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Discussion

Cleaning up plastics in healthcare waste: the transformative potential of leadership

Fawzia N Rasheed [1,2] Gijs Walraven [3,4]

[1]Faculty of Epidemiology and Population Health, London School of Hygiene & Tropical Medicine, London, UK
[2]Aga Khan Health Services, Geneva, Switzerland
[3]Aga Khan Development Network, Geneva, Switzerland
[4]Department of Community Health Sciences, The Aga Khan University, Karachi, Sindh, Pakistan

Correspondence to
Professor Fawzia N Rasheed, Faculty of Epidemiology and Population Health, London School of Hygiene & Tropical Medicine, London WC1E 7HT, UK; Fawzia.Rasheed@lshtm.ac.uk

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ABSTRACT

This article argues that plastics ought to be included under the category of 'hazardous' healthcare waste and suggests that health professionals should strive for alternatives as part of their mission to improve health. The focus of this paper is on replacing, rather than recycling, plastics. The rationale for this stance stems from the unbridled escalation of plastics use, the fact that few countries have significant recycling capacity, and because the process of recycling as well as the end products of recycled plastics remain hazardous to health and the environment.

Issues related to incinerated plastic, plastics in single-use items, plastic blister packs and containers for medicines, as well as plastics which are unrelated to healthcare but which nevertheless make up a substantial part of general healthcare waste are discussed. Suggestions are put forward to dramatically reduce plastics in all such cases.

To support needed reforms and to guide best practice for single-use plastics in particular, a call for a reliable reference source is made—similar to the Essential Medicines Lists, which would share updated information on the most problematic items in use and environmentally friendly alternatives in each case.

It is argued that concerted action by health professionals to improve healthcare waste, beginning with plastics, would send much needed market signals to industry to produce environmentally-friendly products for healthcare and would likely lead to solutions for domestic waste, too.

INTRODUCTION

This article challenges the premise that environmentally damaging waste is a regrettable but unavoidable consequence of providing healthcare—or for that matter, that the health sector should get a free pass to pollute because of the importance of its work. Instead, we suggest that if the health sector exercised leadership in addressing everyday waste—beginning with plastic—the impact could be far reaching and possibly contribute to greater health benefits than the work that we currently do.

To underscore how much needs to happen to ensure waste from the health sector is benign, box 1 outlines a vision of the ideal world.

Plastics in healthcare waste

The term 'healthcare waste' covers all items discarded by healthcare facilities, medical research centres and laboratories, and produced through healthcare at home. The classic literature[1] deems only 10%–25% of such waste to represent risks (radioactive, carcinogen or 'hazardous' waste materials) that require careful management. Guidelines and regulations focus on these areas.[1]

However, plastics are not included within these categorisations. And yet, plastics are made from fossil fuels, are breeding grounds for vector borne diseases,[2] block and break sewage systems,[3] suffocate wildlife,[4] leak toxic products into water ways[5] and into the air when incinerated or burned.[6] Plastics have also been linked with severe adverse health outcomes, such as cancers, birth defects, impaired immunity, endocrine disruption, as well as developmental and reproductive effects.[7] As such, plastics deserve special attention.

Estimates of absolute volumes of plastics in healthcare waste are hard to find but volumes can be assumed to vary between parts of the world and levels of healthcare. WHO describes 75%–90% of health waste

Box 1 Health waste management: the ideal world

In the ideal world, no health establishment would condone—let alone generate—any harmful waste. All by-products of health operations would be valuable resources used for some other purpose or be biodegradable.

Keeping people healthy would be the top priority. Superfluous interventions, treatments, diagnostics and prescriptions would be recognised as health system failures and for being wasteful of precious resources.

Safety considerations would pervade the design of health products. Before reaching the market, products would be vetted by regulatory agencies for their environmental safety as well as virtues for patients. Claims of 'life-saving' products would be tested with a life-cycle lens to ensure that they remain valid in the long term. The onus would always be on manufacturers and suppliers to take back unwanted packaging, equipment and expired medicines for recycling, reuse or safe disposal.

Health practices would be guided by sustainable resource use and environmental impact. Certainly, no practices would be justified on the grounds of immediate needs if they presented risks for the future.

All in all, health facilities would represent the ultimate in environmental standards. As such, waste management staff would be among the most highly trained and respected of all health professionals. Such personnel would also be consulted to advise broader public waste management efforts.

to be 'non-hazardous' or 'general waste', of which more than half consists of paper, cardboard and plastics, while the rest is attributed to food, metal, glass, textiles, plastics and wood.[8] Some cite plastics to represent 25% of all general waste,[9] but in our experience, and perhaps because cardboard, paper, metal and glass are often reused or recycled—plastic is by far the predominant item. See figure 1 for an illustration of general hospital waste in a low income country destined for landfill.

