source

Minnesota Technical Assistance Program

University of Minnesota 2007 issue 1

preventing pollution

www.mntap.umn.edu • 612/624-1300 • 800/247-0015

Rx for the environment

Hospitals are reporting 10-fold increases in costs for managing pharmaceutical waste. Prevention options are helping some facilities reduce drug waste and costs.

MnTAP intern at the Hennepin County Medical Center, Jonathon Schulz, holds two volume options for glutose gel.

With the push to manage waste pharmaceuticals in a more environmentally and healthful way, hospitals are reporting 10-fold increases in costs for managing pharmaceutical waste. Prevention options are helping some facilities reduce these costs. One pharmaceutical reduction project estimated that the hosptial could save a minimum of $23,500 annually if several procedural changes were implemented.

Environmental impact

An increasing number of studies are showing a connection between pharmaceuticals in wastewater and impacts on aquatic life. Concerns have been raised about possible hormone disruption, antibiotic resistance and other affects. Hormones from drugs might be causing male fish to develop female traits and change behaviors in both sexes. Some drugs are also considered acutely hazardous.

Unwanted medication should not be disposed into the sewer system. Technologies used at wastewater treatment plants are not able to remove drug compounds that have entered the sewer system, through excretion of partially metabolized pharmaceuticals and disposal of unused or expired medications down the drain.

Epinephrine

Epinephrine is a P-listed waste because it is considered acutely hazardous by the U.S. Environmental Protection Agency. Its use can easily cause a health care facility to be deemed a large quantity generator (LQG) of hazardous waste.

LQGs must provide hazardous waste training to all of their staff who come in contact with hazardous materials, including pharmaceuticals. In a hospital that includes nearly everyone except administration. Hazardous waste training is estimated to cost $70 per staff person. Small health care facilities can carefully track their historical epinephrine use and control its waste from surgery to help the facilities avoid becoming LQGs.

Stock rotation. An inventory analysis by a MnTAP intern at Tri-County Hospital in Wadena showed that the facility could reduce the stock of epinephrine on ambulances by six vials. A pharmacy staff member at Tri-County conducts an inventory analysis of all crash carts and stations in rooms housing epinephrine. Short-dated medications are removed and reallocated to areas of high use.

Alternate packaging. Another MnTAP intern intern discovered that Hennepin County Medical Center (HCMC) used a fraction of the 250 epinephrine intracardiac

(continued)

(Pharmacy waste, continued from cover)

syringes it purchased in one year. The only significant difference between the intracardiac syringe and other epinephrine syringes is its 18-gauge 3.5 inch needle. HCMC was able to substitute a packaged 100 microgram per milliliter (100 mcg/ml) syringe with an 18-gauge needle affixed to the outside of the box. This allows for stock rotation to reduce hazardous waste by 13 pounds per year and dual waste by 7.5 pounds, saving $900 a year.

Purchasing/inventory management

Hospitals should analyze the demand for pharmaceuticals using par usage reports, which computerized inventory systems can easily output. They should see if dosage types are redundant and can be consolidated. The intern at Tri-County Hospital determined that 157 medications were purchased in multiple dosages and three percent of returns through reverse distribution were from formularies with multiple dosages, costing $1,450 annually.

HCMC was purchasing glutose gel in 15-gram (gm) tubes for its crash boxes—used to store drugs for emergency situations—where it often went unused, and using 45-gm tubes in the Omnicells for diabetics. The facility could switch to only purchasing 15 gm tubes and rotate stock from the crash boxes to reduce costs by $345.

Stock Rotation. The two facilities identified crash boxes, crash carts and ambulances as locations with the greatest potential for products to expire and become waste. Rather than letting products expire on the floor, both facilities developed plans to bring back high use items two to three months prior to expiration for redistribution through the pharmacy.

Sample waste. Samples left by pharmaceutical representatives are often short dated or sometimes have expired. During one two-month time frame, HCMC accumulated 35 pounds of sample waste, costing it $520 in disposal and sorting fees.

Because many samples were not being logged, HCMC moved its sample log from the pharmacy to the Purchasing Department to make it more accessible to visiting pharmaceutical representatives. A new policy was developed making Purchasing responsible for logging samples and only allowing samples with one year or longer for expiration.

See MnTAP's Pharmacies Web page for links to more information <mntap.umn.edu/health/pharm>. ■

Pharmaceutical Waste Workshops

MnTAP is sponsoring three pharmaceutical waste workshops to assist hospital-based pharmacies. Attendees will learn how to stay in compliance with the environmental regulations. And, they will learn about opportunities to minimize drug waste, in order to reduce waste management costs and public health impacts.

