

A FACT SHEET ON: **MEDICAL WASTE INCINERATION**

Sameer Nazareth ,Megh Kela Rathi

1. ***Incineration is a complex technology*** that is used to burn waste .the problem of medical waste is one of disinfecting the waste and not of destroying it. With the increased use of disposables in medicine, the amount of plastic going for incineration has increased manifold .The burning of plastics, especially in a unregulated incinerators, creates a new set of chemical toxins, some of which, are super toxins even in extremely small quantities. Incineration thus converts a biological problem into a chemical one.
2. ***The problem of medical waste is not of quantity but of nature*** .Estimates say that the total quantity of medical waste, in a city like Delhi, is less than 60 metric tones in a total municipal waste stream of 5000 metric tonnes. This is about 1.5 percent .Only 15-20% of this 60MT is of concern, because of its infectious nature, as the other 85% of its non- infectious. Segregation is the key to proper medical waste management, not incineration.
3. Some of the ***Chemical toxins produced by medical waste incinerators*** are
 - a. heavy metals ,such as lead, cadmium etc. ,which reside in plastics;
 - b. acid gases ,such as sulphur gases ,hydrogen chloride and nitrogenous gases;
 - c. Particulate matter and
 - d. Dioxins and furans.

These toxins have gravehealth effects on humans---if not trapped in pollution control devices,they enter the food chain via the air and if trapped ,they become part of the flyash.This flyash becomes very toxic to dispose of as it contains heavy metal impurities .if not disposed of in secured landfills,it can contaminate soil and groundwater.

4. Of all these toxins, ***dioxins and furans are the most toxic*** .These are a family of polycyclic aromatic hydrocarbons, formed when PVC plastic such as blood bags, urine bags, IV tubes and syringes, or any other chlorine containing material(like bleached paper) is burned in the presence of organic matter. The heavy metals present in the waste stream act as catalyst and hasten up the process of dioxin formation.

5. **No testing facilities** for the dioxins and furans emitted from the incinerators are available anywhere in India .These tests cost around \$1000 to \$50,000 for complete profiling.
6. **International regulations:** In the United states, a dioxin risk assessment carried out by the US Environmental Protection Agency (Estimating Exposures to Dioxin-compound, Vol.II, Office of Research and Development, EPA/600/688/005Cb) was published on September 13, 1994. **It stated that dioxin was toxic in concentrations as low as 0.006 picogram (one-trillionth part of a gram) per kilogram body weight per day.** This comes to 0.42 pg of dioxin per day for a 150-pound adult. Dioxin enters the body through fatty foods such as meat and dairy products like eggs, chicken, meat and milk, etc., as they are fat-soluble. In Britain, the Department of Environment(DOE) estimates that the average daily consumption is up to 500 times the EPA limits .It also reported that **Medical waste Incinerators were the highest source of dioxins in the US**, and of a total of 9300 TEQ (Toxic Equivalency Quotients) produced there ,5,100 were contributed by medical waste incinerators (source USEPA 1994 report)
7. The USEPA proposed new standards on Medical Waste Incinerators .Under the new regulations, USEPA predicts 80% of the present on –site incinerators will be shut down, and an alternative method for disposal will be sought.
8. **Regulations for Incinerators now exist in India** .CPCB has laid down standards for incinerators, microwaves, chemical disinfection and autoclaving
9. **Health Effects** of toxins produced by medical waste incinerations; in an attempt to destroy pathogens, chemical hazards are created, which are extremely expensive to monitor and control. The different types of toxic air emissions from incinerators :
 - Acidic gases
 - Dioxins and furans
 - Heavy metals

Acid Gases include nitrogen oxide, which has been shown to cause acid rain formation and affect the respiratory and cardiovascular system. As large amounts of plastic are incinerated hydrochloric acid is produced. This acid attacks the respiratory system, skin, eyes and lungs with side effects such as coughing, nausea, vomiting

Dioxins and furans are organochlorines, which form as a result of the combination of chlorine molecules in plastics (PVC) with organic materials. Organochlorines mimic hormones and do not break down or biodegrade; thus, the

bio-accumulates are magnified up the food chain. They are proven carcinogens and endocrine disrupters; they also weaken the immune system and damage the male and female reproductive organs.

Heavy metals are released during incineration of medical waste, Mercury, when, incinerated vaporizes and spreads easily in the environment. Lead and cadmium present in the plastics also accumulates in the ash.

Acute and chronic exposure to lead can cause metabolic, neurological, and neuro-psychological disorders. It has been associated with decreased intelligence and impaired neurobehavioral development in children.

Cadmium has been identified as a carcinogen and is linked to toxic effects on reproduction, development, liver, and nervous system.

Incinerators are difficult to run: In a hospital environment, technologies like incineration fail because untrained janitor staff runs them. The survey shows that most of the incinerators (over 85%)run at temperatures lower than those specified in the rules .Due to poor operation and maintenance ,these incinerators do not destroy the waste ,need a lot of fuel to run ,and are often out of order. ***There is a lot of difference between the theory and practice of incinerator operation. This is true around the world .The problem of medical waste needs a systematic approach, with investments in training of staff ,segregation ,waste minimization and safe technologies ,as also centralized facilities .Merely investing in unsafe incinerators cannot solve it.***

Recognising **Livelihoods from Urban Waste**

Livelihoods from urban waste

One person's waste is another person's livelihood. Dealers in waste material are common everywhere, whether it is the second-hand merchant or scrap metal dealer.

