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SHANDS at the University of Florida

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# Drugs & Therapy BULLETIN

## FORMULARY UPDATE

The Pharmacy and Therapeutics Committee met October 21, 2003. 2 drugs were added in the *Formulary*. 2 drugs were deleted and designated not available. 7 additional drugs were designated not available. Interchange was approved for 3 combination drugs.

### ◆ ADDED

**Daptomycin**
(Cubicin® by Cubist Pharmaceuticals)*

**Restricted: Requires ID approval*

**Emtricitabine**
(Emtriva® by Gilead)

### ◆ DELETED

**Chlorpropamide** (generic)**

**Quinupristin-Dalfopristin**
(Synercid® by Aventis)**

***Also nonformulary and not available*

### ◆ NONFORMULARY AND NOT AVAILABLE

**Acarbose** (Precose® by Bayer)

**Metformin-Glipizide**
(Metaglip® by Bristol Myers Squibb)***

**Metformin-Glyburide**
(Glucovance® by Bristol Myers Squibb)***

**Metformin-Rosiglitazone**
(Avandamet® by GlaxoSmithKline)***

****Interchanged to the individual ingredients when possible*

**Miglitol** (Glyset® by Pfizer)

**Paroxetine ER**
(Paxil® CR by GlaxoSmithKline)

**Paroxetine mesylate**
(Asimia® by Synthon)

*(continued on next page)*

POLICIES AND PROCEDURES

## Automatic adjustment of ceftriaxone dosages

High utilization of ceftriaxone at Shands at UF raised concerns about prescribing patterns of this cephalosporin antibiotic. Therefore, a 6-month medication use evaluation was performed from February 2003 to July 2003 to determine if opportunities for antibiotic streamlining exist.

The major issue identified in this audit was the excessive use of large dosages of ceftriaxone. 75% of 2-gram ceftriaxone doses were dispensed for indications other than meningitis. A literature review was done to determine the appropriate dosing of ceftriaxone for the common uses. The only clear data to support 2-gram dosing is for the treatment of meningitis.

Using higher-than-necessary doses increases antimicrobial pressure contributing to growing resistance to 3rd-generation cephalosporins. Based on this information, the Anti-Infective Subcommittee recommended a streamlining process allowing automatic adjustment of ceftriaxone dosages based on the indication for use.

The P&T Committee approved a procedure that sanctions an Infectious Diseases clinical pharmacist to adjust ceftriaxone doses based on the criteria listed in the chart below.

### ADULT DOSING

**Meningitis:** 2 grams IV q12h

**Obesity (weight > 125 kg) and non-meningitis:** 2 grams IV every day

*All other indications will receive 1 gram IV daily*

### PEDIATRIC DOSING

**Meningitis:** 100 – 200 mg/kg/day up to 4 grams/day

**Sepsis:** 100 mg/kg/day up to 4 grams/day

**Obesity (weight > 125 kg) and non-meningitis:** 2 grams IV every day

*All other indications will receive 50 mg/kg/day up to 1 gram every day*

Like all P&T-authorized automatic dose or route changes, these changes will be documented in the Progress Notes and Orders section of the patient's chart.

*By Wendy D. Smith, PharmD*

### INSIDE THIS ISSUE

***Formulary update,*** *from page 1*

**Daptomycin** is the first antibacterial agent in a new class of antibiotics called the cyclic lipopeptides. This agent has a labeled indication for the management of skin and soft tissue infections caused by susceptible strains of gram-positive bacteria. The *in vitro* spectrum of activity of daptomycin encompasses most clinically relevant pathogenic gram-positive bacteria. Daptomycin retains potency against antibiotic resistant gram-positive pathogenic bacteria, including isolates resistant to methicillin, vancomycin, and linezolid, which enables use for selected off-label indications.

Daptomycin's use will be limited to patients who have been approved by Infectious Diseases. It will be used for resistant organisms, including methicillin-resistant *Staphylococcus aureus* (MRSA), glycopeptide intermediate sensitive *Staphylococcus aureus* (GISA), vancomycin-resistant Enterococcus (VRE), penicillin-resistant *Streptococcus pneumoniae* (PRSP), and linezolid-resistant isolates.

Dosage adjustment is required for renally impaired patients. Elevated creatine phosphokinase (CPK) levels were observed in clinical trials, which has caused some concern. CPK elevations were seen in 2% to 3% of patients and require weekly monitoring of levels. The clinical significance of these elevations is not yet known.

The addition of daptomycin has made **Synercid®** (quinupristin-dalfopristin) obsolete. Synercid® is rarely used because it has significant holes in its antibacterial spectrum (ie, *Enterococcus faecalis*) and is associated with serious toxicities (eg, bone marrow suppression). Therefore, it was deleted and designated not available.

