

Hospital Waste: Nature, Regulations and Policy

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Abstract: As the link between health and environmental quality is receiving due attention, the commitment to safeguard the environment from both the physical and social impacts associated with hospital waste is growing. Many aspects of human well-being are influenced by the environment and many diseases can be initiated, promoted, sustained or stimulated by environmental factors. Environmental health is a segment of public health and thus the environmental health professionals need to formulate policies which would check the indiscriminate dumping of infectious waste and incorporate the element of accountability. Although the Notification of rules to regulate hospital waste was issued by the Ministry of Environment and Forests, Government of India in 1998 and subsequently revised in 2012, hospitals and nursing homes are yet to react to it seriously thus posing constraints to the safe and rational management of hospital waste. This paper focuses on the Indian and international legal scenario with respect to hospital waste. It is clear that there is a lacuna in the implementation of policies and gross violation of human rights.

Keywords: environmental health, hospital waste, environmental health, human rights

I. Introduction

Over the last couple of years, there has been a growing concern about the disposal of hospital waste. The problem of hospital waste has acquired gargantuan proportions today. Its propensity to encourage growth of pathogens and contaminate the non-hazardous waste jeopardizes efforts taken by the civic authorities. Although more is said than done, scientific waste management strategies are in a nascent stage.

II. Definition and types of Hospital waste

Hospital waste according to World Health Organisation (WHO) "includes all the waste generated by health-care establishments, research facilities, and laboratories. In addition, it includes the waste originating from "minor" or "scattered" sources- such as that produced in the course of health care undertaken in the home (dialysis, insulin injections, etc.)." (WHO, 1999, p.6).

85% of the waste produced by health-care providers is non-risk or "general" health-care waste, comparable to domestic waste. This type of waste usually comes from the administrative and housekeeping functions of health-care establishments and may also include waste generated during maintenance of health-care premises. The remaining 10-15% of health-care waste as shown in Fig.1 is regarded as hazardous and may create a variety of health risks (WHO, 1999).

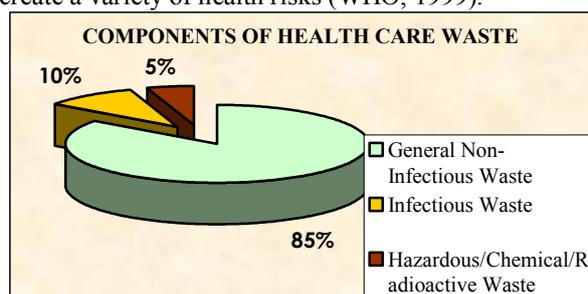


Figure 1

The list of diseases caused due to improper disposal and treatment of hospital waste is endless but majority of them are deadly like Acquired Immuno Deficiency Syndrome (AIDS), Hepatitis B, Bronchitis, Tuberculosis, Skin and Eye disorders.

The infectious potential of waste depends upon:

- (i) the presence of pathogens of sufficient virulence and quantity.
- (ii) the mode of entry, and
- (iii) the resistance of the host. (WHO, 1999)

Infectious waste

Potentially infectious wastes from patients care include:

- (a) Dressings and swabs, contaminated with blood/body fluids.
- (b) Laboratory waste including laboratory samples, cultures stocks of infectious agent, laboratory glassware.
- (c) Instruments used in patient care: Those range from diagnostic equipment such as endoscopes, ultrasound probes, syringes and needles, sharps and other instruments, tubings and bags.
- (d) Potentially infected materials: Placenta, tumors, organs or limbs, which are removed during surgery.
- (e) Potentially infected animals used in diagnostic or research studies. In all these wastes the major concern is to prevent potential accidental transmission of infection.

Toxic wastes

Potentially toxic wastes include:

(a) **Radio-active waste:** These may be solids, liquids and gases used for analytical procedures, body organ imaging and tumor localization and treatment.

(b) **Chemical waste:** These may be hazardous, toxic, corrosive, flammable, reactive or genotoxic.

(c) **Pharmaceutical agents:** These may enter hospital because there were surplus stock, spillage or contamination was detected or the expiry date was over.

