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How Health Care Organizations Can Be Stewardship Leaders

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Abstract

Mismanagement of hospital waste can release harmful, deleterious contaminants into soil, water, and air. Irresponsible or noncompliant handling of health care waste can have far-reaching environmental and public relations consequences. This article describes legal, safe, sustainable health care waste stream management as a challenge to health care leaders that can be met by implementing good stewardship practices.

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Challenges of Solid Waste Management

According to Practice Greenhealth, a membership organization seeking to provide sustainability initiatives for global environmental improvement, hospitals generate over 29 pounds of waste per bed per day, producing over 5 million tons of waste each year.¹ Moreover, the health care industry generates wastes that are considered among the most harmful, including sharps, human body parts, blood, chemical waste, pharmaceutical waste, radioactive waste, and medical devices.² When developing federal solid and hazardous waste disposal legislation in 1976, Congress found that “disposal of solid waste and hazardous waste in or on the land without careful planning and management can present a danger to human health and the environment.”²

The ripple effects of hospital waste mismanagement can not only be environmentally far-reaching, but also give rise to assiduous civil enforcement activity and, in some cases, subject corporate officers to criminal liability. The Environmental Protection Agency (EPA) Criminal Enforcement Program focuses on significant and egregious violations of environmental laws that pose significant threats to human health and the environment.³ This program is arguably appropriate and necessary, given the potential harm associated with negligent waste handling. The COVID-19 pandemic, however, underscored the challenge of waste management, as it fomented palpable instability in health care waste handling and recycling due to the sheer volume and contagious nature of the waste generated.⁴

A challenge faced by health care leadership, particularly environmental services (EVS) and environmental health and safety (EHS) professionals, is to develop programs to manage waste material in a manner that is prescribed by law; is safe for workers, the public, and the environment; is economically sustainable; and demonstrates ecological stewardship. In the final analysis, EVS and EHS professionals and the rest of the multidisciplinary team, including workers in infection prevention and control and waste handling vendors—indeed, the entire health care organization—must take a pragmatic, integrated approach to keep a steady hand on the tiller, as they navigate the whirlwind of regulatory and statutory requirements. In what follows, I highlight and trace the interconnections among waste management, the environment, and federal governance.

Solid Waste Streams

The first page of the playbook is identifying kinds of waste. Federal regulations define solid waste as any discarded material (that is not excluded under law) that is abandoned, recycled, or considered “inherently waste-like.”⁵ Waste streams are differentiated by type of facility and by the nature of the services, processes, and material or product used. The different types of health care wastes include the following:

- Infectious waste/medical waste: articles contaminated with blood and other bodily fluids and sharps waste
- Pathology waste: human tissues, organs or fluids, and body parts
- Chemicals: spent solvents and reagents, disinfectants that could meet criteria for regulation under the Resource Conservation and Recovery Act (RCRA)⁶ or wastewater discharge prohibitions under the Clean Water Act⁷
- Pharmaceuticals: expired, unused, and contaminated drugs and vaccines; cytotoxic drugs used in cancer treatment, some of which could trigger special waste handling requirements under relatively new RCRA subsections
- Radioactive waste: articles contaminated by radionuclides, including radioactive diagnostic or radiotherapeutic materials
- Universal wastes, such as waste electronics, light tubes, and batteries
- Nonhazardous or general waste (ie, solid municipal wastes)
- Food wastes
- Recyclable materials, the responsible management of which is the cornerstone of waste minimization and environmental stewardship

Practice Greenhealth recently estimated that solid waste is the largest waste stream for health care organizations, constituting two-thirds of all hospital waste, the management and disposal of which can consume more than 30% of the hospital’s waste budget.⁸ Hospital solid waste typically comprises paper (especially corrugated cardboard and shipping containers), food waste, and disposable linens, along with rubber, nitrile and plastic from gloves, catheter bags, and other supplies.⁸

Waste Management Laws

Irresponsible or noncompliant management of health care waste can release harmful and deleterious contaminants into the soil, water, and air. Various laws pertaining to the management of wastes were penned by different lawmakers at different times to help address different issues, such as public safety, environmental protection, worker safety, and sanitation.^{9,10,11,12,13,14} This section briefly highlights some important principles of waste management as they align with specific legal provisions of related public policy

and underscores the ecological consequences of noncompliance and the importance of demonstrating organizational ethos and commitment to **environmental stewardship**.

RCRA. The Solid Waste Disposal Act (SWDA) was signed into law in 1965 to address public concern about inappropriate burning and open-air dumping of trash.¹⁵ This act reconciled the notion of sanitary management of waste with applied epidemiological science of the time. As an amendment to the SWDA, RCRA was intended by Congress to be the nexus of all environmental regulations.⁶ RCRA's original objectives were conserving energy and natural resources, reducing the amount of waste generated, and ensuring that wastes are managed in an environmentally sound manner. By the end of the 1970s, however, heightened public awareness of and congressional attention to hazardous waste led to RCRA amendments for hazardous waste management under Subtitle C.¹⁶ As amended, RCRA was designed to fully regulate hazardous waste management from the "cradle to the grave," as opposed to at the "end of the pipe," as was previously specified. This reorientation shifted accountability for hazardous waste from the waste destination storage and disposal facilities upstream to the waste generator (the health care facility) and throughout the entire waste management continuum, including shipping, transport, and disposal. The statute gave rise to stringent regulations addressing waste identification, collection, accumulation and storage, transport, and treatment disposal, all tracked through the use of a uniform manifesting procedure.

