

**STUDY REPORT  
ON**

**Country Situation of Mercury Sources  
and Hotspots in Bangladesh**

2012



# **Situation of Mercury Sources and Hotspots in Bangladesh**

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## Acronyms and abbreviation

CFL	Compact Fluorescent Lamps
ESDO	Environment and Social Development Organization
g	Gram
Hg	Mercury
Kg	Kilogram
Kwh	Kilowatt Hours
LCD	Liquid Crystal Display
MT	Metric ton
mg	Milligram
NRDC	Natural Resources Defence Council
ppm	parts per million
SPSS	Statistical Package for Social Science
UNEP	United Nations Environment Programme
ZMWG	Zero Mercury Working Group
%	Percent

## **Executive Summary**

Mercury (Hg), a potential contaminant of the environment is of global concern because of its toxic nature, trans-boundary movement and its ability of bioaccumulation etc. Bangladesh is one of the vulnerable countries to Hg hazards due to its infrastructural development, people's unawareness about Hg contamination, lack of proper policy to stop Hg use in different products and Hg waste management and so on. Environment and Social Development Organization-ESDO is the pioneer organization, has been working in Hg phase out from the country. In this regard it has started research work on Hg sources, products and hotspots in Bangladesh since 2008. Very recently, it has conducted a study on country situation of Hg sources, products and hotspots in Bangladesh. In this study ESDO identified Hg sources and products in Bangladesh, Hg consumption and emission from different sectors, Hg waste disposal system in different sectors, and people's perception regarding Hg hazards. This study was conducted in 9 different sectors whose products and bi-products contain Hg. Under this study it has categorized 9 sectors for conducting questionnaire survey. Based on questionnaire survey it has estimated Hg waste disposal from each sector. After getting Hg situation of Bangladesh, a workshop has been kicked off to raise awareness among public and invited participant of relevant sectors. It has found that in 2011 total amount of Hg released from cement industries of Bangladesh was 0.489178 ton. The study revealed that Hg emission from cement industries is increasing significantly during last five years. In case of chlor alkali factories estimated Hg release in 2011 was roughly 1.4445 tons. The total amount of Hg usage and release in healthcare instruments in Bangladesh is estimated 24.28 tons and 6.9 tons per year. Consumer beauty fairness cream also retain certain amount of Hg. Study revealed that highest (4653 ppm) level of Hg was in Garnier, on the other hand, lowest (3361 ppm) in Shumons Aroma. Moreover, Hg content in Fair & Lovely Ayurvedic (4004 ppm), Fair & Lovely Max fairness (4174 ppm), Modern (4152 ppm) and Fair & Handsome (Emami) (4133 ppm) exceeded 4000 ppm. Rest of the fairness products contain Hg lower concentration but above 3000 ppm. In case of electrical equipments manufacturer majority (79%) of the people are unaware about the hazards of Hg and only 21% people are aware of Hg contamination and its health and environmental hazards. From the study findings it can be said that people of Bangladesh are not aware about Hg hazards. Moreover, Bangladesh has no policy to stop Hg pollution. So, it is unavoidable to formulate a policy to stop Hg containing products manufacture and reduce Hg pollution in Bangladesh. Moreover, mass awareness is inevitable to aware people about Hg containing products and its health and environmental hazards.

## **1. Introduction**

Mercury, one of the most toxic natural elements, is found in sources such as rock formations and volcanoes. Over the past few decades, anthropogenic sources of mercury have increased dramatically. Many research estimate that the amount of mercury entering the environment has increased manifold due to a wide variety of human activities, ranging from coal-burning power plants and waste incinerators to common consumer products that contain mercury such as thermometers, electronic goods and dental amalgams.

Mercury pollution and its hazards are not yet been addressed in Bangladesh. Due to the lack of information and awareness the hazard of mercury is not taking account in the policy and the mass as well. But the use of mercury and mercury containing products are increasing rapidly in the industrial process and a wide variety of application in Bangladesh. The major consumers of mercury are the chlor-alkali industry, coal based power plant, medical equipments (thermometers, sphygmomanometer etc.) and other measurement instruments, electrical appliances and switches, batteries, dental amalgam and in the formulation of various compounds and consumers products (such as cosmetics/beauty product). Although there has been no attempt taken yet to phase out mercury from the consumer products and the industrial processes; in most cases, even basic standards of occupational safety are not followed.

