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Cover Story

Waste Not

Managing Minnesota's hazardous medical waste is a complicated task.

By Richard Broderick | Illustration by Andree Tracey

The Blaine headquarters of SWDI does not look—or smell—like a facility that handles hazardous medical or, indeed, any kind of waste.

The building's 16,000 square feet are as clean as a hospital kitchen. Its floors, warmed by radiant heat—no open flames that might ignite the flammable liquids stored in one area—are spotless. Colored containers bearing the SWDI logo are neatly stacked in areas designated for hazardous and nonhazardous materials. And there's no odor signaling that the facility's 14 loading docks are the collection point for hazardous and other waste materials that come from some 1,500 clients in five states, including several hundred health care facilities.

Each day, trucks pull into SWDI carrying containers of materials that have been presorted by hospital and clinic staff at pickup sites. Hazardous waste—including pharmaceutical waste, health care's most pressing disposal problem—is set aside, then shipped out to incineration facilities around the country; nonhazardous waste is burned at other sites. In the past, almost all of this waste, including the hazardous materials from health care facilities, would either have ended up in landfills or been "sewered"—flushed down the drain. In 2002, the U.S. Geological Survey reported that pharmaceuticals ranging from antibiotics to analgesics to antidepressants to estrogen were appearing in rivers around the country. Indeed, this is still where much of Minnesota's pharmaceutical waste ends up, according to SWDI vice president and general manager Chris Psihos. "That means it is being mismanaged, not deliberately but out of confusion," he says. "In any case, it's bad for the environment."

About four years ago, SWDI decided to expand its services to include not just picking up waste and sending it out for disposal, but helping health care facilities deal with the byzantine rules for handling and getting rid of it. Psihos says the company now teaches organizations how to reduce the amount of waste they produce in the first place and how to sort and store it in a way that complies with regulations. They ask, "What do you need to know, what permits do you need, where do you take it, and what training and procedures do you need to have in place?" Psihos says.

That health care facilities are in the market for help with ridding themselves of refuse should come as no surprise given the daunting array of federal, state, and local waste management rules and regulations they face and the wide assortment of materials that make up the 2 million pounds of regulated waste U.S. hospitals produce every year. Unlike other industries that might generate a narrower range of waste products, health care produces regulated waste in all corners—from the dental department, to the dialysis unit, to housekeeping, to the laboratory and pathology service, to the surgical suite, to the pharmacy.

Those substances can be hazardous (meaning components appear on one of several federal lists of substances determined to be hazardous in nature or have certain characteristics that make them hazardous), industrial solid (nonhazardous waste other than garbage), electronic, universal (bulbs, batteries, etc.), radioactive, infectious, or municipal solid waste (garbage), each of which requires specific methods of handling and disposal.

Waste produced by medical facilities can span more than one of these categories. Solid, radioactive, and infectious wastes also can be classified as hazardous, adding an overlay of regulations about how to handle and dispose of them. In addition, waste must be evaluated to see if it meets one or more of the hazardous characteristics defined by federal regulations: ignitable, corrosive, reactive, or toxic.

Adding to the confusion is the fact that state laws can be more stringent than federal laws. Minnesota, for example, has an additional hazardous waste characteristic, the "lethality characteristic." Pharmaceutical waste, which includes expired drugs, unused medications, syringes, IV bags, tubing, vials, and other containers holding left-over medications, must be evaluated and handled as hazardous if the median lethal dose is less than the LD50 (the amount needed to kill half the test animals in toxicity studies).

Illustrating just how multifaceted the topic of waste disposal has become for Minnesota medical facilities, the Minnesota Pollution Control Agency (MPCA) last year posted a fact sheet on its website that details at length some 35 different waste-management issues including the regulations for hiring contractors for disposing hazardous waste; the proper handling of ambulance waste, alcohol-based hand sanitizers, epinephrine, and other materials; and the rules about inspection of the pipes that carry sewer hazardous waste to the local water treatment plant.

No One Was Compliant

Over the years, this complexity in the medical waste-management world bred both inconsistent compliance and inconsistent

enforcement. That is, until 2001 when what might be termed the “modern era” of medical hazardous waste management in Minnesota began with an inspection by a Ramsey County regulator of a St. Paul-area hospital (in Minnesota, the metropolitan counties are empowered by the MPCA to enforce waste regulations).