The three-hour workshops will cover:

- Pharmacy hazardous waste overview
- 10-step blueprint for managing pharmaceutical waste
- NIOSH hazardous drugs
- Reducing pharmaceutical waste
- Regulatory update

- **September 7.** St. Luke's Hospital, Duluth, Minnesota. $30. Registration deadline is August 31.
- **September 8.** Pharmacy Waste Regulations and Reduction at the Pharmacy Society of Wisconsin Annual Meeting. La Crosse, Wisconsin.
- **September 9.** Thursday, October 11. Live in Milwaukee, Wisconsin, or available as a Webinar broadcast.

More information online at <mntap.umn.edu/health/pharmwkshp.htm>. ■

Minnesota health care facilities win honors

Three Minnesota health care facilities were recognized at the Hospitals for a Healthy Environment (H2E) Environmental Excellence Summit on May 14.

Ridgeview Medical Center, Waconia, MN, received the H2E Environmental Leadership Award, the nation's most prestigious recognition of innovation in environmentally responsible health care. Recipients are distinguished by their pioneering efforts to reduce the health care industry's environmental impact. Their innovative programs are setting industry standards for waste reduction and pollution prevention. Ridgeview Medical Center will be inducted into the H2E Environmental Leadership Circle—an elite group of facilities that have integrated sustainable environmental programs into their core values.

Hutchinson Area Health Care, Hutchinson, and **University of Minnesota Medical Center—Fairview, Minneapolis,** received the Making Medicine Mercury-Free Award. The national award commends the facilities for outstanding efforts to eliminate mercury from the health care system. One of H2E's top goals is the elimination of mercury from the health care system wherever possible. Mercury—a neurotoxin and developmental toxin—can impair human health at extremely low levels of exposure, and health care facilities can be major contributors to mercury air emissions. The Making Medicine Mercury-Free Award is a one-time award given to facilities that have met the challenge of becoming virtually mercury-free. These facilities join eight other Minnesota facilities who have previously won the award.

"Because of increased hazardous waste regulatory oversight, many hospitals are just beginning to wake up to the environmental and public health impacts of their systems," said Catherine Zimmer, MnTAP health care specialist. "These award winners should be considered superstars for being among the leaders in making improvements."

Jointly founded by the American Hospital Association, the Environmental Protection Agency, Health Care Without Harm, and the American Nurses Association, H2E is an independent not-for-profit organization focused on improving health care's environmental performance. To learn more, visit www.h2e-online.org. ■

Disposing of drug waste at home

Unwanted medications should NOT be disposed of down drains or toilets

Mr. Yuck is changing his advice. Now, aware of the unintended consequences downstream, Yuck no longer recommends that people to flush waste medication—a poison hazard—down the toilet.

While most pharmacies will not accept unused medications, some host "clean out your medicine cabinet" drives. In lieu of that option:

1. Keep medication in its original container. The labels may contain safety information and the caps are typically childproof. Mark out patient's information.
2. Modify the contents to discourage consumption.
   - Solid medications: add a small amount of water to pills or capsules to dissolve them, at least partially.
   - Liquid medications: add table salt, flour, charcoal, or powdered spice, such as turmeric or mustard to make a pungent, unsightly mixture that discourages anyone from eating it.
   - Blister packs: wrap packages containing pills in multiple layers of opaque tape like duct tape.
3. Seal and conceal. Tape the medication container lid shut with packing or duct tape and put it inside a non-transparent bag or container to ensure that the contents cannot be seen.
4. Discard the container in your garbage can.

Tips from the Minnesota Pollution Control Agency. ■

Lou-Rich cuts water

Karl DeWahl, MnTAP chemical engineer, reviewed project status with MnTAP intern Kyle Page.

When the city of Albert Lea increased water and sewer rates by 20 percent, Lou-Rich Inc. was motivated to reduce water use. Lacking the time to take measurements and evaluate opportunities, the contract metal manufacturer requested a MnTAP intern to investigate its four highest water uses.

Phosphatizing

Lou-Rich has a five-stage metal pretreatment system that prepares part surfaces prior to painting. It had been modified to cascade the phosphatizing rinse (stage 4) into the cleaning rinse (stage 2) to reduce water use. The design did not provide enough pressure to return the rinse to the earlier tank. The intern modified the tank to create sufficient pressure; the company was able to shut off the 15 gallon per minute (gpm) fresh water feed to stage 2. The intern found that operators were gauging the flow rate at stage 4 by the position of the ball valve's handle. Ball valves are on/off and do not indicate flow rate. The intern installed a rotameter which gives visual feedback on how much water is being used. Using guidance from the chemical supplier, the intern experimented to reduce flow in stage 4 from 15 gpm to 2.5 gpm. Conductivity rose but remained well within guidelines.

