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Journal of Ecology and Natural Resources
ISSN: 2578-4994

Advancing Environmental Health and Justice: A Call for Assessment and Oversight of Healthcare Waste

Sampson N[1], Canate T[2], Dixon C[3], Dunlap K[4], Herzmark J[5], Jelks NO[6], Patel D[7], Persaud E[8], McLaughlin K[9], Okoh M[10]*, Tallon L[11], Tsongas T[12], Wilson O[13], Omega[14] and Wilson B[14]

[1]PhD, MPH, Environment Section, University of Michigan-Dearborn, USA
[2]MPH, Environment Section, Health Policy & Law Section, Boston University School of Public Health, USA
[3]MPH, MA, MCHES®, Environment Section, Wake Forest University, USA
[4]MPH, CHES®, Environment Section, Community Health Planning and Policy Development Section, University of Alabama, USA
[5]RN, MSN, SafeWork Washington, USA
[6]PhD, MPH, Environment Section, Community Health Planning and Policy Development Section, Spelman College, USA
[7]MPH, Environment Section, Global Alliance for Incinerator Alternatives, USA
[8]DrPH, MEA, Occupational Health and Safety Section, USA
[9]MPH, MCHES®, Community Health Planning and Policy Development Section, New Jersey Department of Health, USA
[10]J.D., M.P.H., Environment Section; Law Section; Chemicals & Health Committee; Environmental Justice Committee; Children's Environmental Health Committee, Lewis & Clark Law School, USA
[11]PhD, CPH, Environment Section, Massachusetts College of Pharmacy and Health Sciences, USA
[12]PhD, MS, Environment Section, Occupational Health and Safety Section, Climate Change and Health Intersectional Committee, USA
[13]M.P.H. candidate '23, Environment Section, Milken Institute School of Public Health, The George Washington University, USA
[14]Co-Founders, Environment Section, West End Revitalization Association (WERA), USA

***Corresponding author:** Michele Okoh, J.D., M.P.H., Lewis & Clark Law School, 10101 South Terwilliger Boulevard, Portland, OR 97219, USA, Tel: 337-207-2382; Email: MOKOH@LClark.edu

Review Article
Volume 6 Issue 4
Received Date: November 09, 2022
Published Date: November 29, 2022
DOI: 10.23880/jenr-16000311

Abstract

Healthcare waste adversely impacts society in ways that have been overlooked for decades, an issue that the COVID-19 pandemic has accelerated significantly. This policy statement addresses the human impacts that occur as healthcare waste is processed, transported, landfilled, or incinerated. With limited federal tracking and lack of regulation, patterns of environmental racism persist. Communities of color and low-income communities most often experience the greatest environmental health burdens through disposal of waste in their communities. Many communities have called for action for decades, as our massive healthcare industry contributes greatly to these harms. Centering these communities, public health professionals must advocate for: 1) Evidence-based federal policies with transparent, accessible data about healthcare waste generation, type, and fate, 2) Leadership within the healthcare industry, from hospitals, accrediting bodies, professional organizations, and medical, health professions, and healthcare administration training programs to address environmental health and justice issues related to waste, 3) Health impact assessments, cost-benefit analyses, and circular economy research with healthcare

systems and communities to identify cost-effective, feasible, and just solutions, and 4) Federal initiatives to prioritize funding towards mitigation of cumulative exposures and impacts, reparation for harms, and investment in well-being for communities fenceline to waste—healthcare or otherwise. Some public health experts anticipate that we may be entering a 'pandemic age,' which suggests that without intervention, intersecting issues of infectious disease, climate change, waste, and environmental health and justice will remain and reoccur.

Keywords: Human Impacts; Transported, Landfilled; Incinerated; Communities; Infectious Disease; Climate Change; Waste

Problem Statement

Healthcare waste refers to all waste related to medical procedures, including waste generated within healthcare facilities, laboratories, research centers, home, community, and veterinary healthcare settings, and other minor sources [1]. This may entail waste from healthcare-related food systems, medical waste plastics (MWPs), pharmaceutical, chemical, radiological, or infectious agents, personal protective equipment (PPE), and human or animal tissues and remains, among other types. In sum, the US healthcare industry generates an estimated 5-6 million tons of waste each year [2], with 5 billion pounds (or about half) attributable to the nation's nearly 6,100 private and public hospitals [3,4]. Beginning in 2020, the COVID-19 pandemic accelerated the production of most types of healthcare waste globally due to increased demands on the system from testing, vaccination, and treatment, as well as increase of single-use MWPs with early concerns of SARS-CoV-2 transmission and infection [5].