Mercury is not extracted from the ores or produced in Bangladesh; it is completely imported, but there are no specific data and information on the mercury import and use in various industrial process and consumer products. Therefore it is very important to assess country situation on mercury sources, uses, hotspots and policy gaps. In response of this issues Environment and Social Development Organization-ESDO have taken initiative to conduct a study to assess the current state of mercury sources and use in Bangladesh.

### **1.1. Background**

Environmental mercury levels have increased considerably since the on-set of the industrial age. Mercury is now present in various environmental media and food (especially fish) all over the globe at levels that adversely affect humans and wildlife. Widespread exposures are occurring due to human-generated sources, and past practices have left a legacy of mercury in landfills, mine tailings, contaminated industrial sites, soils and sediments. Even regions with no significant mercury releases are adversely affected due to the transcontinental and global transport of mercury.

Mercury exposure has serious effects and caused a variety of documented, significant adverse impacts on human health and the environment throughout the world. Mercury and its compounds are highly toxic, especially to the developing nervous system. The toxicity to humans and other organisms depends on the chemical form, the amount, the pathway of exposure and the vulnerability of the person exposed. Human exposure to mercury can result from a variety of pathways including consumption of fish, occupational and household uses, dental amalgams and mercury-containing vaccines.

Methylmercury is adversely affecting both humans and wildlife. This compound readily passes the placental barrier and the blood-brain barrier, and is a neurotoxicant, which may in particular cause adverse effects on the developing brain. Studies have shown that methylmercury in pregnant women's diets can have subtle, persistent adverse effects on children's development as observed at about the start of school age. Moreover, some studies suggest small increases in methylmercury exposure may cause adverse effects on the cardiovascular system. Many people (and wildlife) are currently exposed at levels that pose risks of these, and possibly other adverse effects.

Some populations are especially susceptible to mercury exposure, most notably the fetus, the newborn and young children because of the sensitivity of the developing nervous system. Thus, parents, pregnant women, and women who might become pregnant, should be particularly aware of the potential harm of methylmercury. Moderate consumption of fish (with low mercury levels) is not likely to result in exposures of concern. However, indigenous populations and others who consume higher amounts of contaminated fish or marine mammals, as well as workers who are exposed to mercury, such as in small-scale gold and silver mining, may be highly exposed to mercury and are therefore at risk.

Besides their importance to many native cultures, fish are an extremely valuable component of the human diet in many parts of the world, providing nutrients that are often not available in alternative food sources. Mercury is a major threat to this food supply. Likewise, contaminated fish can bring serious economic problems to communities and regions dependent on fisheries for their economic survival. There are also particularly vulnerable ecosystems and wildlife populations. These include top predators in aquatic food webs (such as fish-eating birds and mammals), Arctic ecosystems, wetlands, tropical ecosystems and soil microbial communities.

Mercury is used in many domestic and office appliances. It has traditionally been used to make products like thermometers, switches, and some light bulbs. Typical products containing mercury include thermometers, thermostats, energy efficient lamps, high intensity discharge lamps, and button batteries. Other products are electric switches and relays, flame sensors, and dental amalgam.

Mercury is found in many rocks including coal. When coal is burned, mercury is released into the environment. Coal-burning power plants are the largest human-caused source of mercury emissions to the air. Burning hazardous wastes, producing chlorine, breaking mercury products, and spilling mercury, as well as the improper treatment and disposal of products or wastes containing mercury, can also release it into the environment. In industrialized country mercury compounds are manufactured for specialty uses, such as chemicals and pharmaceutical applications. Larger quantities of these compounds are generated as byproducts from pollution control activities at gold mines or in waste. Elemental mercury is processed from byproduct mercury compounds, and an unknown quantity of mercury compounds is imported into the country without public concern.