Non-contact cooling water

The intern observed that the temperature of the cooling water exiting the heat exchangers for the hydraulic presses was not perceptibly higher than when it entered, indicating that excess cooling water was being used. The company replaced a solenoid and ball valve with a rotameter to control flow and it reduced flow to the hydraulic presses from 24 gpm to 3 gpm, cutting water use by 2.57 million gpy.

Previously the spot welders had a constant flow of water for cooling the welding tips and power supply. Flow was reduced from 10 to 1 gpm; timers and solenoids were installed to synchronize water flow with use. These changes reduced water use by 1.1 million gpy, saving $2,800.

Interns

"I wanted to bring someone in from the outside to focus on the project. No one here would have been allowed the time to just look at water," said LaVerne Schroeder, safety and environmental coordinator. "Kyle (the intern) did a fantastic job at finding opportunities to reduce water use." The company has reduced its water use by 8.9 million gallons annually.

The complete Lou-Rich intern project summary is available online at <mntap.umn.edu/intern/projects/Lou-Rich.htm>. ■

Lou-Rich water use reductions

Water use	Process	Reduction (annual)	Savings (annual)
41%	Phosphatizing		
	- Modified tank to improve cascade	2.7 million gal water	$7,100
	- Redirect halo rinse effluent to stage 4	4,225 gal chemicals	$16,800
	- Improved flow control in stage 4, installed rotameter, reduced flow 15 to 4 gpm	2.25 million gal water	$ 5,900
24%	Hydraulic presses: installed rotameter and reduced flow 24 to 3 gpm	2.57 million gal water	$6,800
10%	Plating pretreatment: decreased surface area of parts basket to reduce drag out, modified tank design to increase mixing, and cascaded rinses	276,000 gal water	$700
10%	Spot welders: reduced flow 10 to 1 gpm	1.1 million gal water	$2,800

Non-contact cooling water

You may have the opportunity to reduce water use and cost if you have not evaluated your facility's use of non-contact cooling water. Non-contact, or single-pass, cooling water efficiently carries heat away from high temperature areas to maintain effective operating temperatures for equipment, such as air compressors, presses and x-ray processors.

Reducing water use

Check your use of non-contact cooling water against the list below. If your system meets any one of these criteria, you have flagged a possible opportunity to reduce water use.

- The wastewater temperature is not significantly warmer than the incoming water.
- Water is turned on and left on.
- No flow rate specifications. Water valve is left wide open or set at the operator's discretion.
- Water goes to drain.

Set flow levels. Understand the need for cooling. Are you protecting equipment, tooling, operating fluids, or something else? Know the safe range for operating temperatures and set flow specifications to match those parameters.

Install controls to set flows. Eliminate operator guesswork by installing flow controls.

Reusing water

Non-contact cooling water is ideal for water reuse if process demands match supply. Before reusing or recycling water, be sure it meets your water quality requirements and identify any treatment steps that may be needed. Reuse opportunities are better if non-contact cooling water can be segregated from other wastewater streams.

Dominos Pizza—ammonia compressor cooling

To reduce the cost of an impending sewer service availability charge (SAC), Domino's Pizza Distribution Center changed from single-pass cooling of compressors in its refrigeration system to a closed-loop system that recirculates water through a holding tank. During the winter, the water is cooled sufficiently just circulating through the holding tank. The rest of the year, water is circulated from the tank through an evaporative cooling tower to provide additional cooling. On the hottest days of the year, half of the contents of the storage tank will be drained and refilled with cool city water to maintain appropriate cooling water temperatures. Closed looping this system eliminated 2,400 gallons per day of single-pass flow, saving $3,400 a year in water and sewer charges. The company avoided an $11,000 SAC.

Quick test

A quick test to see if you are using too much cooling water is to feel the inflow pipe and feel the outflow pipe. Do you feel a noticeable change in temperature?

If no, you are probably using too much water and should investigate further.

Hibbing Fabricators—spot welder cooling

Hibbing Fabricators uses water to cool two large spot welders, which run four hours a day on average. When the equipment was not in use, water was too often left running. To reduce water use, the company fabricated a 180-gallon water reservoir and interlocked a circulating pump with the spot welder power-supply to automatically trigger the cooling water on and off. The company estimates closed looping has reduced water use by at least 116,000 gpy, saving $570 a year.