As one type of healthcare waste, regulated medical waste (RMW) is not defined by federal US policy but is generally considered "the portion of the waste stream that may be contaminated by blood, body fluids or other potentially infectious materials, thus posing a significant risk of transmitting infection"[6]. This includes microbiological laboratory waste, pathological and anatomical waste, blood specimens and products, and other body-fluid specimens, as well as vaccine sharps and vials. Approximately 75-90% of healthcare waste is non-hazardous, and 10-25% is infectious, toxic, or radioactive and considered RMW in the US [1,7]. In the US, RMW is typically autoclaved (i.e., sterilized with steam) (20-37%) or incinerated (49-60%), or sometimes other technologies are used to process it (4-5%) [3]. Large healthcare facilities treat much of their RMW on-site, but most rely on other companies to take it off-site [3]. By the end of 2021, RMW had also increased at unprecedented rates with more than 8 billion SARS-CoV-2 vaccine doses given globally, resulting in an additional 144,000 tons of RMW from glass vials, syringes, needles, and safety boxes [5]. We must not lose sight of the humanity underlying RMW, which includes bodily remains as well. In 2020, at the onset of the pandemic with an overwhelming number of lives lost to SARS-CoV-2, management of RMW entailed disaster morgues and mass graves in the US and across the planet [8,9].

Overall, healthcare waste poses many threats to public health, including from excessive production and disposal of petroleum-based single-use MWPs, unsustainable waste management practices that contribute to climate change (e.g., failure to adequately segregate RMW vs. non-hazardous waste), and inequities associated with transport and siting of healthcare waste that disproportionately harm communities of color and low-income communities, both urban and rural populations globally, frontline to the waste stream. Of course, the exposure scenarios and environmental risk factors for these related issues vary greatly, and multiple and coordinated policy solutions are needed to improve oversight towards health equity. To begin, this policy statement focuses on common types of healthcare waste, including single use and MWPs and RMW from US hospital settings that are contributing to notable health inequities downstream. (Note: Healthcare waste generated in households is beyond the scope of this policy statement).

Healthcare Waste Management Standards, Regulations, & Guidance

In the US, a variety of agencies have responsibilities for healthcare waste management:

- The Environmental Protection Agency (EPA) oversees waste management through the Resource Conservation and Recovery Act (RCRA), which gives a legal framework for management of both hazardous and non-hazardous solid waste, and much of the general healthcare waste stream makes its way to RCRA-managed waste facilities [10].
- The Occupational Safety and Health Administration (OSHA) and Centers for Disease Control and Prevention (CDC) provide rules and guidance for discarding RMW, and facilities that generate this type of waste are required to have a medical waste management plan to prevent infection [11-13]. OSHA has additional responsibilities over workplace safety for those managing waste [11]. The CDC is responsible for infectious disease management of waste [12,13]. Department of Transportation (DOT),

Veterans Affairs, the Department of Agriculture (USDA), Federal Emergency Management Agency (FEMA), and other agencies have their own regulations or guidelines that point to CDC and OSHA rules.

- Also, with the CDC, OSHA, USDA, and FEMA, the Department of Transportation enforces Hazardous Materials Regulations with requirements for transport of RMW, as workers and communities may be at risk if problems occur in transit. Motivated by cases of Ebola in the U.S. between 2014-2015, DOT developed stronger protections for 'Class A' materials which are defined as those "known or reasonably expected to contain a pathogen that is in a form capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals who are exposed to it" [14,15].

These and many other federal protections are in place, and they are primarily designed to reduce transmission of infection through worker protection.

Ultimately, there are no federal regulations for tracking healthcare waste, making it hard to identify which and how much communities are disproportionately burdened with any associated environmental exposures. The Medical Waste Tracking Act (MWTA) of 1988 followed RCRA's "cradle-to-grave" approach to waste regulation where the EPA specifically tracked RMW from generation to disposal [16]. Motivated by several incidents of healthcare waste washing ashore in waterways and oceans in the late 1980's, it mandated enforceable standards (i.e., standards with penalties) for separating, packing, storing and labeling RMW with recordkeeping of amounts and types of RMW generated. However, the MWTA was only implemented in a handful of states and expired after two years [17].

