

Medical University of South Carolina

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Pharmacy & Therapeutics Update: Drug Information for Health Care Professionals

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Pharmacy & Therapeutics

Update

Drug Information for Health Care Professionals

August 2006

MICROMEDEX® Healthcare Series: A Review

MICROMEDEX® Healthcare Series is a suite of clinical decision support databases that provides a wide range of information designed to meet the needs of health care professionals. It is the official point-of-care clinical knowledge reference in the Medical Center.

MICROMEDEX® Healthcare Series is available through the MUSC Library's home page under *Drug Information*. It may be accessed on campus or from a remote location provided that the user has a network account with login and password.

Recently, MICROMEDEX® has changed to a Internet version;

therefore, the look of the database has changed (Figure 1) and two new databases have been added (ie, Lab Advisor™ and IV INDEX®)

MICROMEDEX® Healthcare Series is updated monthly, except for the Drugs section, which is updated weekly. However, it is important to understand that not all of the information in each database is updated monthly.

The *Main Keyword Search* on the main page retrieves information within *Drugs, Toxicology, Disease, and Lab* databases. It is important to remember that it is a keyword search only; therefore, multiple terms may be needed to

Figure 1. MICROMEDEX® Main Page



find the most relevant information.

DRUGDEX[®] includes drug evaluation monographs and drug consults. Drug evaluation monographs provide a comprehensive review on a particular agent. Each monograph is presented in a standardized, easy-to-follow format. Monograph components include dosing information, pharmacokinetics, cautions, adverse side effects, clinical applications, etc. Drug consults present patient-related, referenced responses to important clinical questions.

POISINDEX[®], located under the *Toxicology* tab or through the *Main Keyword Search*, is divided into two main sections: product and substance identification and poisoning management protocols. The product and substance identification portion contains information on over one million products. Information on prescription medications, industrial products, and over-the-counter preparations is included. The poisoning management protocol monographs include information regarding clinical effects, laboratory/monitoring, treatment, range of toxicity, kinetics, pharmacology/toxicology, and physiochemical properties.

MARTINDALE[®] is the official compendium of the Royal Pharmaceutical Society of Great Britain. This is a useful reference when trying to gather information on foreign medications.

IDENTIDEX[®] identifies tablets and capsules by product imprint

code. This is particularly useful when the practitioner is trying to identify a patient's medications brought into the Medical Center from home.

DRUG-REAX[®] allows the practitioner to enter a patient's medications and check for drug-drug, drug-food, drug-laboratory, and drug-alcohol interactions. In addition, the practitioner may also screen for drug-disease contraindications. DRUG-REAX[®] enables the user to screen for potential cross-allergenicity reactions.

DISEASEDEX[®] General Information and DISEASEDEX[®] Emergency Medicine provide detailed, evidence-based etiology and treatment information for each medical condition and provides recommendations for appropriate care including both in-depth and summary information.

CareNotes[™] Instructions provide practitioners with important patient education materials to use when counseling or teaching patients. This database can be found under the *Patient Ed* tab. Instructions are available in English and Spanish and may be customized with patient-specific information. Information on medications, diseases, and devices is provided. Materials are written at the eighth-grade reading level.

REPRORISK[®] is a collection of reproductive risk databases that covers the effects of medications or chemicals on all aspects of reproduction including

fertility, teratogenicity, and lactation. It is comprised of REPROTEXT[®], REPROTOX[®], *Shepard's Catalog of Teratogenic Agents*, and TERIS[®].

IV INDEX[®] System provides easy access to data that will help ensure accurate IV compatibility decisions can be made. This database features the compatibility of drugs, solutions, and total parenteral nutrition when in solution, during Y-Site administration, or within a syringe.

Lab Advisor[™] features detailed information on over 600 laboratory tests. This database helps guide clinicians to identify the appropriate test and interpret the results. In addition, Lab Advisor[™] contains information on medications known to cause false positive or negative results, tips to minimize patient discomfort associated with tests, and links to relevant information on diseases, medications, and toxicologic substances.

MICROMEDEX[®] Healthcare Series also offers a number of clinical calculators and algorithms. These may be found under the *Main* tab. Topics covered include the following: antidote dosing and nomograms, clinical references and calculators, dietary considerations and guidelines, differential diagnosis, dosing tools, drug classifications, drug comparisons, immunization and prophylaxis, laboratory values, measurement calculators and conversions, and pediatric and pregnancy references.

mobileMICROMEDEX[™] offers handheld information for the per-

sonal digital assistant. Information on medications, alternative medicines, and acute care and toxicology management is available free for MICROMEDEX[®] customers. These databases may be downloaded to any handheld device running on a compatible system. To download your free subscription, click on the *Handheld PDA* tab and follow the easy instructions.

