Editorial

The Medical Waste Conundrum Revisited

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There continues to be considerable confusion and polarization of opinion on how to effectively manage waste produced by the healthcare industry. On one hand, the persistent public view is that medical waste, which is waste produced in the diagnosis and care of patients, is capable of causing infection. This belief was reinforced in 1987 and 1988 when needles, syringes, and other "medical" paraphernalia were found on several beaches along the eastern seaboard of the United States. The national news media reported the findings and public health officials moved quickly to close the affected beaches. The very decisiveness of this action may have forever crystallized the nexus between medical waste and public health.

For a time, national attention was focused squarely upon the issue of medical waste disposal. Later, when we learned that much of the "medical flotsam" that had appeared on our beaches was actually from other sources,[1-3] media coverage on the matter was much less apparent to the casual observer. Policymakers responded to a concerned public by enacting strict regulations governing treatment and disposal of some forms of medical waste. Unfortunately, the various rule-making bodies have failed to reach consensus as to exactly what portion of the overall waste stream needs to receive special treatment or handling. The Environmental Protection Agency (EPA), the Centers for Disease Control (CDC), and state and federal statutes, such as the Medical Waste Tracking Act of 1988, put a slightly different slant on what needs to be done. Each has tried narrowing its impact by using common terms to distinguish the materials or items affected by its standards. Thus, while terms such as "infectious waste" and "regulated medical waste" often are used interchangeably as generic terminology to include contaminated sharps, microbiology or pathological waste, contaminated animal remains, blood, waste from patients in isolation, etc., they may in fact mean different things in different contexts.

Regulated medical waste could be expected to constitute from 6% to 45% of the total hospital waste stream, depending upon what definition is being applied.[4] Generally acceptable methods to render regulated medical waste noninfectious include incineration, autoclaving, chemical or microwave inactivation, or, in the case of blood and other infectious body fluids, pouring the untreated liquid directly into the sanitary sewage system.

The Occupational Safety and Health Administration (OSHA) recently published its final Standard on bloodborne pathogens.[5] This Standard defines the term "regulated waste" to include most of the elements described above but also adds bloodied dressings, empty specimen containers, and virtually all items being discarded that are soiled with blood or other potentially infectious body fluids. The intent of the OSHA Standard was not to change final disposal patterns per se but to simply contain and identify possible sources of bloodborne pathogens in the workplace. The effect of the Standard is that many in

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the healthcare industry are having difficulty drawing the distinction between OSHA and EPA jurisdictional boundaries. The portion of the waste stream receiving special treatment as "regulated medical waste" is likely to increase because of this confusion. Consequently, public anxiety, coupled with an assortment of definitional inconsistencies, has probably led us to overmanage medical waste. "Overmanage" in this context is the substitution of a more expensive treatment technology when a less costly method would offer an equivalent margin of safety. Incineration in place of chemical inactivation or chemical treatment in place of deposition directly into a sanitary landfill are possible examples.

When asked to react to current trends in medical waste regulation, many in the scientific community will respond by posing a series of probing questions. Is there evidence of microbial survival or amplification when medical waste is landfilled? What human illness can be linked to exposure to medical waste? Does medical waste intrinsically represent a greater pathological potential than household waste? Are there "safe" (e.g., subinfectious) levels of pathogen concentrations that can be permitted after processing medical waste? Does a proposed technology reduce or eliminate the pathogenic potential of the waste being treated, only to result in a secondary set of problems, such as air or water pollution? Is the technology safe for the operator? Are there standardized techniques available to measure the efficacy of a treatment process?

Recent commentaries by Rutala and Weber,[4] Karpiak and Pugliese,[6] and Keene[7] have each eloquently discussed the paucity of epidemiologic evidence to support the need for specialized handling and treatment of most forms of medical waste. Each calls for a scientific approach to both the assessment of hazards and the development of regulations governing the management of medical waste. Few in the scientific community would find fault with this position.

The article by Jetté and Lapierre in this issue of ***Infection Control and Hospital Epidemiology***[9] carries with it an implicit recognition of the realities of medical waste disposal: medical waste regulations, whether or not we consider them to be reasonable or scientifically defensible, are here to stay. Given that premise, we must move beyond our natural inclination to question the regulation because of the unscientific nature of its foundation. Instead, we must develop objective methodologies to measure the efficacy and operating characteristics of new and existing waste disposal systems. The infectious waste disposal system, Medical SafeTEC Inc., Model Z-500 HC (Indianapolis, Indiana), described in this article, is representative of emerging technologies in waste treatment. The article describes the findings and the laboratory methods used to evaluate the operating characteristics of the system. The parameters measured by the researchers included the capacity of the device to reduce various forms of biocontamination by a predetermined magnitude as well as the extent to which aerosols (chemical and biological) are produced by the system during operation and the residual chemical composition of treatment end- and by-products. The recent Association for Practitioners in Infection Control position paper on medical waste[8] called for industry to design and market new technologies for medical waste treatment and disposal, and industry will most assuredly do so. The present article contributes not only to our understanding of the Z-500 HC but, perhaps more importantly, begins to give us the tools to objectively compare competing systems as they enter the marketplace.

This is not to say that we should discontinue basic research into the environmental and health implications of medical waste disposal, nor should we stop trying to enlighten policy-makers and the public with our discoveries in this regard. Rather, since our system demands that we respond in good faith to existing regulatory and social pressures, the present article helps to add a measure of scientific validity to the response. This should be of at least some comfort to both the scientific community and the general public looking for tangible evidence of effective medical waste treatment.

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