Sources of Healthcare waste

The major sources that produce large quantities of healthcare wastes are illustrated in Fig.2;

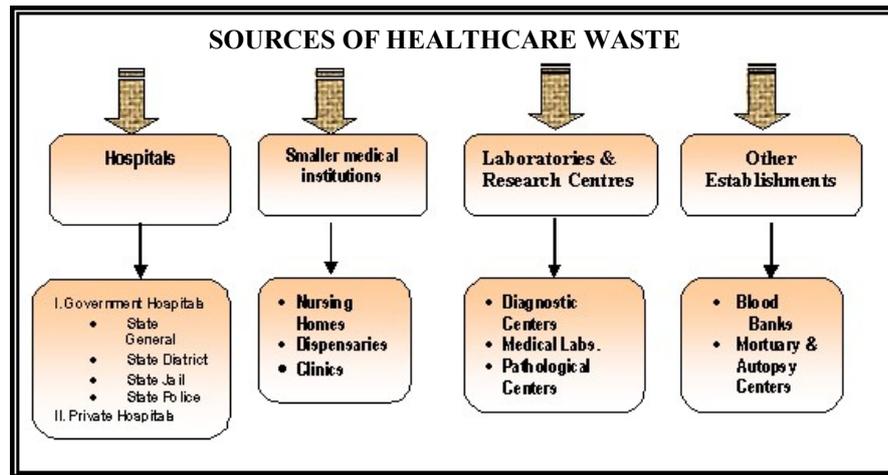


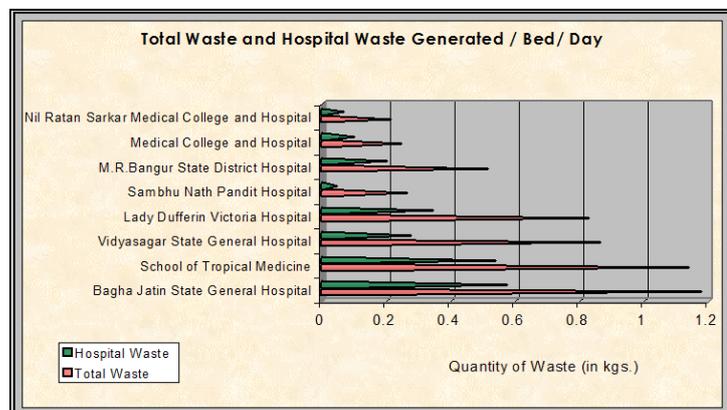
Figure 2

The composition of waste is often characteristic of the type of source. For example, the different units within a hospital generate waste with the following characteristics:

- ❑ **Medical wards:** mainly infectious waste such as dressings, bandages, sticking plaster, gloves, disposable medical items and intravenous sets, body fluids and excreta, contaminated packaging, and metal scraps.
 - ❑ **Operating theatres and surgical wards:** mainly anatomical waste such as tissues, organs, fetuses, and body parts, other infectious wastes, and sharps.
 - ❑ **Other health-care units:** mostly general waste with a small percentage of infectious waste.
 - ❑ **Diagnostic Centers and Laboratories:** mainly pathological (including some anatomical), highly infectious waste (small pieces of tissue, microbiological cultures stocks of infectious agents, infected animal carcasses, blood and other body fluids), and sharps, plus some radioactive and chemical waste.
 - ❑ **Pharmaceutical and chemical stores:** small quantities of pharmaceutical and chemical wastes, mainly packaging (containing only residues if stores are well managed), and general waste.
- (Source: Pruss, A., et al, 1999)

Quantum of wastes

Hospital waste is a small fraction of the urban municipal waste. There are no reliable figures about the quantum of waste generated per person per day. An estimate of it was made during a survey of government hospitals in Kolkata, India. As shown in Fig.3, it is estimated that most in-patient generated 1- 1.5 kg. of wastes per day per bed, but the infectious waste was 200-500 grams per day per bed.



Computed by author

Figure 3

Threats of Hospital waste

- **Reservoir of infection** - Human Immuno Virus (HIV) and Hepatitis viruses spearhead an extensive list of infections and diseases documented to have spread through HIV blood, body fluids and secretions harbor most viruses, bacteria and parasites. This passes via a number of human contacts all of which are potential "recipients" of the infection. For example, a washer man can be infected by blood soaked linen. Visitors to the hospital and the immediate community can be affected by contaminated over flowing water supply and vector contacts.