## **1.2. Justification**

No research has been carried out in Bangladesh to find out mercury sources, products and hotspots. So, this research is necessary to evaluate mercury situation in Bangladesh.

Environment and Social Development Organization-ESDO conducted a study to find out mercury sources, mercury containing products and hotspots in Bangladesh. This intervention has been taken by ESDO to encourage and enable civil society to engage in local, national, and international activities aimed at controlling mercury pollution. The information that originates from the study will be helpful for raising awareness among professionals, media and the public as a whole.

## **1.3. Objectives**

In order to address the mercury problem in Bangladesh, the focus objectives of the study were as follows:

- I. To identify the mercury sources in Bangladesh.
- II. To identify mercury containing products in Bangladesh
- III. To assess Hg consumption in and emission from different sectors
- IV. To evaluate people's perception regarding Hg contamination.



## 2. Methodology

This study was conducted in 9 different sectors whose products and bi-products contain Hg. It has categorized 9 sectors for conducting questionnaire survey. Based on questionnaire survey Hg waste disposal from each sector has estimated.

### 2.1. Sample size

Table-1: Hg sources in Bangladesh

Sl. No.	Sectors	Total sample no.	
1.	Cement industry	5	
2.	Chlor alkali factory	3	
3.	Health care sectors	Hospital	15
		Clinic	10
		Medical college	9
4.	Beauty product consumer	450	
5.	Beauty products manufacturer	Chemical	9
		Herbal	6
6.	Electrical and electronics equipments	Switch Manufacturer	2
		Switch vendor	30
		CFL Bulb manufacturer	2
7.	Jewellery	30	
8.	Parlour & saloon	Beauty Parlor	10
		Gents Saloon	10
9.	Battery industry	4	
Total		<b>595</b>	

### 2.2. Study areas

This study was conducted in Dhaka City Corporation. However, some sectors are situated in outside of Dhaka, but we collected information from their Dhaka office. Moreover, we visited factory site for getting information regarding waste disposal and management.

### 2.3. Study period:

This study was carried out during last three months (March, 2012 to May, 2012).

### 2.4. Data collection

A semi-structured questionnaire was used to collect information. Before questionnaire conduction, we consulted with targeted sources. Cement, chlor-alkali, health care sector, beauty product manufacturer, switch and CFL bulb manufacturer and battery industry for collection of information. Based on their willingness to provide information we conducted questionnaire survey. Information from other sectors namely; electrical switch vendor, jewellery, beauty parlour, gents saloon, and beauty product consumer were collected based on deliberate sampling.

## 2.5. Data analysis

All data were analyzed using SPSS software and MS Excel.

## 2.6. Estimation of Hg in consumer beauty products:

12 consumer beauty products have been analysed in Bangladesh Council of Science and Industrial Research. Hg concentration in beauty products has analyzed in Atomic Absorption Spectrometer using Cold Vapour Unit.

## 3. Results and discussion

### 3.1. Hg use in and release from Cement industry

Bangladesh is one of the developing countries in the world. Due to infrastructural development cement production is increasing dramatically. At present Bangladesh has 18 cement industries mostly situated in Dhaka, Narayongonj, Chittagong division. Most of these industries are located near major river systems of Bangladesh. On the basis of random sampling we selected and conducted questionnaire survey in 5 different industries situated in Narayongonj and Dhaka division. All these industries produce both Portland and Portland composite cement. Total production of cement in these 5 industries is 2,054,511 tons. Considering the average Hg release 0.06 g/ton it has found that total amount of Hg release from 5 industries is 0.13588 tons per year. If we consider 0.027177 ton Hg release from 1 industry, it can be estimated that release of Hg from 18 cement industries of Bangladesh is 0.489178 ton.