The inspector discovered that the facility was in compliance with neither federal nor state hazardous waste requirements because it was disposing of pharmaceuticals as solid or infectious waste. In turn, the inspector alerted the state that this probably wasn't the only hospital in Minnesota that was improperly disposing of pharmaceutical waste.

It wasn't. According to Tanya Maurice, now a compliance coordinator with the MPCA who then was a Hennepin County regulator, “It's fair to say that until then, the regulated community as well as the regulators conducting inspections didn't really understand how hazardous waste regulations impacted them.”

It was not uncommon, she says, for an inspector to go to a health care facility, ask to be shown the hazardous waste waiting to be disposed of, and be taken to the facility's lab or X-ray department. No one looked at the pharmacy, even though many common pharmaceutical agents such as warfarin and chemotherapeutics are highly toxic. “At that point, most facilities had a limited understanding of what constituted hazardous waste,” Maurice points out. “They knew solvents and flammable agents fell into that category, but beyond that...”

Nate Arthur, chair of the Healthcare Committee of the Solid Waste Management Coordinating Board (SWMCB), a joint powers board that coordinates solid and hazardous waste initiatives in the metro area, agrees that before the 2001 Ramsey County inspection, hospitals and clinics were unsure how to handle many substances now recognized as hazardous. “We found that pharmaceuticals, lab reagents, fixatives, chemotherapy agents, and other medications were either being seweraged, going out with the regular trash, or being red-bagged [disposed of in containers intended for infectious agents only],” he says.

Since then, the state's hospitals and clinics have made progress in many areas—shutting down smokestacks that were once used to incinerate refuse, for example—but they are still behind the curve when it comes to disposing of pharmaceuticals.

The MPCA is developing recommendations for wastewater treatment facility operators regarding sewerage of pharmaceutical waste. The agency expects to have this advice finalized later this fall.

A Minnesota Nice Approach

Meanwhile, what happened in the wake of the 2001 inspection has been very Minnesotan in nature. Instead of coming down with a hammer, the state's regulatory community began emphasizing compliance over punitive enforcement.

“It took us about a year to come to some consensus on what the regulations are and what they mean vis-à-vis health care,” recalls Arthur. “Since then, we have tried to work with every sector of the health care industry so that they are not simply hit upside the head with enforcement actions right off the bat, even if they might have known the regulations applied to them.”

A 2003 meeting with the Minnesota Hospital Association (MHA), which represents 145 hospitals in the state, was particularly productive, recalls Mike Lein, Carver County environmental services manager. Lein coordinates the work of Arthur's Healthcare Committee with the environmental managers of other SWMCB counties.

“We explained the findings about compliance and made an offer,” Lein says. “We said, ‘We'd like to work with you on this, rather than enforce things.’ The hospitals were very receptive to that approach, and we were off and running.”

During what Arthur calls an informal grace period, which has not come to an end just yet, the regulations have been articulated and inspections made. Hospitals that are found not to be in compliance face the threat of potential enforcement—and thus punitive action. “We told people what regulations apply and that it was now time to bring the health care field up to speed,” he says.

The Maine Model for Meds

Concerned by statistics about accidental poisonings, especially by drugs in the benzodiazepine family, Stevan Gressitt, M.D., medical director of adult mental health services for the Maine Department of Health and Human Services, became

But the regulators have gone a step further, organizing training sessions for hospital and clinic pharmacists, environmental staff, and nurses. “Anyone who has an interest is welcome,” Arthur explains. The sessions are now in their fourth year, with the most recent one focusing on Minnesota's growing population of same-day surgery centers.

The MHA and regulators have also worked together to come up with a method for determining whether pharmaceutical waste meets Minnesota's lethality characteristic. “What happened is that the MHA sat down with the Solid Waste Management Coordinating Board and the MPCA and we came up with some risk criteria for what categories of drugs should be treated as hazardous,” Maurice explains.

To date, this evaluation method has been approved for use by MHA members, a pharmaceutical manufacturer, a university, and a number of other entities. Under its rubric, pharmaceutical

involved in efforts to counter the afterlife of prescription medications as well as the cornucopia of drug samples pharmaceutical companies shower on doctors.