- **Vector generation** - Unsanitary dumping grounds or stagnant water often become breeding grounds for flies, mosquitoes, insects and rodents. Such vectors help maintaining already established disease cycles.

- **Environmental Pollution**- Advancing technologies and increasing patient numbers lead to increasing amounts of waste production. If not properly treated this will accumulate and cause long-term toxicity to the environment for example, untreated pharmaceuticals and chemicals piling up in pits and foul toxic emissions from incomplete incineration of wastes are serious threats to environmental pollution.

It is not unusual to observe ground scattered with broken glass, intra- venous bottles, used dressings and voluminous spillage of needles and syringes. Yet despite the hypocrisy, hospitals preach about cleanliness and hygiene as the central tenets of preventive medicine. The relationship between hospital and community can be damaged as a result of inadequate waste disposal. It does not encourage confidence in attitudes of staff and leads one to stinking dumping sites and reports like cats and dogs run away with easily accessible amputated body parts and surgical waste.

III. Legal Scenario

Since the closing years of the last millennium, a large degree of the focus has shifted from industrial and solid waste management to hospital waste managements. Some of the policies regarding the same have been highlighted in the subsequent sections.

High Powered Committee on Management of Hazardous Wastes

The High Powered Committee on Management of Hazardous Wastes (HPC) was set up by an order of the Supreme Court of India on 05.05.1997 during the hearing of a Public Interest Litigation (PIL) challenging the import of hazardous and toxic wastes into the country. The PIL was filed in 1995 by the Research Foundation for Science, Technology and Natural Resource Policy, New Delhi (Government of India, 1997).

The HPC took an early decision to focus on those hazardous wastes. The Hazardous Wastes Rules, 1989, specifically exclude those hazardous wastes that are discharged in the form of effluents regulated under the Water (Prevention and Control of Pollution) Act, 1974, and as emissions under the Air (Prevention and Control of Pollution) Act, 1981, respectively.

The HPC also did not cover the entire gamut of bio-medical hazardous wastes. Such wastes though extremely hazardous, are regulated under a separate statute specifically dealing with them, namely, the Bio-medical Waste (Management and Handling) Rules, notified under the Environment (Protection) Act, 1986, on 20.07.1998. No major effort was therefore made by the HPC to examine the handling, management and disposal of bio-medical wastes during the initial phase of its tenure. (Government of India, 1997).

On many occasions, the HPC has noticed that adequate attention is not been given to the health and safety of workers engaged in the hazardous waste materials sector. Violation of occupational safety and health of waste handlers tantamount to a violation of human rights. The problem does not end here; the leakage of infectious waste has led to it being handled by waste recyclers at great detriment to their health and the well being of those around. Children and aged are directly exposed to infection and disease due to close proximity to it in slum clusters. This makes it a public health hazard. Irresponsible disposal of wastes by hospital administration is the root cause of this crisis. In addition to its capacity of vector generation and disease transmission, this is also contributing to a booming market in hospital waste, where syringes, needles, cotton, gloves, etc. are being recycled. This threatens the lives of hundreds and particularly the life of the poor.

The question therefore arises that "what is the legal position as far as hospital waste handlers are concerned? Which is the Act that protects their health and welfare?"

Central Pollution Control Board Rules

Central Pollution Control Board (CPCB) formulated environmental standards and guidelines for management of hospital wastes during 1996 under the Environment (Protection) Act 1986. While the guidelines formulated by CPCB are quite similar to the Bio-medical wastes (Management and Handling) Rules, 1998, it is important to include it since it is one of the apex institutions involved in management of critical environmental issues. The bio-medical waste management guidelines according to CPCB state that no person shall handle or dispose off any biomedical waste except in accordance with these rules.

The Indian Legal Scenario Re-examined

Laws like the Mines Act, Plantation Act and Port and Dock Workers Acts deal with occupational hazards in individual sectors. Workers not falling under these categories have to make do with Factories Act or the Hazardous Substances Act. Hence, health care waste handlers do not have any law protecting their interests.

Today the ramifications are very wide and need to cover not just the worker but also the risks to the public and the environment at large (The Bhopal Gas Tragedy underlines this fact in the recent times). Recognizing the deficiencies in its laws, the Ministry of Labour in November 1983 set up a Working Group to consider whether it was desirable to have general legislation to safeguard the safety, health and welfare of all people at work. The Working Group unanimously reported in 1984 the need for such legislation. Consequently, a blueprint was developed in 1986 by an Expert Group of the ILO on the request of the Indian Government for a Law on Occupational Health and Safety. However, after several rounds of consultation after formulation, the law has been consigned to cold storage (Government of India, 1997).