In low-income countries, a number of other livelihoods are derived from waste. The two most common groups involved in these activities are waste pickers and street sweepers.

Waste Pickers separate re-saleable materials such as plastics, paper, and glass, to sell on in the recycling chain. Sometimes they take over and hold on to a single site that yields waste. Such as a rubbish dump and sometimes they move from place to place, collecting waste that is discarded from offices and factories, schools and hospitals as well as residential neighbourhoods.

Sweepers are those people involved in street cleaning and primary waste collection. They are usually employed by municipalities, private waste collection agencies or are self-employed small scale operators who make a living by charging households a fee for providing a primary collection service.

What do we mean by Livelihoods?

Livelihoods involve income earning as well as a wider range of activities required to sustain a means of living. These include gaining and retaining access to resources and opportunities, dealing with risk and negotiating social relationships. Urban poor pursue livelihoods from waste often to overcome the vulnerability. They do so by deploying both tangible assets, such as material resources and skills as well as intangible assets, such as rights of access or social resources.

Why are waste pickers Vulnerable?

Waste Pickers are vulnerable because they are often among the poorest of the poor and have few assets on which to fall back when facing external or internal threats.

Using the example of paper pickers, external threats could result because extensive poverty and unemployment increases competition for access to sources of waste paper, because technological changes to collection and disposal systems or the coming of the rainy season makes collecting of paper difficult, or because prices paid by dealers drop due to competition from imported waste paper. Waste pickers turn to waste picking they have few alternative livelihood opportunities (either at all or particular times of the year). They also face a number of internal threats, such as health and safety hazards, from

the conditions under which they work, as well as conflict among different groups of pickers over issue of access. This might be between different ethnic groups, newcomers and more established groups ,men and women or young and old .finally ,waste pickers risk being controlled by the dealers to whom they sell and are often in debt bondage.

Why are sweepers vulnerable?

Sweepers are not usually as materially poor as waste pickers ,but they are often just as vulnerable and face a number of current threats to their livelihoods>In countries ,labour – intensive strategies of waste collection and disposal are on wane for a number of reasons .These include the mechanization of waste collection systems .The use of NGO’s and CBO’s as contractors of waste collection service as well as privatization initiatives such as the contracting out of waste collection services .Private contracting ,in particular ,is often associated with the declining influence of trade unions ,downsizing of the labor force ,lower wages ,less security and fewer long term benefits .As sweepers are stigmatized by the work they do ,they face problems finding alternative forms of work. For all these reasons ,sweepers face increasingly insecure livelihoods .

Challenges and Opportunities for promoting livelihoods from waste

It is tempting to leap to the conclusion that integrated approaches to solid waste management should incorporate into the formal system of waste collection and disposal, the I formal activities of waste pickers and sweepers that takes place outside of it. We know that vast quantities of waste are retrieved and fed into the recycling chain by pickers in low-income countries .Is, it, then possible to involve pickers formally in waste collection? We know that sweepers operate privately as door- to- door waste collectors and cleaner’s .Is it, then, possible to sub-contract primary waste collection to sweeper micro-entrepreneurs.

In theory ,these things are possible and there have been some good examples in practice (see cases).However ,there are a number of constraints and threats that might increase the vulnerability of these groups .for example ,there may be vested interests ,which would attempt to sabotage any attempt to reduce their control over pickers or sweepers or the dependence of the latter on them .alternatively, it might be that the successful operation of informal systems of waste collection depend on them remaining exactly that – informal. In such circumstances ,an arms length relationship might be better than full integration into the formal system.

A Case of Integration--- Faisalabad, Pakistan

In Shadab colony in Faisalabad ,where municipal solid waste collection was failing, the community contracted a private sweeper to take charge of waste collection .Initially ,the local CBO contracted a private sweeper who was not part of the sweeper networks ,However, the municipal sweepers and pickers working at the local transit site would not

allow him to dump the waste he had collected .Eventually, the CBO contracted someone from the local sweeper network and the system has worked smoothly since ,also, with the help of a local NGO, the CBO is working with the municipality to share their experiences and to get assistance from them for other services.

A case of Arm's length cooperation----Bangalore, India

In Bangalore ,India ,there are a number of NGO's which have worked with waste pickers over a long period .They have tried to incorporate pickers into neighborhood-based primary collection schemes and have worked with the city corporation to develop integrated approaches to solid waste management that incorporate the pickers .Never the less ,experience has shown that the most successful approaches are those where picker children are not separated from their families ,where alternatives are provided but where customary patronage relationships with dealers are not challenged and where pickers groups can operate with some autonomy . so, for example , the rag pickers education development scheme (REDS) not only works with the street children who are alone ,but supports the efforts of the picker families to take responsibilities for and reap the benefits from collecting and selling the waste from prescribed residential and commercial areas, by helping them negotiate and protect their interests and livelihoods . This is with the knowledge and acceptance of the corporation, local businessperson, and residents, but without their interference.

Lessons Learnt

There are three key lessons to be learned from the experiences gained from recognizing that livelihoods are derived from urban waste:

- Solid waste management is not just a technical or managerial affair, but one that impacts directly on people who depend on the collection and retrieval of waste for their livelihoods
- Before planning and implementing innovations, a careful social impact Assessment and institutional analysis should be undertaken, as enhancing livelihoods in one way may reduce livelihoods in another.
- There are no blueprints but only guidelines that should be applied to specific social and economic contexts.