cardiac disturbances in children with advanced AIDS</td>
</tr>
<tr>
<td>GABA agonists</td>
<td>Indicated for sedation, induction of amnesia, and reduction of spasticity&lt;br&gt;When administered with opioids, an increase in sedation and respiratory depression is noted</td>
</tr>
</tbody>
</table>
Women with osteoporotic risk factors such as metabolic bone disease, chronic alcohol and/or tobacco use, anorexia nervosa, family history of osteoporosis, or chronic use of medications known to reduce bone mass (i.e. anticonvulsants or corticosteroids) should consider alternative contraceptive methods.

All women receiving Depo-Provera® should consider taking adequate calcium and vitamin D supplementation; however, no studies have addressed whether or not such supplementation will affect BMD loss from the drug.

In summary, Depo-Provera® is an effective contraceptive; however, prolonged use may result in a significant reduction in BMD and an increase in risk of osteoporotic fractures. The drug should only be administered to women who have experienced an inadequate response to other birth control methods. Women with osteoporotic risk factors should strongly consider other contraceptive options, and all women receiving Depo-Provera® should be administered adequate calcium and vitamin D.

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**Metal Content of Transdermal Patches**

*List is not all inclusive (Updated 10/27/04)

<table>
<thead>
<tr>
<th>GENERIC</th>
<th>BRAND</th>
<th>MANUFACTURER</th>
<th>METAL</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clonidine</td>
<td>Catapress TTS</td>
<td>Boehringer Ingelheim</td>
<td>Yes</td>
<td>Vaporized Aluminum.</td>
</tr>
<tr>
<td>Estradiol</td>
<td>Climara</td>
<td>Berlex</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Estradiol</td>
<td>Vivelle</td>
<td>Novartis</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Estradiol</td>
<td>Vivelle Dot</td>
<td>Novartis</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Estradiol</td>
<td>Estraderm</td>
<td>Novartis</td>
<td>Yes</td>
<td>Aluminum layer in patch, none within medication reservoir.</td>
</tr>
<tr>
<td>Estradiol</td>
<td>Alora</td>
<td>Watson</td>
<td>See comment</td>
<td>&lt;0.001% heavy metal in the release liner*</td>
</tr>
<tr>
<td>Estradiol</td>
<td>Esclim</td>
<td>Women First Healthcare</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Estradiol / Levonorgestrel</td>
<td>Climara Pro</td>
<td>Berlex</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Estradiol / Norelgestromin</td>
<td>Ortho Evra</td>
<td>Ortho-McNeil</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Estradiol / Norethindrone</td>
<td>CombiPatch</td>
<td>Novartis</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td>Duragesic</td>
<td>Janssen</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Lidoacaine</td>
<td>Lidoderm</td>
<td>Endo</td>
<td>See comment</td>
<td>Manufacturer recommends removing patch. Contains aluminum salt, no metal.</td>
</tr>
<tr>
<td>Nicotine</td>
<td>Nicoderm CQ</td>
<td>Glaxosmithkline Consumer</td>
<td>Yes</td>
<td>Aluminum layer between 2 polyester sheets.</td>
</tr>
<tr>
<td>Nicotine</td>
<td>Clear Nicoderm CQ</td>
<td>Glaxosmithkline Consumer</td>
<td>No</td>
<td>Minute amount of iron oxide &amp; titanium oxide present on the print.</td>
</tr>
<tr>
<td>Nicotine</td>
<td>Habitrol</td>
<td>Novartis Consumer Health</td>
<td>Yes</td>
<td>Aluminum coating</td>
</tr>
<tr>
<td>Nicotine</td>
<td>Nicotrol</td>
<td>Pfizer</td>
<td>Yes</td>
<td>Pigmented aluminized polyester</td>
</tr>
<tr>
<td>Nicotine</td>
<td>Nicotine Transderm</td>
<td>Watson</td>
<td>See comment</td>
<td>Trace metal in the release liner*</td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td>Minitran</td>
<td>3M</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td>Nitrek</td>
<td>Bertek</td>
<td>See comment</td>
<td>Information not available**</td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td>Hercon Laboratories</td>
<td>No</td>
<td>Information not available**</td>
<td></td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td>Nitro Dur</td>
<td>Mylan</td>
<td>See comment</td>
<td>Information not available**</td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td>Nitro Dur</td>
<td>Schering Plough</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Oxybutynin</td>
<td>Oxytrol</td>
<td>Watson</td>
<td>See comment</td>
<td>&lt;0.02% heavy metal in the release liner*</td>
</tr>
<tr>
<td>Scopolamine</td>
<td>Transderm Scop</td>
<td>Novartis</td>
<td>Yes</td>
<td>Aluminum outer polyester layer.</td>
</tr>
<tr>
<td>Testosterone</td>
<td>Androderm</td>
<td>Watson</td>
<td>Yes</td>
<td>Aluminum in the polyester backing film.</td>
</tr>
</tbody>
</table>