In 1990, Congress commissioned a report by the Government Accountability Office to assess, "1) selected states' infectious medical waste regulatory programs; and (2) the status of the Environmental Protection Agency's (EPA) implementation of the Medical Waste Tracking Act" [18]. The report yielded six recommendations for the EPA to reconsider various health waste management practices, and 5 of the 6 recommendations were considered 'closed and not implemented' stating that "EPA does not anticipate having a regulatory role in medical waste management" [18], without any indication of which agencies should have this responsibility.

EPA did address one of the 1990 GAO recommendations by developing the Clean Air Act's Hospital Medical Infectious Waste Incinerator standards [16]. The EPA does consider impacts for communities where healthcare waste is incinerated by regulating emissions through the Clean Air Act's Hospital Medical Infectious Waste Incinerator standards. More than 90% of U.S. healthcare waste was incinerated prior to 1997 and the implementation of these standards [16], a process which may contribute to ambient air pollution as a major source of dioxins, furans, and particulate matter [7].

Most states have developed laws pertaining to RMW (some patterned after the MWTA), and these vary in their stringency, definition of RMW, and requirements. For example, some states require registration for medical waste generators, but most states do not. Some states set timeframes for how long RMW can be stored before disposal, and others do not. A federal repository of state laws does not exist, but the Healthcare Environmental Resource Center does have a map endorsed by the EPA that links to each state's RMW policies, although some are outdated [19]. Similarly, many healthcare waste industry websites (e.g., PureWay, SharpsCompliance, Inc.) have links to each state's related policies to support hospital administrators who use their services to maintain compliance within and across states. Commissioned and funded by the EPA and prepared by the Council of State Governments, Model Guidelines for State Medical Waste Management can be found on the EPA website [20], but these were published in 1990 and thus do not reflect current trends in science, policy, or technology.

Relatedly, there is also no limit on transporting healthcare waste from a state with more stringent regulations to one with more lax regulations [21], which may lead some states and municipalities to take on more waste in exchange for economic revenue. Historically, this has generally meant that a large portion of waste is placed in communities that are already overburdened with incinerators, landfills, or other cumulative environmental risks, where cheaper land and fewer regulations perpetuate disproportionate impacts [22-25]. Environmental protections in the U.S., including the Clean Air Act's Hospital Medical Infectious Waste Incinerator standards, have long failed to account for these cumulative impacts [26].

Producing and Managing Single-Use and Medical Waste Plastics

The healthcare industry generates much MWP, and much medical equipment (e.g., tubing, blood sample tubes) and PPE (e.g., gloves, N95s, plastic face shields, Class II surgical gowns) are designed to be disposable [27-31]. In addition to generation of more single-use PPE and municipal solid waste (MSW) during the COVID-19 pandemic, disposable non-prescription 'over the counter' community antibody and diagnostic tests have become a part of life for millions, and may be increasingly available also during future infectious disease outbreaks [32]. Although these single-use and MWP

items help sustain life, are often mandated, and protect the healthcare workforce from contracting infections such as SARS-CoV-2, they can also harm human life with major environmental health and justice implications. To begin, that frontline to industry manufacturers at the front end, and incinerators and landfills on the back end, carry the burden of related pollution emissions and discharges, unsafe noise, or harmful odors that reduce quality of life in significant ways. Also, with the ongoing increases in single-use and MWPs, manufactured using fossil fuels, there are more carbon dioxide and methane emissions leading to further climate disruption.