For assistance with reducing your non-contact cooling water call MnTAP at 612/624-1300. See the fact sheet *Non-contact Cooling Water* online at <mntap.umn.edu/water/conservation/nccw.htm> for more information. ■

where's your waste?

Nine interns—reducing waste across the state

MnTAP is hosting pollution prevention student intern projects at the following nine companies this summer:

- Advanced Web, Minneapolis—reduce scrap rate and the volume of waste paper produced.
- Arctic Cat, Thief River Falls—reduce energy use from the paint line, reduce phosphorus discharges in the wastewater and improve compressed air efficiency.
- Boise Cascade, International Falls—improve energy efficiency and conserve water by improving the compressed air system efficiency, improving steam system insulation and reducing water use.
- Cook Area Health Services, Cook—reduce pharmaceutical waste at its hospitals, medical clinics and nursing home.
- The Dotson Company, Mankato—reduce energy use by reusing process heat from casting iron.
- Greatbatch - Globe Tool, Minneapolis—reduce trichloroethylene (TCE) emissions from vapor degreasers.
- Kraft Foods Global, Inc., New Ulm—reduce water use by reclaiming water for reuse and reduce energy use by installing a condensing boiler-stack economizer and installing a heat recovery system on the ammonia gas compressor system.
- McLean Thermal / Hoffman Enclosures Inc., Champlin—improve operating efficiencies in the pre-paint/ washer/ conversion coating process lines by reducing cleaning chemical use, energy used by heated stages, and wastewater discharges.
- Olmsted Medical Center, Rochester—reduce use of hazardous chemicals and reduce number of chemicals used for cleaning and disinfecting.

MnTAP intern presentations

Mark your calendars to come hear how the 2007 MnTAP student interns helped their companies prevent pollution.

Thursday, August 23, 2007
1:30 p.m. - 4:00 p.m.
University of Minnesota,
McNamara Alumni Center

Save your seat, RSVP to MnTAP at 612/624-1300 or 800/247-0015. More information online at <mntap.umn.edu/intern>. ■

Vacuum bagging and infusion demonstration

Carstens Industries, a custom fiberglass molding shop in Melrose, is opening its shop on Wednesday, September 12, to share its process for vacuum bagging and infusion.

Attendees at this four-hour demonstration will observe Carsten's processes for vacuum bagging boat hulls and vacuum infusing hatch covers using both rigid and flexible tooling. FRP manufacturers can see how this shop improved upon the vendor's process steps for vacuum bagging.

This workshop is intended for FRP manufacturers. To register or for more information, contact MnTAP. ■

materials exchange

A materials exchange program lists one company's unwanted material and makes it available for use by another company. The lists below are examples from the Minnesota Materials Exchange.

For more information, call MnTAP at 612/624-1300 or 800/247-0015. Or, visit **<www.mnexchange.org>.**

Materials available

3-ring binders: 4,000. 1 to 5 inches. Black with clear overlay to hold cover page. In good condition. St. Paul or Minneapolis. Free. [18349]

Barn wood: One barn. Old, rotting. Needs dismantled. Free. Dexter. [19606]

Common mode filters: Over 350. Frontier Electronics. Part number CFU1602-01. Free to nonprofits. Minnetonka. [19653]

Drums, fiber: Amount varies. 55-gallon and larger. Open-top lever lock. Food grade. Fee charged. St. Paul. [19684]

Hanging lateral file cabinets: 600. Herman Miller. One-drawer, suspended. Most are 24 inches wide; some 30, 36 and 42 inches. 16 inches deep. Medium tone. Free to nonprofits or $10 each. St. Paul. [19650]

Wood furniture pieces: Seven pallets. Pre-cut and pre-stained. Used to make futons. Sizes vary. $40/pallet or $20/pallet for damaged pieces. Henning. [19674]

Xylene: 6 to 8. One-gallon bottles. Fisher Chemicals. Unopened. Histological grade. Expires June 2008. Free. St. Paul. [19594]

Materials wanted

Benches/tables, outdoor: Heavy duty. For an elementary school. In good condition. Will pick up. Forest Lake. [19675]

Boxes, Gaylord: 200 per month. Will pick up. Will pay fee. Fridley. [18340]

Envelope stuffer, electric: One. Will pay fee. Mendota Heights. [19635]

File cabinets: Four. Four-drawer. Prefer vertical. Prefer free. Owatonna. [19676]

Liftgate: One. Tommy. Will pay fee. Le Roy. [19640]