Presently there is need to advocate for fresh legislation in this regard. This is because the safety and health of poor and uneducated hospital waste handlers is highly compromised. Though they stand exposed to HIV and Hepatitis everyday, there is no law that stipulates protective gear for them, safety measures like preventive vaccinations or training on how to handle hazardous waste. The magnitude of the problem becomes apparent when one examines the exact nature of labour rights violations that occur at each stage. The picture becomes much more pronounced if one goes by the dictum that 'labour rights are human rights at the workplace.'

Violation of Labour Rights

The discussion on the legal position establishes that hospital waste handlers fall outside the ambit of the Factories Act that guarantees the occupational safety and health of workers law in India. Other laws that may be applicable to them do not have any provisions on occupational health and safety. There is no law on occupational health and safety in India. In light of this situation, it becomes pertinent to examine the nature and extent of deviation from existing and universally accepted norms of worker health and safety.

Constitutional Provisions

Article 39 (e) of the Constitution states that the State, shall, in particular, direct its policy towards securing that the health and strength of workers, men and women, and the tender age of children are not abused and that citizens are not forced by economic necessity to avocations unsuited to their age or strength.

Article 42 of the Constitution states that "The State shall make provisions for securing just and humane conditions of work" (Government of India, 1997).

As far as the hospital workers are concerned, the health of each and every person, both within and outside the hospital, is compromised due to irresponsible disposal of wastes generated by the same. The violations are often drastic and lead to the spread of life threatening diseases.

International Agreements, Underlying Legislative and Regulatory Principles for Hospital Waste

The WHO (1999) Report points out that international agreement has been reached on a number of underlying principles that govern either public health or safe management of hazardous waste. It goes on to add that the principles outlined below should be taken into consideration when national legislation or regulations governing health care waste management are formulated:

❑ **The Basel Convention** signed by more than 100 countries, concerns transboundary movements of hazardous waste; it is also applicable to health care waste. Countries that signed the Convention accepted the principle that the only legitimate transboundary shipments of hazardous waste are exports from countries that lack the facilities or expertise to dispose of safely certain wastes to other countries that have both facilities and expertise. Exported waste should be labelled according to the UN recommended standards.

❑ **The "polluter pays" principle** implies that all producers of waste are legally and financially responsible for the safe and environmentally sound disposal of the waste they produce. This principle also attempts to assign liability to the party that causes damage.

❑ **The "precautionary" principle** is a key principle governing health and safety protection. When the magnitude of a particular risk is uncertain, it should be assumed that this risk is significant, and measures to protect health and safety should be designed accordingly.

❑ **The "duty of care" principle** stipulates that any person handling or managing hazardous substances or related equipment is ethically responsible for using the utmost care in that task.

❑ **The "proximity" principle** recommends that treatment and disposal of hazardous waste take place at the closest possible location to its source in order to minimize the risks involved in its transport. According to a similar principle, any community should recycle or dispose of the waste it produces, inside its own territorial limits. (Government of India, 1997).

WHO Guidelines on Handling Medical Waste

It has been seen throughout that the WHO document which deals with medical waste gives utmost importance to the occupational health and safety issues of waste handlers. Additionally they raise the issue of health risks posed to waste handlers outside the hospital in countries like India. However, the official documents generated so far in India on this issue have been grossly ignored.

The Inter-regional Consultation on Medical Waste Management in Developing Countries held at WHO, Geneva in September 1992 pointed out that the human element is more important than the technology. Almost any system of treatment and disposal that is operated by well trained and well motivated staff can provide more protection for staff, patients and the community than an expensive / sophisticated system manned by staff who do not understand the risks and importance of their contributions.

Thus the current system being followed vis a vis infectious / hazardous waste handlers are a violation of WHO Recommendations on the Occupational Safety of waste handlers in every sense.

Universal Declaration of Human Rights

At the international level, the Universal Declaration of Human Rights is a basic international statement of the inalienable and inviolable rights of all members of the human family. It is intended to serve as "the common standard of achievement for all peoples and all nations."

