

## Safe options for suction canister waste

**A**s suction canister drops and breaks, splashing fluid into the air and onto the face of an OR employee. As a nurse is pouring suction canister contents into the hopper, the liquid splashes back, splattering his goggles and forehead.

These are the types of incidents OR leaders dread in the disposal of liquid waste from surgery.

Traditionally, suction canisters have been poured down the sewer. But no one likes this nasty job, even though they are supposed to wear protective attire. Suction canisters can be red bagged and hauled away. But bans on medical waste incinerators and rising landfill costs are narrowing the options.

It's not a small issue—a limited study by the University of Minnesota found that suction canisters comprise 25% of regulated medical waste at hospitals.

Among options for disposing of medical waste liquids besides pouring are:

- adding solidifiers and sanitizers
- installing an enclosed waste management system that collects and disposes of surgical fluids via the sewer without contact by personnel.

One challenge in evaluating the options is lack of a standard with uniform criteria for judging companies' claims. A 5-year effort by Underwriters Laboratory to develop a standard was shelved in February after the committee failed to reach a consensus. The Environmental Protection Agency (EPA) has said it does not plan to develop a standard on its own but has looked to voluntary organizations to do so.

### **Losing incinerators and landfills**

One reason hospitals have fewer choices is the closure of hospital incinerators because of EPA regulations to reduce dioxin and other airborne contaminants.

The number of medical waste incinerators has fallen from about 6,000 to 113, notes Laura Brannen of Hospitals for a Healthy Environment. On top of this, fewer landfills are being permitted, and existing ones are filling rapidly. Landfill costs range from 21 cents to \$3.65 or more a pound and are highest in the East and West.

Here is a look at the alternatives for liquid medical waste disposal.

### **Pouring waste**

Disposing of liquid medical waste in the sewer is much less costly than landfill disposal, says Brannen, because full suction canisters are heavy and are disposed of as regulated medical waste. Many water treatment plants can handle the liquid waste and, therefore, still allow sewer disposal.

The drawback, of course, is potential exposure of staff if they must dump the waste.

Occupational Safety and Health Administration (OSHA) regulations require personal protective attire whenever splashing or splattering is expected, but not everyone adheres to that rule.

### **Using solidifiers**

Solidifiers are chemicals added to liquid waste that turn the liquid into a solid that is not able to release pathogens.

The drawbacks of solidifiers are that they add cost (\$5 to \$30 per package), are regulated differently from state to state, and use chemicals that may carry risks of their own.

As for medical waste in general, there are no uniform standards for determining solidifiers' effectiveness in disinfecting waste. The EPA has jurisdiction over medical waste treatments that use chemicals and provides oversight for labeling of chemical

treatments, including solidifiers, but it does not test them ([www.epa.gov/compliance/civil/federal/fifra.html](http://www.epa.gov/compliance/civil/federal/fifra.html)).

The new *Guidelines for Environmental Infection Control in HealthCare Facilities* from the Centers for Disease Control and Prevention, issued in 2003, say sanitary sewers may be used for safe disposal of blood and suctioned fluids, provided local sewage discharge requirements are met, and the state has said this is an acceptable disposal method ([www.cdc.gov/ncidod/hip/default.htm](http://www.cdc.gov/ncidod/hip/default.htm)).

A health care environmental expert, Hollie Shaner, RN, MSA, says, "Anyone who is thinking about solidifiers should carefully study the Material Safety Data Sheets (MSDS) to really understand what they are. And people need to be very specific in educating their staffs about how to use them." Shaner is president of CGH Environmental Strategies, Inc, Newport, Vt ([www.cghenvironmental.com](http://www.cghenvironmental.com)).

She advises managers to look at the tradeoffs. Some solidifiers are powders that can aerosolize when the lid is unscrewed or the package is opened. Then "you solve the biological risk problem but you are creating a chemical risk" because the chemicals can be breathed in, Shaner says.

### **Solidifiers and the environment**

Wisconsin's medical waste coordinator, Barbara Derflinger, says solidifiers for liquid medical waste are not environmentally preferable for several reasons:

- A chemical is being added to the waste and discarded with it.
- Commonly, suction containers are not full. Either the solidifier is wasted because too much is added, or too little is added and the waste may not be disinfected.
- The containers are discarded, which is a waste of materials.
- The chemical, containers, and waste take up valuable space in landfills.
- Eventually, the liquid and solidifier chemicals either will contaminate the groundwater or will leach out and be treated in a wastewater treatment plant, possibly releasing the chemical to water supplies.

Over the long term, Derflinger believes solidifiers cost more than enclosed waste management systems because of the ongoing cost of chemicals, containers, and waste bags as well as labor and landfill fees.

Incineration of medical waste was banned in the Omaha area two years ago. As a result, the Nebraska Medical Center (NMC) in Omaha must pay to transport waste to a distant landfill and incinerator. Starting this year, the state requires hospitals to add solidifiers to liquid waste, which NMC estimates will add another \$50,000 a year.

### **Enclosed systems**

A newer option is portable enclosed waste management systems that collect surgical liquids and flush them away without anyone having to pour them down the drain.

The drawbacks are cost and installation. The systems are expensive and require space and plumbing (sidebar).

Shaner is enthusiastic about the enclosed systems.

"I think any time you can collect blood and body fluids and flush them down the sanitary sewer without exposure to the staff, it is better," she says. Because medical waste disposal costs about 10 times more than regular solid waste, "If you can take a big portion of that waste and pour it down the sanitary sewer, that's the way to go."