#### 3.1.1. Trend of Hg emission in surveyed industries

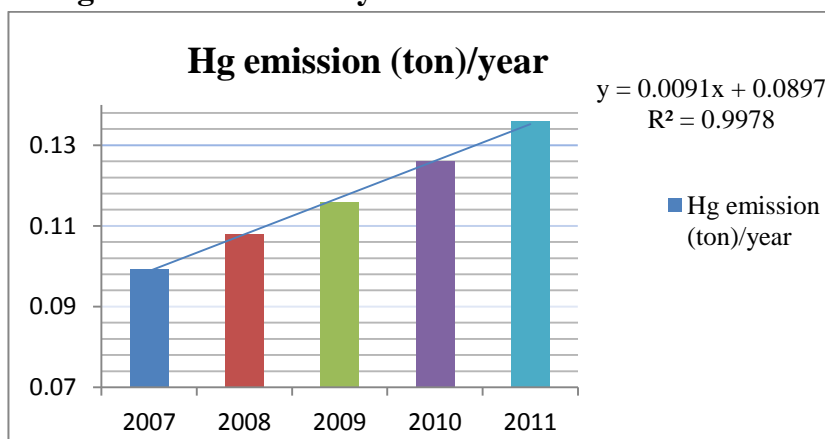


Figure-1: Hg emission from 5 cement industries during last 5 years

The study revealed that Hg emission from cement industries is increasing significantly during last five years. In our survey we found that in 2011 release of Hg from 5 cement industries was 0.1359 tons which is nearly one and half times higher compared to release in 2007 (0.099 tons) (Figure-1).

### 3.1.2. Industry Demand & Production of cement in Bangladesh

In 2006, cement consumption was 7.6 million MT, whereas, in 2011(13.93 million MT) it was almost 2 times higher that of 2006. Cement consumption in 2007, 2008, 2009 and 2010 was 8.40, 8.20, 8.54, 10.57 million MT respectively (Table-2).

**Table-2: Cement consumption during last 6 years in Bangladesh**

Year	Consumption (Million MT)	Growth rate (%)	Capacity (Million MT)	Growth rate (%)
2006	7.60	18.50 %	11.17	5.20 %
2007	8.40	10.53 %	11.91	6.63 %
2008	8.20	-2.38 %	12.20	2.48 %
2009	8.54	4.10 %	14.44	18.38 %
2010	10.57	23.82 %	17.35	20.14 %
2011	13.93	31.80 %	19.95	14.96 %

### 3.1.3. People's perception regarding Hg contamination

According to study findings it has seen that 60% industries treated waste, in contrast, rest 40% did not treat their produced waste during cement manufacture (Figure-2). In addition, those industries that have waste treatment facilities are aware about Hg and other heavy metal pollution. But industries those are dumping their waste in adjacent land and water bodies, not familiar with Hg Hazards.

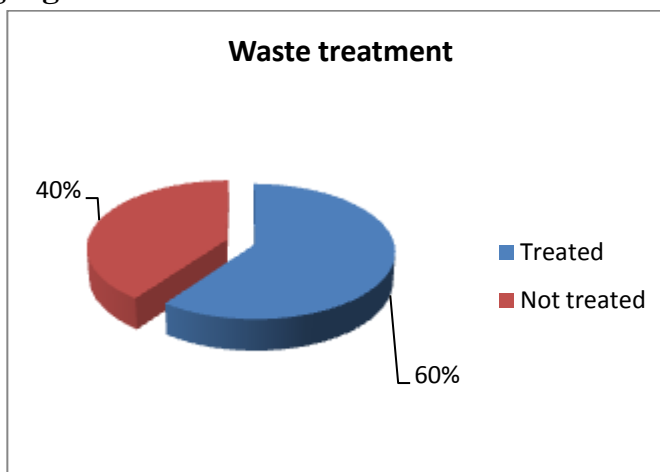


Figure-2: Perception of Hg pollution among cement industry

### 3.2. Hg use in and release from Chlor alkali factory

There are 5 chlor alkali factories exist in Bangladesh. We selected 3 factories (Samuda Chemical Complex Ltd., ASM Chemical Industries, and Global Heavy chemicals Ltd.) based on random sampling. The survey showed that 6 different chemicals are used in their production. These are chlorine, caustic soda, hydrochloric acid, sodium chlorate, sodium hypochlorite and chlorinated paraffin wax. Total production of chlorine in 3 industries is 2350 tons per year. Caustic soda (700 tons/year) is produced in 2 industries. Moreover, hydrochloric acid, sodium chlorate, sodium hypochlorite and chlorinated paraffin wax production are lower (<300 tons) in comparison with chlorine and caustic soda. If we consider typical average Hg emission (212.5 g/ton) from chemical industry, we found that from these 3 industries approximately 0.87 tons of Hg is emitted to environment.