"This is not a new problem. I've worked in a number of facilities where patients have walked in with boxes of outdated drugs, and where there were boxes of unused and outdated drug samples sitting in the corner," he says.

In 2000, he and a number of other practitioners established the Maine Benzodiazepine Study Group. After meeting with representatives of the Maine Medical Association, the head of the Maine DEA, and others, the group helped draft a one-sentence state law empowering the Maine DEA to receive unused drugs as part of its assigned duties. "We opted out of drug recycling because it is against FDA regulations," Gressitt says.

The bill passed in 2001, with no money appropriated for its implementation. The study group partnered with the University of Maine to apply for a \$150,000 Environmental Protection Agency grant, which is now being used to fund educational programming, pay for prepaid mailers patients can use to send drugs to the Maine DEA, and hire staff to keep track of what drugs come in and see to their disposal. This past year, the Maine Legislature awarded an identical amount to the Maine DEA for the project.

Initially, the prepaid mailers were distributed only through pharmacies in the state's four largest counties, but the program is going statewide later this fall. To make it easier, patients are encouraged to send in all unused medications, whether over-the-counter, prescription, or controlled substances.

In addition to Maine, a number

waste must be assumed to be lethal if it is a carcinogen, a chemotherapy agent, included in two of the federal lists of hazardous wastes, a controlled substance, an endocrine disruptor, or deemed hazardous by NIOSH or OSHA, or some combination of the above. Any pharmaceutical waste that does not meet the criteria can be presumed not to meet Minnesota's lethality characteristic.

For its part, the MHA is pleased with the new evaluation method. "The process we worked out has allowed us to bring together the finest minds in the state in chemistry, pharmacy, and waste management to find solutions," says David Feinwachs, general counsel for the MHA.

Starting at the Source

In addition to sorting out regulations for properly disposing waste, the medical community has been attempting to reduce its output of waste. This, it should be pointed out, is not a new idea.

In 1992, Itasca Medical Center in Grand Rapids won accolades for a comprehensive source-reduction program that covered virtually every form of potential waste generated by the hospital, from batteries to dessert plates. In the end, the program reduced Itasca's waste stream by 238 cubic yards, and the facility saved \$11,000 a year in 1992 dollars.

Nationally, the American Hospital Association and the Environmental Protection Agency (EPA) launched an initiative in 1998 called Hospitals for a Healthy Environment or H2E and signed a memorandum of agreement pledging to eliminate certain persistent toxins such as mercury, lead, and dioxins from the health care waste stream and reduce the overall volume of that stream by 50 percent within 10 years.

A University of Minnesota program called MnTAP (Minnesota Technical Assistance Program) is working on source reduction across industries, including health care. "We work with facilities and ask, Are they routinely ordering too much of a particular medication? Is there some way to change the ordering or dosing regimens in order to reduce waste?" says Catherine Zimmer, MnTAP's health care specialist.

MnTAP conducts regional seminars, produces fact sheets, and dispatches staff and interns to facilities. The organization also sponsors quarterly meetings of HEARRT (the Healthcare Environmental Awareness and Resource Recovery Team), a networking group that addresses environmental issues within the state's health care industry. The meetings are open to nurses, doctors, facility managers, environmental services personnel, regulators, and anyone else with an interest in the topic. "HEARRT meetings are a good place for me to go and get ideas from other hospitals," says Tim Matthews, environmental services director for Cuyuna Medical Center, a facility with 25 acute care and 120 long-term and transitional care beds in Crosby, Minnesota. "They also provide a chance to talk with folks from the MPCA in a less-formal setting to find out if you're doing things right." A couple of ideas Matthews gleaned from the meetings and has put to use are finding a recycling vendor that will accept clear plastic bags and having laundry chemicals shipped in reusable bulk containers.

When it comes to both waste management and source reduction, as might be expected, Minnesota's big health care facilities are making big changes. "People look at us as the grandfather of waste," jokes Michael Burke, director of environmental services at North Memorial Medical Center. The reason, he says, is the hospital's Path to Compliance program, a multi-year effort to reduce waste.

Several years ago, Burke was a member of North Memorial's original hazardous waste committee, an unwieldy—there were, he recalls, 35 to 40 members—group that was under the jurisdiction of the hospital's security department. Responsibility for waste management was spread across numerous departments—for example, paints and light bulbs fell under the jurisdiction of maintenance; cathode ray tubes under IT; construction materials, including asbestos, under the construction department; and so on.