Some single-use and MWPs are RMW but many are not. In the late 2000's and early 2010's, several studies began to outline related issues of inadequate waste segregation. One systematic review reported that up to 90% of 'red bag waste' (i.e., RMW) was not hazardous or infectious [33]. Other researchers reported that 40% of operating room waste was simply non-hazardous packing material, and up to 60% of operating room waste was recyclable [34]. According to Healthcare without Harm, in healthcare settings with operating rooms in the US, these activities are responsible for producing about 1/3 of waste in the facility and 2/3 of that waste is considered RMW [35]. In 2019, a survey across four Mayo Clinic campuses found that, of the 524 operating room staff and clinicians who participated, 57% were unclear on which items were recyclable [34]. In fact, studies suggest that as much as 80% of waste is uncontaminated and accumulated prior to a patient entering the operating room and could be directed towards non-hazardous waste or recycling streams [36,37]. However, the WHO reports that 3 out of 10 healthcare facilities globally do not have the infrastructure to segregate waste [5]. Further, during the COVID-19 pandemic, many healthcare facilities considered all healthcare waste infectious and deemed it RMW even though much was not—as we have since learned the primary transmission route is airborne rather than dermal [38].

Assessing Healthcare Wastestreams and Public Health Impacts as a Matter of Environmental Racism

For generations, environmental racism has underlain the general management and siting of waste in the US and the shipping of waste to lower-income nations [22-25,39]. In 1979, a group of Black homeowners in Houston, Texas formed the Northeast Community Action Group and used legal tactics to cease the placement of a sanitary landfill in their neighborhood. Even though their lawsuit, *Bean v. Southwestern Waste Management, Inc*., failed to stop development of the landfill, it raised awareness about the potential health effects of waste management and siting. In 1982, protests further galvanized the Environmental Justice movement when Warren County, North Carolina residents fought back against dumping 60,000 tons of PCB-contaminated soil in their community. The United Church of Christ led a historic analysis in 1987 with a follow-up conducted in 2007 [22,23]. These reports confirmed that race predicted hazardous waste siting in the US, above and beyond one's income. As of 2019, there are 73 municipal solid waste incinerators in the U.S., and 79% of them are located in low-income communities or communities of color [39]. In Michigan, for example, six of the state's eight hazardous waste facilities are located in Wayne County, a majority-Black county in one of the most segregated regions in the nation, with nearly 70% of this waste coming from outside the state [40].

Much healthcare waste from hospital and clinical settings heads off-site and, thus, contributes to exposures and impacts for those living near incinerators and landfills across the US in both urban and rural communities. Rather than health equity, waste facility siting and expansion decisions have often been determined by availability of affordable land, which then perpetuates co-location of environmental exposures through a system of environmental racism [22,25]. A systematic review of studies published between 2002 and 2017 on the health impacts of waste incineration identified 61 papers reporting on adverse outcomes [41]. This included 34 papers reporting exposure to elevated levels of known pollutants, nine papers for each of the following outcomes: increased risk of developing neoplasia; correlation with adverse reproductive outcomes; and a link to hypertension, reduced lung function and other diseases [41]. Another systematic review led to close examination of 29 studies assessing health effects associated with proximity to landfills, incinerators, and dumpsites/open burning sites [42]. They found that residing near landfills was associated with increased risk of mortality, respiratory diseases, and negative mental health effects, and living near any type of MSW site was associated with increased risk of adverse birth and neonatal outcomes. However, there was not always extensive evidence and major gaps in the scientific literature remain. Data about RMW and overall healthcare waste amounts, types, and fate, could help us to better understand and address the healthcare industry's contributions to environmental injustice.

The role of medical and public health professionals is relevant in addressing healthcare waste as an issue of health equity. Increasingly, medical and other health professional programs are integrating climate change into curricula, and some are beginning to acknowledge waste as a contributor [43]. The Association for Medical Education in Europe, the American Medical Association, the Australian Medical Association, and the World Medical Association has all called

on medical professionals to recognize their role in addressing the climate crisis [44]. Yet, few appear to explicitly recognize climate or environmental *justice* implications of our healthcare systems in policy and position statements. The *U.S. Call to Action on Climate, Health, and Equity: A Policy Action Agenda,* with signatories including APHA, the Academic Pediatric Association, Physicians for Social Responsibility and the American Medical Student Association, as well as nearly 100 other health-affiliated organizations, does draw particular attention to environmental justice [45]. Additional attention to healthcare waste will further help to achieve these goals. As the accrediting body for healthcare organizations, The Joint Commission's environmental standards focus on ensuring safe handling of RMW with no attention to where that waste eventually goes [46]. These standards have substantial reach as they apply to approximately 78% of US hospitals [47]. Ultimately, medical communities have not fully recognized the need for assessment and oversight of healthcare waste to achieve health equity.