Pallets: 600 per month. Will pick up. Prefer free. Fridley. [19649]

Paper folder, electric: One. For letters. Will pay fee. Mendota Heights. [19540]

Projector, overhead: One. Must work. Prefer free. Minneapolis. [19654]

Sewing maching, commercial: To sew canvas. Prefer free. Harris. [19644]

Successful exchanges

- A medical company donated two oscilloscopes to a start-up repair business and an electronic safety analyzer to a museum.
- A local business received 125 stadium lights from a city department.
- A nonprofit received a mailing machine from a bank and a copier from a food waste processor.
- A photographer gave nearly 4,000 out of date T-shirts to a charity.
- A music business gave $650 of office furniture to a marketing company.

Items may be sold for a nominal fee—20 percent or less than the value of an item. An item's value must be based on its current condition. ■

Lean and green seminar

Lean manufacturing is about no waste. Lean efforts to eliminate defects and errors, overproduction and inventory can also reduce energy and water use, and solid and hazardous waste.

After examining data from nearly 17,500 manufacturing facilities, New York University researcher Andrew King concluded that "we find empirical support for the assertion that 'lean is green.'" King's study found that establishments which adopt lean practices have lower emissions.

Empirical evidence doesn't inspire you? Then listen to the lean and green stories of Ecolab, Inc., Tennant Company and Interlock Structures International.

Manufacturers Alliance is hosting the educational seminar *The New Scene is Lean & Green* on Thursday, August 9, 2007, 7:30 - 9:30 a.m. at the Dunwoody College of Technology, in Minneapolis. The cost is $30 at the door for non-MA members. Event information can be found though MnTAP's online calendar. ■

helping businesses implement industry-tailored solutions that maximize resource efficiency, prevent pollution and reduce costs and energy use

mntap

MnTAP

The **Minnesota Technical Assistance Program** helps businesses and industries develop and implement industry-tailored solutions that maximize resource efficiency, prevent pollution and reduce costs and energy use to improve public health and the environment. As an outreach program at the University of Minnesota, MnTAP provides free technical assistance tailored to individual businesses. By reducing waste and increasing efficiency, companies save on disposal and raw-material costs and make working conditions healthier and safer for employees.

MnTAP is funded primarily by a pass-through grant from the Minnesota Pollution Control Agency's Prevention and Assistance Division to the University of Minnesota, School of Public Health, Division of Environmental Health Sciences.

calendar

31st Annual Conference of the Minnesota Wastewater Operators Association (MWOA) July 25, Willmar, MN. Sponsored by MWOA, 763/682-6313.

Lean and Green August 9, Plymouth, MN. Sponsored by Manufacturers Alliance, 763/383-9445.

MnTAP Intern Presentations August 23, Minneapolis, MN. Sponsored by MnTAP, 612/624-1300.

Pharmaceutical Waste Workshop September 7, Duluth, MN. Sponsored by MnTAP, 612/624-1300.

Pharmacy Waste Regulations and Reduction at the Pharmacy Society of Wisconsin Annual Meeting, September 8, La Crosse, WI. Sponsor Pharmacy Society of Wisconsin.

Vacuum Bagging and Infusion Demonstration September 12, Melrose, MN. Sponsored by MnTAP and Carstens Industries, 612/624-1300.

Lean Maintenance September 25, Plymouth, MN. Sponsored by Manufacturers Alliance, 763/533-8239.

Reducing Pharmaceutical Waste Workshop and Webinar October 11, 2007. University of Wisconsin, Milwaukee, Wisconsin. Sponsored by MnTAP and Solid and Hazardous Waste Education Center, 414/227-3160.

For more information and links to Web pages for these events, visit MnTAP's online calendar at <mntap.umn.edu/resources/cal.htm>.

Editor/writer: Deb McKinley. Articles published in *Source* may be reprinted only with permission from MnTAP. Copyright 2007, MnTAP. This newsletter is sent free to Minnesota businesses and is available online at <mntap.umn.edu/source> and in alternative formats upon request.

☎ Call MnTAP 612/624-1300 or 800/247-0015 • www.mntap.umn.edu

Minnesota Technical Assistance Program
McNamara Alumni Center • University of Minnesota
200 Oak Street SE • Suite 350 • Minneapolis, MN • 55455-2008

Subscribe | correct address:
fax 612/624-3370
call 612/624-1300
email mntap@umn.edu

CHANGE SERVICE REQUESTED

Nonprofit organization
U.S. Postage
PAID
Mpls, MN
Permit No. 155