- Article 3 of the Universal Declaration states that "Everyone has the right to life, liberty and security of person." As stated earlier, the right to life and security of person of hospital waste handlers (rag pickers, waste recyclers, municipal sanitary workers and hospital 'safai karmacharies'-cleaners) is being breached.
- Article 23 of the Universal Declaration states that everyone has the right to just and favourable conditions of work. Article 7 of the International Covenant on economic, social and cultural rights, clearly articulates the Right of every individual to just and favourable conditions of work, which ensures, in particular, the Right to safe and healthy working conditions. (Government of India, 1997).

International Labour Standards

Article 16 of ILO Convention No.155 requires that employers are required to keep the workplace and processes safe and without risk to health. Employers also have to ensure that chemical, physical and biological substances and agents under their control are without risk to health. Employers also have to provide; where necessary adequate protective clothing and protective equipment to prevent risks of accidents or adverse effects on health.

Recommendation 164 of the ILO reinforces the aspect of worker safety as enunciated above when it lays down that employers should give the necessary training and instructions, taking into account the functions and capacities of different categories of workers (Government of India, 1997).

One notices a clear violation of all these aspects among all categories of workers dealing with hospital waste.

National law on Healthcare Waste Management

A national law on health care waste management may stand alone or may be part of more comprehensive legislation such as the following:

- Law on management of hazardous wastes: application to health care waste should be explicitly stated;
- Law on hospital hygiene and infection control: a specific chapter or article should be devoted to health care waste

The law should include the following:

- A clear definition of hazardous health care waste and its various categories;
- A precise indication of the legal obligations of the health care waste producer regarding safe handling and disposal;
- Specifications for record keeping and reporting;
- Specifications for an inspection system to ensure enforcement of the law, and for penalties to be imposed for contravention;
- Designation of courts responsible for handling disputes arising from enforcement of or non-compliance with the law.

In addition, hospitals should be run, and health care waste disposed of, in accordance with all other relevant national legislation, such as regulations pertaining to:

- Waste in general
- Effects on public health and the environment
- Air quality
- Prevention and control of infectious disease

- Management of radioactive materials (Kishore, 1999)

Policy Document

The policy document should outline the rationale for the legislation, plus national goals and the key steps essential to the achievement of these goals. It may contain the following:

- Descriptions of the health and safety risks resulting from mismanagement of health care waste;
- Reasons for sound and safe health care waste management practices in health care establishments;
- Listing of approved methods of treatment and disposal for each waste category;
- Warning against unsafe practices, such as disposing of hazardous health care waste in municipal landfills;
- Management responsibilities within and outside health care establishments;
- Assessment of the costs of health care waste management;
- Key steps of health care waste management: minimization, separation, identification, handling, treatment, and final disposal of waste; technical specifications for the implementation of each step should be described in separate technical guidelines;
- Record-keeping and documentation;
- Training requirements
- Rules governing the protection of worker's health and safety.

Role of Facilitators

Hospital waste management is a complex technological area, where a large number of actors need to be involved to look into the multi-dimensional aspects and complexities of the problems. Though delayed, positive steps have been taken by the government, non-governmental organization and several academicians in this area.

Government Responses

The Indian government has initiated a number of activities to address the public health hazards of hospital waste exposures.

- A Committee on Urban solid waste management was formed in 1994 to assess the impact of current solid waste management practices on the general health of the community. It reported technological options for the safe collection, transportation and disposal of urban solid waste as well as identified the potential of hospital waste in terms public health risks.
- The Ministry Environment and Forests have drafted rules for bio-medical waste management, which has been published in the Gazette of India October 27, 1997 and revised in 2000. The Ministry is also surveying hazardous waste generation and tracking practices in hospital, clinics and blood banks.
- The All India Institute of Hygiene and Public Health assisted by the experts at the West Bengal Pollution Control Board and the Natural Environmental and Engineering Research Institute-Nagpur, carried out an assessment of waste generated and managed in medical institution in West Bengal. The study revealed that the hospitals in the state were turning hazardous because of the poor treatment of hospital waste.