If you would like to request a training session in your work area, please contact the MUSC Drug

An Overview of Heat-related Illnesses

By:

Ashley Holt, PharmD Candidate

Extreme heat can cause a variety of conditions in people who are exposed and not adequately protected. More people die from extreme heat than from hurricanes, lightning, tornadoes, floods, and earthquakes combined.^{1,2}

An excessive heat event is defined as a prolonged period when temperatures reach greater than 10 °F above the normal high temperature for that region.^{1,2} Urban areas may be more susceptible to the effects of excessive heat because asphalt and concrete absorb the sun's energy and retain it longer than bare earth.^{2,3} Therefore, urban areas do not get as much relief from the heat at night. This phenomenon is referred to as the 'urban heat island effect.'³ High humidity along with excessively high temperatures can accelerate the onset of heat-related illnesses. The combination of high temperatures and elevated humidity can

make the outdoor temperature feel even hotter, which is known as the heat index.⁴ When temperatures are extremely high along with increased humidity, evaporation from the skin is slowed making it much more difficult for the body to maintain a normal temperature.^{1,3}

Those individuals at the highest risk for heat-related illnesses include children, elderly, patients with chronic illness, and those that are overweight.³ Additionally, some medications may make patients more sensitive to the sun and its effects.⁵ Such medications include alpha agonists, anticholinergics, beta blockers, calcium channel blockers, diuretics, ethanol, and some antidepressants.⁵

Heat-related deaths are preventable. Therefore, it is important to know the signs, symptoms, prevention strategies, and treatment measures for such adverse events. Air conditioning is the number one prevention technique against extreme heat.^{1,3} For families without air conditioning, visiting public places that have air conditioning such as the library, movie theater, or shopping mall may be a healthy option.¹⁻³ Another important method is maintaining proper hydration.¹⁻³ It is important to remind patients not to wait until they are thirsty to drink. Fluids containing caffeine, alcohol, and sugar should be avoided as they can promote water loss. Fluid-restricted patients should consult their physician to discuss how much extra fluid they can safely ingest.¹⁻³ Additionally, sweating

removes salt and minerals from the body that need to be replaced in order to maintain fluid balance.¹ Many sports drinks contain these minerals that are lost through sweating; however, people who are on a low sodium diet should contact their physician before drinking sports drinks.

Other simple heat prevention strategies include wearing loose and light-colored clothing, avoiding overexertion when outdoors, taking plenty of breaks in the shade, wearing sunscreen, scheduling outdoor activities in the early morning or late evening, and always having someone else present.¹

Heat exhaustion occurs when people exercise heavily and become volume depleted from excessive sweating.^{3,5} This can develop in a few hours or over a period of several consecutive days of heat exposure.^{1,6} Signs and symptoms include profuse sweating, headache, dizziness, malaise, nausea, vomiting, chills, muscle weakness, hypotension, and tachycardia.⁵ People exhibiting signs or symptoms of heat exhaustion should be moved to a cool area, their legs should be elevated to promote blood flow, and they should be given plenty of cool fluids.^{1,5,6} However, fluids should not be too cold, as this can induce stomach cramps.¹ Recovery should occur within a few hours.⁵ If the person continues to show symptoms of heat exhaustion for more than 24 hours, or if their condition worsens, they should seek immediate medical attention as heat exhaustion can rapidly progress to heat stroke.^{5,6}

Heat stroke is the most dangerous form of heat-related illness, as it can be life-threatening if not treated quickly.^{5,7} During heat stroke, the body is producing heat faster than it can dissipate it.⁵ In this situation the body temperature rises to over 104 °F, and if the fever is not controlled it can cause organ damage. Changes in mental status can be seen and can range from personality changes to coma.⁷ Other symptoms of heat stroke include a rapid heart rate, rapid and shallow breathing, increased or decreased blood pressure, absence of sweating, hot and dry skin that is red in color, headache, nausea, and syncope.^{1,5,7}

There are 2 types of heat stroke: classic heat stroke and exertional heat stroke.⁵ Classic heat stroke occurs mostly in underlying chronic conditions that either impair thermoregulation or prevent removal from a hot environment. Exertional heat stroke usually occurs in younger, healthy individuals upon strenuous activity in a hot environment.

If someone is having symptoms of heat stroke they should be immediately moved to a cooler environment and medical assistance should be sought. Augmentation of evaporative cooling is considered the treatment of choice. Other cooling methods include placing the patient in a cool bath or shower, wrapping the patient with a cool, wet sheet, or applying ice packs to the axillae, neck, and groin areas. The patient's body temperature should be monitored at all times.^{1,7} Pharmacotherapy is not required for heat stroke.

Extreme heat can also cause heat cramps.^{1,3} This is characterized by muscle pain and uncontrollable spasms. Cramps most commonly occur after heavy physical exertion and increased sweating.^{1,3} Although heat cramps are not as severe as heat exhaustion or stroke, they are often a precursor to more severe conditions if interventions are not taken. A person experiencing heat cramps should cease all physical activity, move to a cooler location, and drink plenty of fluids (ie, clear juice or a sports drink).¹ Medical attention may be needed if the cramps are still present after 1 hour.¹

Heat rash is another relatively minor condition caused by excessive sweating during hot, humid weather.¹ Heat rash usually occurs in young children, but it can occur at any age. The rash appears as a red cluster of lesions that look like pimples or blisters. These lesions usually occur on the neck, upper chest, in the groin, under the breasts, and on the elbow.¹ The area affected should be kept dry and cool. Baby powder can help decrease the discomfort. Creams or ointments should be avoided, as they hold moisture in and can worsen the symptoms.¹

The key to reducing heat-related illnesses is prevention. Understanding and using appropriate prevention measures will decrease the occurrence of heat-related illnesses.