**Emtricitabine** is a synthetic nucleoside analog of cytosine. It is the newest nucleoside reverse transcriptase inhibitor (NRTI) approved by the FDA for the use in combination with other antiretroviral agents for the treatment of HIV-1 infections. It is structurally similar to lamivudine.

Clinical trials have demonstrated a constant reduction in viral load in both naïve and experienced patients. The most frequent adverse events identified are infection, diarrhea, dizziness, headache, skin discoloration, and rash. The major benefit of this agent is its low pill burden because it is given once a day.

Emtricitabine was added in the *Formulary* for continuity of care and to prevent a delay in therapy when patients are admitted taking this medication.

**Chlorpropamide** is a first-generation oral sulfonylurea hypoglycemic agent. It was rarely used, although it was listed in the *Formulary*. It was deleted because of lack of use and designated nonformulary and not available. A second-generation oral sulfonylurea hypoglycemic agent can be used if a rare patient on this drug is admitted (eg, glipizide or glyburide).

**Acarbose** and **miglitol** are alpha-glucosidase inhibitors and are the only drugs available in this class of oral hypoglycemic agents. Both are infrequently used.

Alpha-glucosidase inhibitors act at the brush border of the proximal small intestinal epithelium to inhibit the breakdown of complex carbohydrates. The result is a delay in the intestinal absorption of carbohydrates. This blunts the postprandial glucose peak.

Alpha-glucosidase inhibitors must be taken 3 times a day with meals. The dose is taken with the first bite of the meal. This requirement is inconvenient and is usually unrealistic in the inpatient setting. Also, antidiabetic regimens usually require adjustment once patients are admitted to the hospital. Because of infrequent use and the lack of a therapeutic niche, acarbose and miglitol were designated nonformulary and not available. Patients who bring in their own medications can continue acarbose or miglitol.

**Metaglip®**, **Glucovance®**, and **Avandamet®** are combination oral hypoglycemic agents containing metformin and another agent (ie, glipizide (Metaglip®), glyburide (Glucovance®), and rosiglitazone (Avandamet®). Traditionally, the pharmacy has dispensed the individual components of combination products. However, not all the strengths contained in these combination hypoglycemic products are commercially available as single agents.

Patients' inpatient hypoglycemic agents often need to be re-adjusted when they are hospitalized because of changes in caloric intake and activity level. Thus, having the exact combination products in the *Formulary* is not crucial. Also, patients' own medications may be used for continuity of care. These agents were not requested last fiscal year.

The appropriate conversion for patients taking these medications is important. Because the individual products are not available in all strengths, the exact dosage equivalents cannot always be dispensed. If the individual ingredients are available in the same strengths as the combination products, they will be automatically interchanged. A guide for how to switch patients to an approximate equivalent is posted on the Shands intranet at http://intranet.shands.org/pharm/Combo_Metformin_Interchange.pdf.

**Paxil® CR** is an extended-release version of paroxetine in a specialized delivery system. There does not appear to be any therapeutic advantage for this product; however, it has been suggested that this dosage form may cause less gastrointestinal adverse effects. There is no published head-to-head comparison that supports this contention.

Since paroxetine recently came off of patent, the marketing of this medication appears to be a patent-extension ploy. No evidence could be located to support the use of Paxil® CR over paroxetine. Both agents are dosed once daily and have similar pharmacokinetic profiles.

The dosage equivalent of Paxil® CR and paroxetine can be found on the Shands intranet at: http://intranet.shands.org/pharm/PaxilCR_Conversion.pdf. The dosages of Paxil® CR are slightly higher (eg, 12.5 mg = 10 mg).

In addition, a different salt of paroxetine, **paroxetine mesylate** [Asimia®] received approval by the FDA. This salt offers no advantage over paroxetine hydrochloride. Paroxetine mesylate was designated nonformulary and not available.

## To Report an Adverse Drug Reaction

**Call the ADR Hotline: 5-ADRS (5-2377)**

**PROVIDE:**

- Patient's name
- Patient's location
- Suspected drug(s)
- Type of reaction
- Whether the reaction was: — probable, possible, or definite
- Your name and pager # or extension

*And we'll do the rest!*

◆

**☎ ADR HOTLINE: 5-ADRS**

PRESCRIBING

# What takes the Pharmacy so long?

This phrase, or those similar, may be heard throughout the halls at Shands, and more than likely, most hospitals daily. What could possibly take the pharmacy so long to get the medications prescribed to the patient once they are ordered? It *is* a relatively simple process…right?

Many steps must take place between the time an order is written and when then patient actually receives the medication. As with most things, the complexity of the process is directly proportional to the number of threats that may result in breakdown of that process. Hopefully, an understanding of the medication-use process will help answer why it takes so long.