The ensuing EPA regulations advanced the congressional agenda and intent by providing prescriptive, legally enforceable requirements for waste management.¹⁷ According to the EPA, the discovery of pharmaceuticals in **drinking water** around the country raised concerns about potentially adverse environmental consequences and detrimental effects on human health.¹⁸ It is imperative that drugs are included in the health care organization's waste minimization, handling, and disposal programs in accordance with RCRA.¹⁹

Comprehensive Environmental Response, Compensation, and Liability Act. The Comprehensive Environmental Response, Compensation, and Liability Act—commonly known as "**Superfund**"—addresses the safe and environmentally responsible management of abandoned waste sites, cleanup of releases of hazardous substances into the environment, and the financial responsibility for abatement.²⁰

The importance of cradle to grave accountability was painfully underscored for some California hospitals that, in good faith, offered to transport their waste lead containers and aprons (from diagnostic imaging) to a local metals smelter company for disposal. In July 1992, the *Los Angeles Times* wrote: "The US Environmental Protection Agency had declared the property in ... Bell Gardens a threat to public health. Cleanup crews leveled the smelter building last week and began digging up hundreds of cubic yards of contaminated soil."²¹ These hospitals found themselves in the throes of civil action, as the federal government directed the disposal facility and alleged contributory parties to remove and remediate the waste.

Regulations pertaining to radioactive waste. Radioactive waste is a byproduct of various nuclear technologies used in health care facilities, including nuclear medicine, radiotherapy, and reagents for research. This waste contains radioactive substances, eg, unused liquids from radiotherapy or laboratory research. Radioactive contaminated glassware, packages or absorbent paper, and urine and excreta from patients treated or

tested with unsealed radionuclides also constitute radioactive waste.²² Centers for Medicare and Medicaid Services regulations pertaining to radiology address precautions to safeguard against radiation hazards and harmful exposures, including “appropriate storage, use and disposal of radioactive materials.”²³ Similarly, Joint Commission standard EC.02.02.01 EP 6 specifies that hospitals must minimize risks associated with selecting, handling, storing, transporting, using, and disposing of radioactive materials.²⁴ The US Nuclear Regulatory Commission regulates low-level waste disposal through a combination of regulatory requirements, licensing, and safety oversight.²⁵

Clean Air Act. The SWDA was the first federal law that required environmentally sound methods for disposal of household, municipal, commercial, and industrial waste. Due to the various treatment methods used to render waste nonhazardous and suitable for landfill disposal, these provisions gave rise to new **air quality** challenges.²⁶ In 1970, shortly following the first Earth Day, Congress enacted amendments to the Clean Air Act to improve upon its prior legislative efforts to control air pollution. The EPA published Clean Air Act Guidelines and Standards for Waste Management that identified stationary sources of air pollution for waste management industries and their corresponding air pollution regulations and guidelines. Applicable regulations include National Emission Standards for Hazardous Air Pollutants,²⁷ New Source Performance Standards,²⁸ and waste incineration rules.²⁹

Waste management and climate change. According to the EPA, landfill gas (LFG) is a natural byproduct of the decomposition of organic material in solid waste landfills that is composed primarily of methane (the primary component of natural gas) and carbon dioxide (CO₂).³⁰ The 2014 Intergovernmental Panel on Climate Change assessment report states that methane is a potent greenhouse gas (GHG) that is 28 to 36 times more effective than CO₂ at trapping atmospheric heat over a 100-year period.³¹ Poorly managed food waste, for example, can contribute significantly to GHG emissions. According to the EPA, every year in the United States, approximately 31% (133 billion pounds) of the overall food supply is wasted, which contributes to the 18% of total US methane emissions from landfills.³⁰ In light of this finding, in 2015, the US Department of Agriculture joined the EPA in setting a goal to cut our nation’s food waste by 50% by the year 2030.³² Proper management of food waste through composting and other waste minimization programs can demonstrate an organization’s concern for long-term ecological issues and a commitment to making adjustments in the spirit of environmental stewardship.