"It [the committee] was large, cumbersome, and lacking in direction," Burke says. "In addition, regulators were not coming out and enforcing compliance."

That changed in 2004 with the receipt of what Burke calls the "collaborative letter of warning" county regulators sent to hospitals notifying them that regulators were going to make sure facilities were compliant with the Resource Conservation and Recovery Act, the federal law passed in 1976 to regulate waste in the United States.

of other states have either enacted or have legislation pending to deal with unused drugs. And the August 2007 Athens Declaration, adopted at the Second Annual International Conference on the Environment, calls for all countries to address the issue.

But, Gressitt observes, drug return is not the only or the best answer to pharmaceutical waste. As with other kinds of waste, source reduction must be the primary way of handling the issue. "Otherwise the problem is only going to get worse."—**R.B.**

nontoxic alternative. The new cleaner is a little more expensive up front but does not require housekeeping staff to wear protective gowns, masks, and gloves when applying it. It also can be safely sewered. "In the long run, the new cleaner will save us money and be easier on the environment," Whittaker says. "The few minutes we spend reviewing products at the outset can save us a lot down the line."

For smaller facilities, especially those located further outstate, the challenges of implementing comprehensive waste-reduction programs can prove more difficult than for larger, more centrally located medical centers.

Cuyuna Medical Center's Matthews says the primary issue right now is disposal of infectious waste. He says employees sometimes fail to place it in one of the designated red bags, and it ends up in a landfill. "Hazardous waste for us right now is not so much an issue of training as getting information out about rules changes," he says.

With 600 people working three shifts, "sometimes the learning curve is steep and long. And our resources are limited. There are certain things we'd like to do but are still trying to figure out how." He says it would be easier if they were closer to the Twin Cities, where they would have access to experts and organizations that can help with training and proper disposal.

Coming into Compliance

Despite such difficulties, and despite ongoing problems trying to reconcile the Drug Enforcement Administration's requirements for "witnessed destruction" of unused controlled substances—which has generally meant flushing them down the drain—with the MPCA's and the EPA's concerns about the sewerage of pharmaceutical waste, Minnesota has made big strides in the past few years.

Tanya Maurice of the MPCA estimates that at last count, about two-thirds of Minnesota hospitals have been inspected and are coming into compliance with all hazardous waste regulations. Most are in the metro area; but more and more outstate facilities are coming on board all the time. "Here at the MPCA we are still working on the hazardous waste initiative," she says. "Now we are holding training sessions outstate to help hospitals out there get into compliance, too."

"There are still naysayers out there," says SWDI's Chris Psihos. "People who have said health care facilities in Minnesota could never come into compliance—'You want to train how many nurses? Evaluate how many drugs?'"

But because the regulators have set up a system to encourage compliance and the health care industry has put up the necessary resources, he says, the state is well on its way to solving its medical waste management problems, complex though they may be. **MM**

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In response, the hazardous waste committee was put under the direction of Burke and his colleague, Jerry Fink, the hospital's regulated waste supervisor. Membership was pared down to a half-dozen key individuals.

As for pharmaceuticals, Dennis Thelen, North Memorial's pharmacy operations manager, says they continually re-evaluate their formulary in order to reduce waste. "If there are items that are not used consistently, we will try to eliminate them." As a result of this constant winnowing, North Memorial has been able to remove Darvon, Quinine, Tigan, Procainamide, Ludiomil, Mellaril, and antinausea drugs such as Anzemet and Kytril from the formulary—and waste stream.

Around the state, mid-sized medical facilities have also ramped up their waste-management initiatives. For example, Ridgeview Medical Center in Waconia recently made oversight of the medical waste generated by its 130-bed hospital and 12 satellite clinics a team effort that starts with decisions about what to buy. A Value Analysis Team, composed of staff from across the facility, including the pharmacy, has to approve the purchase of any product by any department—the one exception being the pharmacy.

"That analysis includes looking for less-toxic alternatives when they are available," says Paul Whittaker, the hospital's director of environmental services. He cites, as an example, a recent decision by the team to replace a cleaning product that contains hydrochloric acid with a