Evidence-Based Strategies to Address the Problem

Ongoing improvements to procurement and waste management in hospital and other large clinical settings could help to reduce production of petroleum-based single-use MWPs and alleviate harmful downstream incineration and landfill practices that disproportionately affect low-income communities and communities of color in the US. Leading organizations, such as Healthcare without Harm and Practice Greenhealth, have long advocated for reduction with frameworks such as "rethink, reduce, reuse, recycle, dispose," [35] and specific evidence-based strategies continue to emerge that make it possible to move away from 'dispose' and towards 'rethink' and 'reduce'. For example, the Ronald Reagan UCLA Medical Center piloted a switch from single-use to reusable surgical gowns, which are ultimately thicker, offer more protection against infectious disease transmission, and diverted 297 tons of waste from landfills between 2011 and 2015 [48]. Today, reusable surgical gowns are increasingly used in healthcare settings but are still not commonplace [48]. The WHO's 2022 report, "Global Analysis of Healthcare Waste in the Context of COVID-19" spells out the following strategies for reducing PPE-related waste that hospitals are piloting across the world: compostable face masks, recycling of surgical masks, and repurposing used medical masks as construction materials [5]. Also, several autoclaving techniques allow hospitals to treat RMW on-site, avoiding community transmission during handling, enabling it to be handled as MSW rather than RMW, and reducing overall waste weight [49]. Of course, many waste reduction approaches are already routine in healthcare settings, such as small, color-coded, and labeled medical waste containers to avoid mixing of waste types.

Many large hospitals have sustainability coordinators, committees, offices, or senior leadership focused on environmental programming, or they hold membership with organizations providing technical assistance, communities of practice, and inspiration, such as Practice Greenhealth [50]. This work may or may not emphasize waste issues. Some major healthcare systems are leading the way by addressing waste through larger sustainability, carbon neutrality or LEED-certification planning processes, entailing largescale organizational shifts. Kaiser Permanente has a history of leadership focused on environmental stewardship, and they have launched various recycling and environmental procurement programs to meet the goal of carbon neutrality set in 2016 [51]. As part of this plan, they set a goal of recycling, reusing, or composting 100% of their nonhazardous and nonmedical waste by 2025. In 2020, they reported collecting 400 tons of medical devices for reprocessing and more than 45,900 tons of waste for recycling, reuse, or composting.

Further, there are economic incentives that may support the healthcare industry towards improved waste reduction. Over a decade ago, the Commonwealth Fund studied hospital programs that centered energy conservation and waste reduction and estimated that, if expanded to all US hospitals, the programs could save the healthcare system $15 billion over ten years [52]. Practice Greenhealth conducted a survey of 331 hospitals and found that initiatives to reduce waste in operating room facilities saved them $100,000, on average, and nearly $72.4 million total in 2019 [53]. Representing nearly 20% of the US Gross Domestic Product, the healthcare industry has purchasing power to shift industry practices, and environmentally preferable purchasing programs have long been effective at reducing costs while reducing waste [54]. The Healthcare Environmental Resource Center informs hospitals that if RMW is more than 15% of their total waste, there is likely much room for cost-savings given that hospitals may pay up to 10 times the cost to process RMW compared to their solid waste [55]. Additional cost-benefit analyses, circular economy studies (i.e., how to design for durability, reuse, remanufacturing, recycling), and health impact assessments may help to inform administrative and financial decision-making at varying scales.

Even with increasing options for sustainable practices, massive amounts of healthcare waste will remain a global reality and a likely threat to environmental health and justice given historic patterns. To truly address downstream environmental impacts of healthcare, some governments recognize the need to track and report environmental metrics by healthcare systems, sometimes including waste-related metrics. In a cohort study of 49 large US health care organizations, Senay and Landrigan found that the health care delivery sector has long lagged in sustainability reporting compared to other US sectors [56]. Hensher and McGain

note that while some US healthcare organizations are leading in environmental stewardship (e.g., Kaiser Permanente), most fall short in moving beyond basic corporate social responsibility and climate risk disclosure reporting [57]. Hensher and McGain then direct readers to a potential model: England's National Health System's Sustainable Health Dashboard. The dashboard, "provides performance data for every NHS provider, clinical commissioning group, and region in England on a range of indicators in the domains of governance; carbon; resources, water, and waste; air pollution; plastics; and adaptation" [58] Although less comprehensive than the NHS, many other countries or provincial and state governments also make efforts to generate data needed to make evidence-based healthcare waste management decisions. For instance, in Victoria, Australia, state government funding policy mandates that all public health services report specific environmental impact measures annually, including energy use, greenhouse gas emissions, water use, and waste generation [59].