Figure 1 An image of general hospital waste.

Concerns regarding plastics in healthcare are not new.[10] But rather than follow calls for more recycling,[11] we feel the need to rethink the use of plastics altogether. We take this position for a number of reasons: First, since the emergence of medical plastics in the 1950s, less than 9% is deemed to have been recycled[12] and recycling policies are rarely translated into action.[13] The manual sorting that is often required for recycling often constitutes real health risks for those involved.[14] Furthermore, recycling comes with additional energy needs, requires infrastructure that few countries have and does not resolve the central problem—while some plastics may be temporarily transformed into new products, these items still remain persistent and environmentally problematic.

The sources of plastics within health waste

Most of the plastic items from health operations that find their way into 'general waste' are indistinguishable from what you would find elsewhere—wrappings from junk food and other food containers, plastic bottles from water and soft drinks, containers for detergent as well as bubble wrap and styrofoam (see figure 1). Most come from items purchased within the premises, from canteens, vending machines and tuck shops or come from products used for cleaning. The fact that this type of waste has become so ubiquitous likely explains why it escapes attention.

Plastic items that are specifically 'medical' include gloves, personal protective equipment, syringes, tubing, speculums and the like, as well as plastics from packaging for sterile items and containers and blister packs for medicines.

Much can be done to reduce the volumes of all these sources of plastic.

Incinerated plastic

Reducing incinerated plastic is a priority because of the fossil fuels used to power the process as well as the carbon emissions and air pollution that results.[15] Furthermore, many items are incinerated because they are plastic (see the section on single-use items below). Of all medical plastics, around 12% are reported to be incinerated.[12]

While side-stepping important questions of whether incineration does more harm than good[15] or the many alternatives[16] to it, many would agree that incineration is used too liberally. A recent audit in one of our own facilities revealed that 75% of the incinerated waste (by weight), was in fact, not infectious. Besides items which should not have been incinerated in the first place (food and drink, medicine bottles, medical notes), most of the contents consisted of plastic packaging for sterile single-use items. From personal accounts, these findings appear to be common.

In terms of remedies for incineration overuse, training and supervision is key. So too, are simple measures to reduce items that find their way into bins

for incineration. Restrictive placement of such bins is a start. For instance, one bin could be allocated per ward or nursing station rather than for each bed. Mobile bins can be taken from bed to bed on rounds. Such steps, coupled with the liberal placement of general waste bins (lined with biodegradable, rather than plastic bags), would radically reduce volumes of incinerated waste as well as plastic bags currently used to manage waste. While these measures may seem obvious, staff members involved in the many steps leading to incineration tend not to have an overview of costs or impact.

Single-use items

Single-use products have been marketed on the basis of reducing infections and convenience. A plastic trade group states: 'Single-use plastics are the cleanest, most efficient way,' to facilitate health and hygiene in hospitals.[17] While single-use items are certainly convenient, many such items—including syringes—are in fact reused.[18 19] In other words, the availability of these items does not guarantee safety. Furthermore, plastics are not always the most sterile option. For instance, reusable gowns are reported to present better barriers than single-use plastic versions.[20]

Healthcare interventions in wealthier countries tend to generate much more waste due to single-use products than elsewhere.[21 22] Practices in the days before plastics as well as those in resource poor settings are being revisited due to concerns over waste, plastics in particular,[23] but also cost. In a survey of practices adopting alternatives to single-use plastics in 332 hospitals, considerable savings were identified.[17] Certainly, with respect to personal protective equipment, linen aprons are making a come back,[24] as is hand washing with a more selective use of gloves.[25] Glass syringes are also gaining popularity for repeat personal use.[26] These trends to reduce the use of plastics, if maintained, will make a big difference.

To remedy the fact that single-use items have saved time, businesses that clean, sterilise and return instruments to hospitals are emerging.[27] Some even claim to safely sterilise 62% of single-use items including heat-sensitive items.[28] Others, offer certification training for a new cadre of health professionals[29] and industry.[30]

But aside from plastics in single-use products, there is another associated problem: these items are often wrapped in packs with see-through plastic facing (figure 2). In countries with weak waste management systems, hospital administrators often elect to burn rather than throw away such wrappings because of the plastic content to avoid these items being identified and persisting in public waste; risks include having unrelated waste items associated with health facilities as well as prompting (hopefully unfounded) concerns about the infectivity of health waste. There is a solution. Many single-use items such as bandages come in all paper wrappings (see figure 3). These rapidly decompose and can be composted or recycled. Calling

Figure 2 A sample of single-use items in plastic-facing packs.

for all-paper or biodegradable alternatives as well as batches of items to be sold in single packs would considerably reduce plastic, energy use and waste.