A small study by the University of Minnesota's Technical Assistance Program found an organization could save \$75,000 annually in suction canister purchase, management, and disposal cost if an enclosed waste management system was installed ([www.mntap.umn.edu](http://www.mntap.umn.edu). Enter search term Suction Canisters).

Nebraska Medical Center is building new ORs and will install the plumbing and support structures for an enclosed disposal system because of the incinerator ban as well as employee safety and cost.

"An enclosed system takes away the worry about employee exposure to infectious liquid waste when changing suction canisters," says Shelly Schwedhelm, RN, BSN, director of perioperative services.

Barnes-Jewish St Peters Hospital in St Peters, Mo, has been using an enclosed waste management system for more than a year.

"The safety issue is what prompted us to get these systems," says the manager of surgical services, Patty Winslow, RN, BSN. She was able to justify adding the system to the capital budget as an employee exposure and safety issue. She also was able to validate its cost-effectiveness on high fluid-volume cases.

William S. Middleton Memorial Veterans Hospital, Madison, Wis, found the enclosed waste management system paid for itself in about four years compared to incinerating waste on-site. The return may be even faster when the cost is compared to using solidifiers or off-site waste treatment, says Keith Bednar, chief of environmental and material management services. The waste management system costs 6 cents per pound to operate versus the incinerator cost of 25 cents per pound.

Harborview Medical Center in Seattle is making plumbing modifications to its soiled utility room for a waste management system. The OR business manager, Don Millbauer, thinks the advantages of convenience and safety for staff override the cost. A potential savings that is hard to quantify is the cost of treating employees who have had exposures related to disposal of liquid medical waste.

"I believe if we knew that, and the waste system would eliminate those exposures, it would be more cost effective than the current way of doing things," says Millbauer.

One 1990 report estimated the direct costs of initial and follow-up treatment of exposed health care personnel to be \$500 to \$3,000. Harder to quantify are the anxiety and fear plus the obviously high costs if there is a seroconversion.

### **How many workers are exposed?**

Though there are not precise data on employee exposures during canister disposal, in general, splashing and splattering exposures to OR personnel are a serious problem.

In a 2002 interview with *OR Manager*, OSHA's national bloodborne pathogen coordinator said the biggest exposure problem OSHA inspectors see in the OR is splashes and splatters with blood. She did not specifically discuss suction canisters.

Workers' eyes are exposed in the majority (70%) of reported mucocutaneous blood and body fluid exposures, according to EPINet data from the International Healthcare Worker Safety Center at the University of Virginia. Other frequently exposed body parts are intact skin (34%), nonintact skin (13%), the mouth (3%), and the nose (3%). (On the report form, workers can check more than one body area exposed.) The data, from 1993 to 2001, were collected from 51 hospitals in the EPINet network.

Only a small fraction of OR exposures (8.6%) involved body fluid containers (other than specimen containers or IV bags or pumps) that spilled or leaked. The numerical data do not indicate whether any involved suction canisters.

Workers can, however, provide EPINet with additional information about their exposures. These text descriptions, which EPINet has collected since 2000, have five cases that specifically mention suction canisters. Three of these exposures happened while changing a canister; unhooking the canister from suction; or dropping the canister, which broke. None mentioned exposures during disposal. These descriptions do not necessarily represent all incidents involving suction canisters but indicate some scenarios. ❖

—Judith M. Mathias, RN, MA

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## **Manufacturers of products for liquid waste disposal**

### **Solidifiers**

#### **Omni/ajax**

www.omni-ajax.com      570/848-4186  
OMNI-KAP

#### **Metrex**

www.metrex.com      800/841-1428  
PremiCide  
Canister Express

#### **Microtek Medical, Inc**

www.microtekmed.com      800/824-3027  
Isosorb  
Isolyser's LTS-PLUS

#### **Safetec of America, Inc**

www.safetec.com      800/456-7077  
CanZ Bottles, Diamond Pouches, CanZ Pac Drop Ins

### **Enclosed waste management systems**

#### **Stryker Instruments**

www.strykercorp.com      800/253-3210

#### **Neptune Waste Management System**

System has a rover and a docking station. Rover can be moved from room to room and does not have to be emptied after each case, only when full. A disposable manifold does have to be changed for each case. Rover costs about \$13,125 for the machine; docking station costs about \$12,600. Single-port manifolds cost from \$15 to \$30, depending on the contract.

When full, the rover is rolled to the utility room to a docking station where the canisters are flushed into the disposal system. When empty, canisters are back-washed with bleach. Flushing and cleaning take 3 to 5 minutes.

#### **Dornoch Medical Systems, Inc**

www.dornoch.com      888/466-6633

#### **Transposal**

System consists of a high-fluid cart and a safety station. The cart collects waste in one or two reusable reservoirs using wall suction. After surgery, cart is rolled to the safety station in the decontamination room. The canisters are placed in the safety station and the lid closed. With the press of a button, the station removes canister lids and empties, cleans, and disinfects the canisters. The process takes about 3.5 minutes.

Once disinfected, canisters are rinsed with cold water before the unit's lid unlocks and opens. Reusable canisters are removed and allowed to air dry before reuse. Disposable canisters and lids are discarded.

Station costs about \$20,000 with the consumables at about \$2.50 per use. The cart costs about \$8,000.

*We have attempted to provide a complete list. If any vendor has been omitted, we apologize.*