Even though the US healthcare system is radically different than most other nations, similar federal reporting policies could be designed, and they could also be an opportunity to consider and develop strategies to alleviate environmental injustice impacts. For instance, we saw the Affordable Care Act call on non-profit, tax-exempt hospitals to begin assessing and addressing social determinants of health in the communities they serve through required Community Health Needs Assessments (CHNA) [60]. Some scholars have seen CHNAs as a missed opportunity for addressing environmental issues and preparing for climate change. CHNAs may not currently be the appropriate mechanism for assessing healthcare waste impacts, as they are designed to focus on the community defined by geographic area and target populations served [60]. If healthcare waste is sent across state lines, for instance, this would be beyond the CHNA's required scope, but requirements could be extended to account for this issue. Of course, many federal policies exist whereby, with EPA oversight, states are charged with managing regulation, data collection, and enforcement of industry to uphold the Clean Air Act, Clean Water Act, and RCRA, for instance. Although these policies have failed in many ways to address environmental injustice, new policies are under consideration that may be relevant, such as Justice40 designed to ensure that "40 percent of the overall benefits of certain Federal investments flow to disadvantaged communities that are marginalized, underserved, and overburdened by pollution" [61]. Through these policies, much data are made publicly available through databases, such as EJScreen and the Climate and Economic Justice Screening Tool. In the US, we have evidence that policies and tracking tools are possible and could be helpful for documenting and addressing healthcare waste in efforts to curb environmental injustice.

Opposing Arguments/Evidence

Admittedly, many of these evidence-based solutions for waste reduction have tradeoffs. For instance, in efforts to reduce RMW, healthcare facilities must balance the benefits and costs of using large amounts of chemical disinfectants that may have environmental health implications also [62]. Many strategies must be approved by leadership or accrediting bodies as cost-effective, and they may raise liability issues when shifting from single-use towards reuse of materials, such as PPE [63]. Recycling, rather than disposal, may still have major implications for global environmental health and justice associated with its transport, processing and siting, whereby US waste is often transferred to other countries [64]. As Wyssusek explains, "until recently a significant portion of the world's recycled plastic, paper and scrap metal have been exported to China. Up to 70% of the world's plastic waste alone was exported to China and Hong Kong in 2016 [65]. However, recently China has put a ban on such waste imports causing a global panic around where else to divert the increasing volumes of recyclable waste, raising the question of sustainability of recycling after all" [66]. Sustainability efforts towards environmental justice cannot be abandoned, however; research that considers health impacts of these decisions holistically, alongside costs and benefits, is needed to inform programs and policies.

Given that healthcare in the US is largely private, and thus profit-oriented, many industry leaders may argue the costs of shifting towards environmentally just practices is too high. Small healthcare systems, especially those serving rural communities and providing care to the uninsured may not be able to implement major environmental changes because of cost or lack of expertise. Increased costs for meeting any new recycling, segregation, or handling requirements, or shifting to new purchasing models, may lead healthcare providers to shift added costs to patients. Evidence suggests this does not need to be the case. Decreasing RMW through improved segregation can mean fewer processing costs and less air emissions [49]. Many cost-saving programs do exist, and they model that it may not be necessary to increase the already high cost of healthcare for patients [49].

Opponents may also suggest the disproportionate adverse health impacts of healthcare waste on communities of color and low-income communities is inconclusive as there is not a national system to track the transport and disposal (landfill or incineration) of healthcare waste, or RMW specifically. Of the 73 MSW incinerators operating in the US, 79% are located in communities of color and low-income communities with more than half of them (44 and

48, respectively) in communities where the population is at least 25% people of color and 25% of the population is below the federal poverty line [39]. For decades, countless studies have shown similar inequitable siting patterns for landfills and hazardous waste sites, suggesting these patterns have held steady or worsened [21-25]. And, we know that communities surrounding landfills and incinerators experience adverse health effects [41,42]. Federal policy has never truly confronted the environmental racism embedded in waste management—healthcare or otherwise.