References available upon request.

Medication Safety Alert: Promethazine Extravasation

Promethazine (Phenergan[®]) is a commonly prescribed antihistamine that is used for sedation, motion sickness, and nausea and vomiting. It is also a known vesicant, which is extremely caustic to the intima of blood vessels and surrounding tissue.

Due to the properties of the promethazine (pH between 4 and 5.5), severe tissue injury can occur regardless of the route of parenteral administration, although intravenous and inadvertent intraarterial or subcutaneous administration results in more significant complications (eg, burning, erythema, pain, swelling, severe spasm of vessels, thrombophlebitis, nerve damage, paralysis, abscess, tissue necrosis, gangrene).

Several cases of promethazine extravasation were detailed in the August 10, 2006, edition of the *ISMP Medication Safety Alert*. The actual incidence of extravasation is unknown; however, patient harm may be occurring more frequently based on adverse event reports submitted, articles in the literature, and lawsuits. Therefore, safe administration of promethazine is necessary to reduce the risk of harm in our patients. Along with manufacturer recommendations, the following strategies should be followed:

- Limit the concentration to 25 mg/mL.
- Consider using a lower starting dose such as 6.25 or

- 12.5 mg, especially in elderly patients.
- Require further dilution of the 25 mg/mL strength to reduce vesicant effects and enable slower administration. Dilute the 25 mg/mL strength in 10 to 20 mL of NS or D5W and administer through a running IV line.
 - Give through a large-bore vein, preferably through a central access site. Promethazine should not be administered through hand or wrist veins.
 - The patency of the access site should be verified before administration. Of note, aspiration of dark blood does not preclude intra-arterial placement of the needle because blood can become discolored when in contact with promethazine.
 - Educate patients prior to administration about the signs and symptoms of extravasation and have them report any symptoms immediately.

Med•U•Way to Focus on Women and Heart Disease

The next MED•U•WAY Conference will focus on women and heart disease. The program will be held on Thursday, September 21, 2006, at 12:00 PM, in 2 West Amphitheater.

The featured speakers will be Marian Taylor, MD, Assistant Professor, Division of Cardiology, Anne Spencer, PharmD, BCPS, Associate Professor, College of Pharmacy, and Christine Mancine, RN, Clinical Nurse Leader, Heart and Vascular Center.

Attendees will receive 1 credit hour of continuing education, and lunch is provided. MED•U•WAY is sponsored by the Pharmacy and Therapeutics Committee.

Formulary Update

The Pharmacy and Therapeutics Committee recently approved the following actions:

Additions:

Effective August 15, 2006

Atazanavir (Reyataz[®])
100-, 150-, and 200-mg capsules

Fosamprenavir calcium (Lexiva[®])

700-mg tablets

Emtricitabine (Emtriva[®])

200-mg capsule and 10-mg/mL oral solution

Nepafenac (Nevanac[®])

0.1% ophthalmic suspension

Restriction Removal:

Effective August 15, 2006

Ziprasidone intramuscular injection (Geodon[®]) will be available on an unrestricted basis.

Changes in Restrictions:

Effective August 15, 2006

Ropivacaine (Naropin[®])

Prescribing is restricted to the anesthesiology service or by patient location in the pain clinic.

Nondepolarizing muscle relaxants

All nondepolarizing muscle relaxants that are currently formulary restricted (ie, atracurium

besylate, mivacurium chloride, pancuronium bromide, rocuronium bromide, vecuronium bromide) now have the same formulary restriction. Prescribing is restricted to the anesthesiology service or by patient location in the emergency department or intensive care unit.

Mercaptopurine (Purinethol[®])

Prescribing is restricted to physicians on the hematology/oncology service or to attending physicians or fellows on the gastroenterology and gastrointestinal surgery service for patients who have inflammatory bowel disease (ie, Crohn's disease, ulcerative colitis).

Automatic Therapeutic Substitution (ATS)

Effective August 15, 2006

DuoNeb[®] nebulization solution has been added to the ATS program. The protocol is located on the [Formulary and Drug Information Resources](#) Web site.

Line Extensions:

Effective August 15, 2006

Urokinase (Abbokinase[®])
250,000-units/5-mL injection

Pregabalin (Lyrica[®])

25-mg capsule

Deletions:

Effective August 15, 2006

Tuberculin (Tubersol[®])

1-TU/0.1-mL and 250-TU/0.1-mL vials

Sulfacetamide/prednisone (CetaPred[®])

3.5-gram ophthalmic ointment