Blister packs and medicine containers

Pharmacy products do not feature prominently in descriptions of health facility waste but they do make their way into homes. Today, solid medicines predominantly come in blister packs—in Europe, 85% are sold in this format.[31] While the rationale for blister packs is based on helping patients track consumption, there are alternatives. In the first place, people can be tasked with remembering what they consume as they did before the advent of blister packs. Scratch-card stickers[32] also exist to help track the number of pills ingested. Fortunately, paper equivalents for blister packs have been revived.[33] Some of these products work with machinery designed for their plastic equivalents,[34] which is an important consideration for a US$280 billion industry.[31]

Loose tablets are mostly sold in plastic jars—far fewer are sold in glass. Suppliers could be persuaded to use glass rather than plastic jars and to operate take back schemes for recycling and/or reuse. Pharmacists could also revive older practices of buying in bulk and dispensing pills to patients in biodegradable containers such as smaller glass vials or paper envelopes.

Plastic in general waste

There are many ways to reduce plastic in general waste, most of which is food related. In the first instance, there are reusable and biodegradeable alternatives to disposable plastic cutlery, plates and food

Figure 3 Examples of sterile items in paper packs.

containers for take-out food. Banning the sale of junk food, bottled water and soft drinks would also make a significant difference and should be pursued on the grounds of promoting healthy diets alone. To help with transitions, health facilities should provide healthy alternatives and safe drinking water. These measures are directly under the control of health facilities and if taken, we estimate would reduce plastic in general waste by at least 80%.

Solutions also need to be found for plastic containers for bleach, sterilants and other cleaning products. Here again, the onus can reasonably be placed on manufacturers to either use alternative biodegradable products or to take back containers. The business model for returning containers—such as for soft drinks—exists. Going this route makes sense. Manufacturers are the most likely to be able to recycle products that they make in the first place or design products that they are comfortable with cleaning and reusing.

Alternatives to medical plastics

When it comes to medical plastics, identifying alternatives can be difficult to navigate. For instance, some products, such as nitrile medical grade gloves, are touted as biodegradable[35]—but are also said to be far from environmentally friendly.[36] Degradable plastic and oxodegradable plastic sound good but are, nevertheless, still plastic and reputedly contain chemicals that accelerate degradation into microplastics, the effects of which are yet to be fully understood but this far are not reassuring.[37–39] Furthermore, while technically recyclable, polypropylene and polyethylene syringes last up to 1000 years[30] and are not recycled because manipulating these comes with infection risk and large volumes are needed to make recycling economically feasible. Bioplastics, based on ingredients such as corn or mushrooms appear to signal hope although much work needs to be done to ensure that the chemicals used in production and resulting from degeneration do more good than harm.[40]

Besides vetting innovations in the future, identifying safe alternatives for problematic products in use is not a straightforward process. A case in point are reusable silicone menstrual cups. These have long been demonstrated as being the environmentally friendly alternative to plastic based sanitary towels, as well as safe, cheaper and last longer.[41 42] A single menstrual cup does away with ten years' worth of alternative products. However, despite these clear advantages, menstrual cups are crowded out of the market by companies that control the industry and the advertising narrative.

CONCLUSION

Health professionals should ensure that all that happens within health facilities supports good health. If airports from San Francisco, Nairobi, Dubai to Kolkata can limit plastic products—so can health facilities. Members of the public will understand. As with smoking bans, such measures, would surely add to the credibility of any health establishment.

To get away from harmful products in healthcare, including plastics, health professionals need to send uniform market signals of what they prefer to buy. Towards that end, the health community needs help with identifying problems and better alternatives. Similar to the Essential Medicines Lists,[43] which maintain updated information on the best available treatments for the biggest health problems, a reliable reference is needed on environmentally friendly options for items most used. Creating such a resource will take investment and expertise but is entirely within the realms of the health sector; this sector is, by nature, science based and riddled with standard setting bodies. If it is to work, such a resource would need to be credible, free from vested commercial interests and have the backing of relevant authorities. First adopters of new products and practices will likely face some resistance and need support as they change the status quo.

If the health sector makes significant progress with its own waste, the potential to catalyse wider reforms is obvious. Health professionals have considerable leverage within communities to influence changes in practice. Furthermore, this sector, which represents

10% of Gross Domestic Product or the total monetary value of goods and services produced and sold on the market,[44] also has the necessary purchase power to influence industry. We would suggest that no other sector commands such power and potential to organise and unify positions. As such, the health sector has a particular responsibility to use its leverage to drive the reforms we all need.

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ORCID iD
Fawzia N Rasheed http://orcid.org/0000-0002-3417-0513

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