Clean Water Act. A revision and reorganization of the Federal Water Pollution Control Act of 1948, the Clean Water Act regulates wastewater discharges and quality standards and establishes federal funding schemes for pollution control programs,³³ all of which were necessitated by improper solid waste disposal. When waste chemicals are not properly manifested and shipped to licensed treatment and disposal facilities and are instead shipped to municipal waste landfills, chemicals can leach into the groundwater and eventually surface water by means of percolation, precipitation, and runoff. While new landfills are required to have clay or synthetic liners and collection systems to protect ground water, older landfills, however, do not have these safeguards. These landfills were often sited over aquifers or close to surface waters and in permeable soils with shallow water tables, enhancing the potential for leachate to contaminate ground water.³⁴

Occupational Safety and Health Administration. Following a well-publicized incident in the late 1980s involving medical waste washing up on several East Coast shores,³⁵ Congress passed the (temporary) Medical Waste Tracking Act (MWTa), which required the EPA to examine various treatment technologies and various chemical and mechanical systems for their ability to render waste noninfectious.³⁶ Two years after the enactment of the MWTa, the EPA concluded that the disease-causing potential of medical waste is greatest at the point of generation and that the occupationally exposed individual is more at risk than the environment.³⁷ In light of this risk profile, provisions of the Occupational Safety and Health Administration Bloodborne Pathogen (BBP) standard protect workers who can reasonably be anticipated to come into contact with blood or other potentially infectious materials as a result of performing their job duties, such as handling potentially contaminated waste.³⁸ In addition to its requirements concerning engineering and work practice controls, personal protective equipment, and vaccinations, the BBP standard provides for the proper collection, containment, and management of regulated waste, including placement of waste in properly labeled containers that are closable, rigid, and constructed to contain all contents and to prevent leakage of fluids during handling, storage, transport, or shipping.

Health Insurance Portability and Accountability Act. In 1996, the Health Insurance Portability and Accountability Act was promulgated as an amendment to the Consolidated Omnibus Budget Reconciliation Act in an effort to make health care delivery more efficient and to “improve the portability and accountability of health insurance coverage” for employees between jobs.³⁹ Included is a general mandate that a health care facility must reasonably safeguard protected health information (PHI)—identifying information, as well as information about a patient’s medical condition or method of payment—from negligent use or disclosure. These safeguards include measures for managing wastes that contain PHI, such as after-visit summaries, medication labels, invoices, and information on intravenous bags. In consequence, hospital waste management systems must include unfettered access to designated confidential waste bins at the point of waste generation, a robust chain of custody, and verifiable destruction.⁴⁰

Waste Reduction

The denouement of this story should come as no surprise: the best way to manage waste is not to generate it in the first place. Ecological considerations notwithstanding, from a business perspective—irrespective of the type or volume of waste a hospital generates—it is all the same in one respect: it costs money! In fact, hospitals pay twice—once when the material is purchased and the second time when it’s thrown away. By consuming and discarding less, health care organizations can reduce the need to handle, treat, and dispose of waste. The EPA encourages practices that reduce the amount of waste needing to be disposed of, such as source reduction, waste prevention, and recycling.⁴¹ The federal government, however, has mainly depended on local and state governments to enact their own waste management and recycling laws.⁴²

In recognition of the fact that much of the commercial sector waste sent to landfills is readily recyclable, states like Illinois and California have championed targeted recycling initiatives and laws. The state of California, for example, requires all businesses, apartment complexes, and government entities to recycle as one of the first actions under the state’s Air Resources Scoping Plan, which lays out California’s strategy for meeting GHG reduction goals.⁴³ In the state of Illinois, the 3 main pieces of legislation that address waste reduction and recycling are the Illinois Solid Waste Management

Act, the Illinois Solid Waste Planning and Recycling Act, and the Illinois Environmental Protection Act.⁴⁴

Action Steps for Organizations

Other waste reduction and minimization ideas include the following:

- Employ permitted or legally approved onsite treatment, neutralization, and detoxification of chemical wastes to render them suitable for safe sewer disposal. For example, the California Health and Safety Code contains regulations and incentives that ensure that the generators of hazardous waste employ technology and management practices for the safe handling, treatment, and recycling of their hazardous wastes prior to disposal.⁴⁵
- Develop internal programs that promote the substitution of less hazardous chemical products and laboratory chemistry whenever clinically and operationally feasible, such as nontoxic or less toxic xylene replacements for the pathology laboratory that are compatible with tissue processors and mounting media.
- Work with procurement and supply and suppliers to avoid products with excessive packaging whenever possible and to purchase items in bulk, in concentrate, or in refillable packages.
- Donate used (but still operating) electronics for reuse. Doing so extends the life of devices and keeps them out of the waste stream for a longer period of time.

As a matter of law, hazardous waste generators (including hospitals) must certify that they have waste reduction programs in place. Along with federal hazardous waste regulations is a little-known waste minimization certification tucked away within Item 15 of the Uniform Hazardous Waste Manifest that must accompany off-site shipments.⁴⁶

A large-quantity hazardous waste generator, for example, must certify to a statement that the generator has “a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable.”⁴⁶ That means every signature of every hazardous waste manifest memorializes an organization’s commitment to regulatory compliance, as well as its covenant to the community, and should strengthen the organization’s resolve to help protect the environment through strong waste reduction policies and practices.

Conclusion

The true *raison d’être* of health care is to improve public health, as highlighted in the mission statement of the American Medical Association. Pursuant to that goal, this article has shown how the management of medical waste can be aligned with environmental sustainability, resource stewardship, and regulatory compliance.

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