Non-Governmental Responses

- Dr. P.D.Grover (Ex-Prof. IIT, Delhi) has provided an overview of the hospital waste management scenario in India. He has highlighted the present dismal scenario and the management imperatives required due to the lackadaisical attitudes of agencies, concerned about after effects of Incineration, prevalence of HIV, HBV infection and rapid proliferation of health care facilities.
- Institute of Public Health Engineers (IPHE) and Tata Consultancy Services in collaboration with Government of West Bengal and World Bank have carried out extensive survey of the waste management scenario of a number of hospitals, primarily district and state general hospitals. They have developed health education materials like posters and pamphlets, which have been circulated in all the selected hospitals.
- Disha a Calcutta based NGO in close association with like minded individuals (academicians, research scholars, doctors) have analyzed and reviewed the Bio-medical Waste (Management and Handling) Rules, 1998 and 2000 in minute details. A memorandum suggesting certain changes in the existing rules has been prepared and forwarded to Health Secretary, Government of West Bengal, Mr. Asim Burman.
- Dr. Harbans S. Wasir, Chief Cardiologist and Medical Director, Batra Hospital and Medical Research Center, New Delhi, in his paper 'Sound Hospital Waste Management' has thought it essential for the doctors to be aware of the fate or end use of the waste being generated in the wards and operation theaters. He has emphasized on segregation, avoiding the use of antibiotics as panacea of all problems and common waste disposal facility. He has concluded by emphasizing on the need for a holistic approach and polluter pays principle.

- Dr. Kalpana Balakrishnan, SR Medical College-Chennai, has highlighted the apathy of most hospitals and the initiatives being made by SR Medical College. According to her, training is mandatory for hospital staff. Occupational surveillance through immunization, health check ups form an integral part of the hospital's operations.
- Drug Action Forum, Calcutta were the catalysts of a project undertaken by the Department of Science and Technology in 1997 which studied the practices and problems of Hospital waste management in Calcutta city with special reference to Howrah General Hospital and M.R.Bangur Hospital, West Bengal.
- Ravi Agrawal of Srishti-a Delhi based NGO has emphasized that the proper disposal of hospital waste is a management problem rather than a technological problem. He has stressed on the need for segregation of waste, on site disinfection and off-site disposal. He has further reiterated the need for centralized treatment facilities as the actual quantum of infectious waste is small and the investment needs for treatment are high.

IV. Strategies for Sustainable Initiatives in Hospital Waste Management

Given the disparity between available resources and the magnitude of the problem at hand, it is imperative that all initiatives undertaken for the purposes of alleviating this problem be sustainable. The recommendations that are crucial for the success of hospital waste management procedures are as follows;

- A separate wing, called Hospital Waste Management Cell, can be created in each of the hospitals, which would maintain an inventory of waste generated ward wise and the quantum sent for treatment and disposal.
- The civic authority should insist on proper hospital waste management as a pre-requisite to licensing health care set-ups (12-18 months). License should be renewed at specific intervals of time after reviewing and assessing the working of the system.
- An Infection Control Committee should be established for CMC to supervise hospital waste management in all health care institutions.
 - Medical Insurance for the workers involved in handling waste.
 - Follow a "risk reduction approach" in execution of various steps outlined in the policy
 - Recycling of plastics should be institutionalized and monitored closely.
 - Set up proactive policies that would go beyond regulatory compliance requirements
 - Pay special attention to occupational safety and health issues while setting the policy
 - Long term environmental policies, guidelines and status should be linked with immediate requirement to segregate and decontaminate medical waste at its source. This linkage should include appropriate technology for sustainable environmental and public health protection, rather than imported high-technology incineration, which are expensive to purchase and difficult to maintain.
- Integrate hospital waste management into a comprehensive hospital environmental management programme

V. Conclusion

Compared to the voluminous literature published on solid management, the study on hospital waste management seems minuscule. Though the quantum of municipal waste is almost five times that of hospital waste, the potentiality of the latter in both vector generation and disease transmission is much higher. It is this very infectious and contaminated nature of waste that calls for further investigation.

A hospital cannot operate in isolation but works in close relationship with not only the Government (Central and State) but is strongly influenced by the policy and legal provisions framed by the international apex bodies like WHO and World Bank. The successful implementation of the formulated rules would be possible if the community is involved. A Bottom-Top Approach would ensure the active participation of the people living in close proximity of the hospitals. Residents can be encouraged to take the responsibility of managing certain key areas of hospital management.

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