*The release liner is the backing that is removed prior to placing the patch on the body. There is a slight chance that the patient did not apply the patch correctly and should be verified prior to the MRI procedure. **Information not available – Company would not provide data – patch should be temporarily removed for MRI.
Gemini Update: Goal of Therapy

There is a new required field added to many of the adult critical care drips to address JCAHO standard MM 3.20, specifically the use of titrating orders. This new required field is called Goal of Therapy. The purpose of this field is to require the ordering clinician to provide titration goals or parameters. This field will be required on the following Adult Critical Care Drips:

- cisatracurium
- DOBUTamine
- DOPamine
- epinephrine
- esmolol
- fentanyl
- insulin
- labetolol
- lorazepam
- midazolam
- morphine
- NICARDipine
- nitroglycerin
- nitroprusside
- norepinephrine
- pancuronium
- pentobarbital
- phenylephrine
- propofol
- vecuronium

Examples of titration goals or parameters include:

- Neuromuscular Blocking Agents (cisatracurium, pancuronium, vecuronium): - Train-of-Four - Physiological parameters (e.g., respiratory rate, peak inspiratory pressure, plateau pressure)
- Sedatives (lorazepam, midazolam, pentobarbital, propofol): - Riker Sedation-agitation scale (SAS), or Ramsay score, or BIS score
- Vasopressors (DOBUTamine, DOPamine, epinephrine, esmolol, labetolol, NICARDipine, nitroglycerin, nitroprusside, norepinephrine, phenylephrine): - Systolic BP or MAP
- Narcotics (fentanyl, morphine): - Pain Score
- Insulin - Glucose

This new field can be accessed by selecting the ellipse for Order Details. If the field is not completed during order entry, Gemini will prompt that the field be completed at signing.

P&T Formulary Actions

Additions

- Antihemophilic Factor 8/Von Willebrand Factor (Humate-P®) - Restricted to Hematology
- Aspirin-Dipyridamole-ER (Aggrenox®) capsule
- Diatrizoate Meglumine/Diatrizoate Sodium (Gastroview 76%®)
- Diatrizoate Meglumine (Hypaque 30%®)
- Diatrizoate Meglumine (Hypaque 60%®)
- Diatrizoate Meglumine/Diatrizoate Sodium (Hypaque-76®)
- Ioxaglate Meglumine/Ioxaglate Sodium (Hexabrix®)
- Iothalamate Meglumine (Conray 30®)
- Iothalamate Meglumine (Conray 400®)
- Iohexol (Omnipaque 180®)
- Iohexol (Omnipaque 240®)
- Iohexol (Omnipaque 300®)
- Iohexol (Omnipaque 350®)
- Iodixanol (Visipaque®)
- Gadodiamide (Omniscan®)
- Tiotropium (Spiriva®) powder for inhalation
- Exetimibe/Simvastatin (Vytorin®) tablet
- Papain-Urea-Chlorophyllin Copper Complex Sodium (Panafil®) topical spray
- Sertraline 25 mg tablet

Deletions

- Dexamethasone 0.05% Ophthalmic ointment
- Benzocaine 5% Ointment
- Cepastat Oral Lozenge
- Chlorpromazine Syrup
- Danocrine 200 mg tablet
- Digoxin 0.5 mg tablet
- Fluoxymesterone 5 mg tablet
- Isoproterenol syrup
- Loxapine
- Morphine 5 mg suppository
- Papain-Urea-Chlorophyllin Copper Complex Sodium (Panafil®) topical ointment
- Promethazine 50 mg/ml injection
- Rofecoxib (Vioxx®) tablets and suspension
- Organ preservation solution (Perfadex®)

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