Once a medication order is written, it is flagged and taken to the nurses' station to be faxed to the pharmacy. Recent research on turn-around-times at Shands indicates, on average, that 40–60 minutes elapse between the order being written and being faxed to the pharmacy.

Once the order has been faxed, it is transmitted to the appropriate pharmacy satellite serving that area. 4 satellites exist: medicine-surgery, oncology, pediatrics, and intensive care. Each satellite's responsibilities change according to the time of day and on weekends.

During regular hours during the week, the ICU pharmacy takes care of the Emergency Department and the surgical, cardiac, medicine, and neonatal intensive care units, in addition to labor and delivery and the clinical research area. The medicine-surgery satellite, located on the ground floor, is responsible for floors 6, 7, 8, and 9. The oncology satellite services the 5th floor and the Bone Marrow Transplantation Unit, and the pediatric pharmacy takes care of all of the pediatric floors.

Once the order is transmitted, the pharmacist reviews it and enters it into the pharmacy computer system to be filled. If there are no problems with the order and the medication is contained in the SureMed® dispensing cabinet on the floor, the medication is immediately retrievable by the nurse. If not, the medication must be sent from the pharmacy. If problems are found with the order, the pharmacist must contact the individual who wrote the order and/or the nurse.

Problem orders are frustrating for both pharmacy and medical staff. From the physician's perspective, "rules" for correct orders are always changing. Many physicians write orders on rounds, an environment filled with distractions, and helpful information may not be readily available. From the pharmacist's point of view, each order to be clarified represents a disruption of work-flow, and at least 1 phone call. Even if the clarification of an order requires a few minutes, the delicate balance of time and work-flow may be disrupted for several hours.

Reasons that orders require clarification frequently include: use of "illegal" abbreviations, dosing problems, patient allergies, and orders for nonformulary medications, just to name a few. Nonformulary items trigger the pharmacist to call the physician in order to change to a medication listed in the *Formulary*. If they are unable to change the order, they must first determine if the medication is stored in the hospital and if so, where. After this, the pharmacist must complete a form so the medication is ordered, fill out a sticker to go in the patient's chart, and finally fill the medication. If the signature on the order is illegible or if there is no signature, it becomes even more difficult to determine the appropriate physician to contact. Also, consider that most orders are written at the same time every day, between 3 and 5 pm. Just to provide a bit more insight, pharmacists in each satellite (4) process, on average, 150 orders per hour between 9 am and 6 pm.

After the medication is entered into the computer, excluding IVs, the medication is filled by the technician and brought back to the pharmacist for a final check. IVs are sent to the IV center to be made. Once it is made, the IV comes back to the satellite, once again, for a final check. These final checks are done once an hour, because the technician delivers orders to the floors once an hour. Once the pharmacist makes the final check, the medication is delivered to the floor to be administered to the patient.

Each order has specific time instructions. Medications with no designation are considered standard or routine orders, of which the expected turn-around-time is 2 hours. If the medication is to be given within 30 minutes, the order should be designated STAT. In order to call attention to this order, the nurse calls and informs the pharmacy of the STAT order. The designation NOW indicates the order should be administered within 1 hour. In order to insure medications are filled and delivered within an appropriate time, it is important for physicians to communicate this information to the nurse who will then contact pharmacy.

Because of the many steps involved in this process, many places exist where a breakdown can occur. Breakdowns may result in delays of treatment to the patients. There are multiple levels of staff, technology, and communication that must align in order for the patient to receive their medication as ordered.

Steps practitioners writing orders can take to help improve this process include: writing all orders clearly and within hospital standards, use *Formulary* agents when possible, legibly date and sign orders with your doctor number, appropriately flag orders so they are faxed in a timely fashion, and communicate with nursing and/or pharmacy for medications with special instructions.

*by Wendy Smith, PharmD*

POLICIES AND PROCEDURES

# Automatic interchange of MDIs for nebulized bronchodilators

The P&T Committee has approved a policy that will enable respiratory therapists to interchange orders for nebulized bronchodilators to metered-dose inhalers (MDIs). Currently, this policy only applies to adult patients receiving mechanical ventilation.

This new policy allows respiratory therapists to use an MDI with a spacer instead of the nebulized route of administration. The interchange will occur after 24 hours of receiving drug by the nebulized route. It will reduce administration time and may allow for more delivery of the medication.

This interchange excludes bronchodilators mixed with other medications, orders with frequencies of greater than every 4 hours, or continuous nebulization. No substitution will be made on orders indicating the substitution is unwanted.

The "P&T Committee-Authorized Interchange" will be documented in the Progress Notes and a new order will be written in the Orders section of the chart.

*by Wendy Smith, PharmD*

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