Action Steps

Because healthcare waste in the US is a matter of environmental health and justice, a coordinated policy effort is needed. Public health experts anticipate we may be entering a 'pandemic age' [67]; thus, intersecting issues of infectious disease, healthcare waste management, and climate change require assessment and policy intervention. APHA offers these recommendations:

1. Federal lawmakers must increase oversight of healthcare waste, whereby current state-by-state policies likely perpetuate environmental justice issues. To begin, Congress should hold hearings and call for a GAO report to outline challenges and opportunities for environmental protections with respect to healthcare waste, including a much-needed comparative, evaluative scan of existing state-by-state policies.
2. Based on lessons learned from other federal policies and state management of healthcare waste, Congress should establish new policies after completing the GAO report. This could entail an updated version of the Medical Waste Tracking Act of 1988 (MWTA), an amendment to RCRA, and/or new requirements within the ACA's CHNA process to address healthcare waste, for instance. Policy is needed to delineate federal definitions of RMW and call on EPA to establish a tracking system to easily understand who is transporting healthcare waste (RMW and MSW) within and across state lines, US territories, and Tribal lands, and out of the US. EPA should make healthcare waste tracking data available in tools including EJScreen and Climate and Economic Justice Screening Tool. This would allow communities, agencies, and scholars to understand social, economic, and health implications of this waste and inform and compel strategies to address disparities.
3. Federal or state lawmakers should establish policies that require healthcare systems to prioritize environmental health and justice through adequate staffing, resources, training, and capacity for sustainability initiatives that reduce healthcare waste and propose solutions from generation to segregation to siting. Policies should also include protections for workers that handle healthcare waste.
4. The EPA should revisit the *Model Guidelines for State Medical Waste Management* and generate updated guidelines based on lessons from state policies and evidence of cost-effective sustainability programs that have emerged over the last several decades with intentional consideration of environmental justice impacts of healthcare waste. Their technical assistance or grant opportunities could better help to continually identify and improve upon such models. In doing so, EPA should consult with diverse stakeholders within the healthcare and waste industry, state agencies, and the environmental justice movement.
5. The Joint Commission should extend its environmental standards for site accreditation by requiring waste audits to assess the type, amount, and fate of healthcare waste for each facility. Site accreditation should also include review of protection measures in place for workers who handle healthcare waste.
6. With increased integration of climate change-related curriculum in medical and other health professional training programs, as well as a move from leading health-related professional associations to call on their members to act on climate change, instructors in clinical training programs must more explicitly acknowledge local and global climate and environmental justice to increase awareness across the healthcare workforce of waste issues in a deepened commitment to doing no harm.
7. Scholars should conduct health impact assessments, cost-benefit analyses, and circular economy research with healthcare systems and communities to identify cost-effective, feasible solutions to reducing use of single-use and MWPs and moving towards environmentally preferred purchasing. These studies could assess environmental justice impacts related to different waste management strategies (e.g., sterilization and reuse; on-site sterilization before landfilling; incineration, etc.) or the potential economic and environmental health impacts of closing landfills or incinerators. They could account for healthcare trade-offs (e.g., infection risks, unintended effects of recycling process, elevated costs, etc.), as well as downstream impacts of healthcare waste, and consider metrics relevant to fenceline communities in the US and beyond.
8. Finally, reduction of healthcare waste and increased tracking alone will not fully eliminate the longstanding burden of waste (healthcare and otherwise) on low-income communities and communities of color in the US. Federal initiatives designed to address environmental racism, such as Justice40, must prioritize funding towards mitigation of cumulative exposures and impacts moving forward, reparation for harms, and investment in amenities to support well-being for communities fenceline to various waste management practices.

Editor's Note

This document is a proposed statement that is currently pending adoption on November 8, 2022 at the American Public Health Association's (APHA) 2022 Annual Meeting and 150th Anniversary Celebration. APHA issues Public Health Policy Statements annually. These statements are initially drafted by members of APHA and are submitted for adoption at APHA's Annual Meeting. Upon adoption by the APHA Governing Council, the statements are made available on the APHA website. This statement was submitted by members of the APHA Environment Section.

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