

Trash Talk in the ED: Takeaways from Waste Audits at New England Hospitals

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Recent investigations at Kent Hospital, a suburban community hospital in Rhode Island, and Massachusetts General Hospital (MGH), a Level 1 trauma center, highlight the importance of health care waste.^{1,2} These investigations involve a simple concept: sorting through trash can help identify ways to cut costs and reduce environmental impact.

The waste audits – both conducted in the Emergency Department (ED) – followed a similar protocol. Environmental Services staff collected waste from the ED for a 24-hour period. Waste was then sorted into various categories, including paper, plastic, food waste, glass, metal, electronic material and unused items. Most waste from the ED is considered municipal solid waste (MSW) and requires no additional treatment and can be disposed in a landfill. Regulated Medical Waste (RMW), on the other hand, requires specific protocols prior to disposal. It is expensive and often requires energy intensive processes such as autoclave sterilization or incineration.

Attention was given to whether Regulated Medical Waste (RMW) and sharps were appropriately disposed (i.e., in designated containers). Investigators also examined if non-RMW was inappropriately placed in RMW containers. All categories of waste were weighed and direct pollutant emissions were calculated using the M+ WasteCare Calculator.³ The waste audits at the two facilities revealed some important takeaways:

(1) Inappropriate disposal of Regulated Medical Waste (RMW) is expensive and inefficient

While the amount of waste generated per-patient encounter was similar at Kent and MGH, estimated carbon emissions were 10 times higher at MGH. The difference in emissions was driven by differences in RMW. The waste audits identified 71.67 kg in RMW containers at MGH compared with 4.67 kg at Kent. Disposing of this waste accounted for 70% of overall waste emissions at MGH. This is because there are specific requirements for disposing of RMW that tend to be energy intensive. RMW needs to be rendered safe prior to disposal in a landfill. Hospitals can perform on-site sterilization or utilize a specialized hauling service to have waste processed off-site.

Only 15% of waste disposed in RMW containers at MGH met criteria for RMW. Eighty-five percent of material in RMW containers could have been transported to a landfill but, instead, was processed using the energy-intensive disposal methods reserved for RMW. Behavioral characteristics are partly responsible for inappropriate use of the RMW containers. Improvements in ED staff knowledge regarding RMW criteria and ED design simplifying RMW bin location could lead to more appropriate disposal.

(2) ED waste is filled with unused items

Audits at Kent and MGH demonstrated that unused items tossed in the garbage are a significant issue in the ED. More than 170 unused items were identified in the Kent audit, consisting of 5.2% of total waste. These items included unused boxes of gloves, surgical face masks, suture material and medications (Table 1). The audit at MGH identified 201 unused items, including 76 bundled and unused tourniquets. Both audits revealed resuscitation supplies still in storage packaging. Unused items tossed in the garbage are pure waste. There are monetary and environmental costs to producing these items, transporting them to the hospital and then disposing of them in a landfill.

It is unclear as to why there are so many unused items in ED waste. Infection control policies may play a role. Unused items may be considered “contaminated” if present in a room under isolation precautions. In addition, procedure kits often contain redundant or useless items, leading to the disposal of unused items. Evidence of unused resuscitation supplies in the Kent and MGH audits suggests that resuscitation scenarios are particularly prone to waste. There is likely also a behavioral component to the disposal of unused items. In a busy ED, it is easier to toss unused supplies into the garbage rather than placing them back in a drawer or supply closet.

Potential solutions for the problem of unused items include only bringing necessary supplies into the room when caring for patients on isolation precautions and designing “in-house” procedure kits with items pre-approved by ED staff. Kits for certain procedures (such as laceration repairs) could be sterilized in-house and then returned into circulation. ED administration could incentivize re-stocking of unused supplies. Specific ED staff could also be tasked with a re-stocking role. As with RMW disposal, ED design should

Table 1. A List of Unused Items Identified during the Kent ED Waste Audit

2 unopened boxes of non-sterile gloves
2 partially finished boxes of non-sterile gloves
3 unopened sets of sterile gloves
8 unopened female catheterization kits
6 unopened Yankauer suction handles
8 unopened suction tubing sets
1 unopened sterile drape
2 unopened 4x4 sponges
4 unused (and folded) adult diapers
7 unopened urine sample collection kits
13 unused bedpans
1 unopened Tegaderm
1 unopened C-collar
2 unused bags of IV fluids
12 unopened normal saline flushes
3 unopened IV catheters
10 unopened pairs of socks
1 partially finished box of procedural masks
2 sterile large cotton swap applicators
1 sterile solution bowl
4 unopened electrode sets
1 unused suction container
1 unopened ambu-bag
34 unopened alcohol prep pads
6 unopened small gauze packets
6 unopened ChloroPrep swab kits
1 unopened pill of Lorazepam
13 unused emesis basins
2 unopened Iodine prep pads
6 unused large pink irrigation containers
26 unused Castille soap towelettes
1 unused bag of IV antibiotics
Multiple unopened food items

also be taken into account. The layout of patient rooms and the ED should make it as easy as possible for staff to restock unused items instead of tossing them in the trash.

(3) How and where we process waste matters

Waste disposal sites and their proximity to the hospital are important to consider. Gunderson Health System in Wisconsin treats 90% of RMW through an in-house sterilization system powered by steam from the heating and cooling system at one of its buildings.^{4,5} After sterilization, waste is transported just four miles to a waste-to-energy facility. Previously, waste was shipped to a landfill 1,250 miles away.

CONCLUSION

Waste audits can help make EDs and health systems more cost-efficient and environmentally friendly. While health-care providers pledge *primum non nocere* – do no harm – pollutants and wasteful practices adversely affect our patients. We need to continue to examine hospital waste habits and embrace solutions that provide healthcare without harm.

References

1. Hsu S, Thiel CL, Mello MJ, et al. Dumpster diving in the Emergency Department: quantity and characteristics of waste at a level 1 trauma center. *West J Emerg Med.* 2020;21:1211-1217.
2. Hsu S, Banskota S, McCormick W, et al. Utilization of a waste audit at a community hospital emergency department to quantify waste production and estimate environmental impact. *The Journal of Climate Change and Health.* October 2021;4: 10041.
3. <http://wastecare.mazzetti.com/>.
4. Kelly M. Reducing the Emergency Department's Footprint: Greening the ED. *Annals of Emergency Medicine.* September 2021;78(3):15A-18A.
5. Khalamayzer A. The profitable hospital system with sustainability in its DNA. *GreenBiz.com.* Published on April 10, 2017. <https://www.greenbiz.com/article/profitable-hospital-system-sustainability-its-dna>

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