

Waste Disposal in the 21st Century and Diabetes Technology: A Little Coffee (Cup) or Beer (Can) with That Insulin Infusion (Set)

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Abstract

The advent of single-use disposable syringes along with myriad similar products for the health care industry has raised interest in the impact of these devices on the environment. Interest does not stop at impact of the device, but also includes associated pharmaceutical agents. Across the spectrum of health care, providers as well as end users of products are assessing the impact of product design and contents upon land, air, and water. In this issue of *Journal of Diabetes Science and Technology*, Pfützner and colleagues tackle the issue by focusing on a product for the diabetes patient. As environmental sustainability has become part of the evaluation process of many products, their assessment sheds some interesting light on the impact of a group of devices when compared and contrasted against the ever-popular disposable coffee cup or beer/soda aluminum can. Regional variations in waste disposal practices need to be understood when conducting these types of assessments.

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The advent of disposable medical products ushered in a new era of patient as well health care worker safety. The development of the single-use disposable syringe, initially by Murdoch and subsequently by Becton Dickinson and Monoject, was a major milestone for diabetes care as well as health care and injection safety.¹ What we have now learned in the ensuing years is that all these single-use devices and the various next generation products, including diabetes care products, have spawned an interesting contribution to the global waste stream.

In this issue of *Journal of Diabetes Science and Technology*, Pfützner and colleagues² tackle the issue of the growing interest in the impact of discarded health care products on the environment with their assessment of the environmental impact of insulin infusion sets based on loss of resources with waste. Environmental

sustainability is now embraced by health care institutions, governments, and business organizations around the world. It has grown beyond being a buzz word.

Some consumers have seen a television commercial of B. B. King, the great blues guitarist, lamenting the frequent needle sticks to check his glucose level only to be informed that a less painful approach is available.³ Millions of people in the past have endured this painful daily ritual of finger sticks with metal lancets. Engineering and science have improved the method of testing to lessen the pain and accelerate the results. A slew of glucose monitoring devices are now available on the market, and some are even collected for quality control/Food and Drug Administration requirements as well as for the potential of recycling recoverable components.⁴ Some companies had previously offered collection programs for pen needles.⁵

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Numerous countries have implemented various programs related to the collection of injection devices to reduce potential risk of occupational exposures to sharp devices such as insulin syringes and lancets.⁶ In high-income countries, this has garnered much attention to the extent that either legislation has been introduced that specifically prohibits the disposal of sharp devices such as the syringes and lancets into the solid waste stream⁷ or programs have been established that offer a collection service to those who are self-injectors.⁸ A not-for-profit organization has been organized to promote safe needle disposal in the community: Safe Needle Disposal.⁶ Mail-back service of used needles and sharps is available in the United States via the United States Postal Service.⁹ However, many of these programs were designed to specifically address one issue: how to treat and dispose of this waste from an infectious risk perspective.

This issue of impact on the environment cuts across many areas of health care. EDANA, the trade organization representing the nonwoven textile industry, issued a sustainability document in which it demonstrates the reduction in the weight of diapers and other personal hygiene products. Much has been written regarding the impact of diapers and nappies on the environment.¹⁰

The interest in pharmaceutical waste management has taken on a life of its own. Numerous studies since 2000 have pointed to the impact of active pharmaceutical ingredients upon the environment.¹¹ Various drugs have been detected in varying concentrations in the drinking water in major cities around the world. Various studies and programs have been undertaken to address collection of unused pharmaceuticals from homes (United States Drug Enforcement Administration, France, Germany)¹²⁻¹⁴ as a way to reduce the impact management of wastewater from health care institutions (Pills Project)¹⁵ through the collection of used pen needles (Novo Nordisk)⁷ and glucose monitoring devices (Roche).¹⁶

Pfützner and colleagues² provide a very good analysis of the impact of several infusion sets on the environment when compared with a take-away or disposable coffee cup and a soft drink or beer in an aluminum can. Where they may fall short is the assumption that these insulin devices will be incinerated. Disposal of medical waste from the home, and for that matter solid waste, varies tremendously around the world. Northern Europe is more likely to incinerate waste whereas Southern and Eastern Europe still utilize landfills.¹⁷ And with respect to the United States, 80% of solid waste is still sent to landfills.¹⁸ And let us not forget the drinking

habits of these cultures. While various take-away coffee emporiums abound—Starbucks, Costa Coffee—certain patriots of countries such as Italy still enjoy brewing their own cup of espresso or whatever suits their taste. Pfützner and colleagues have clearly placed their hands on the pulse of the environmental impact of disposable health care devices. How these impact the environment requires further analysis and an assessment of regional variations in the delivery of health care as well as waste management practices in those regions.

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