From this amount chlorine production contributes highest (63%) amount of Hg emission, whereas, sodium chlorate and sodium hypochlorite share only 3% in each (Figure-3). Moreover, if we consider all i.e. 5 chlor alkali factories, we can estimate that in Bangladesh roughly 1.4445 tons (0.2889 tons Hg/factory) of Hg released to environment in every year.

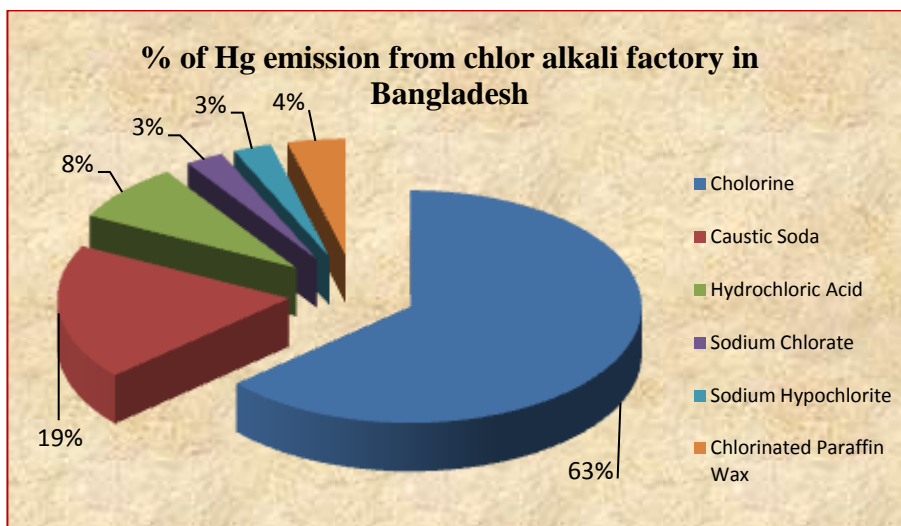


Figure-3: Emission of Hg from different chemical production in Bangladesh

### 3.3. Hg use in and release from Health care sector

Health-care facilities are one of the main sources of mercury release into the atmosphere because of emissions from the incineration of medical waste. Health-care facilities are also responsible for mercury pollution taking place in water bodies from the release of untreated wastewater. These health-care facilities may also have been responsible for as much as 5% of all mercury releases in wastewater. Waste incineration and crematoria are also listed as major sources of mercury emissions. Many countries recognize the contributions from hospital thermometers, dental amalgams, hospital waste and/or medical waste incinerators but lack quantitative data. Despite the lack of data, there is good reason to believe that mercury releases from the health sector in general are substantial. Bangladesh is also one of the growing countries to Hg release from health care sectors.

The total amount of Hg usage in healthcare instruments in Bangladesh is estimated 24.28 tons per year. According to the study findings; in health care institutions (public and private medical college, hospitals, clinics) average equipments' types are used Sphygmomanometers 1 to 10, thermometers 3 to 50 per year and estimated number of thermometers used per year is 104,825 and ratio of the broken thermometers is about 97.5% (102,204.37).

Estimated number of Sphygmomanometers (mercury) used per year 5,930 and ratio of the broken Sphygmomanometers (mercury) is about 10%. According to the study and expert opinion 1 fever thermometer contain 0.5g – 2.0g mercury and sphygmomanometers contain 80-160g mercury. In addition, other hospitals equipments’ like laboratory thermometers has contained 3-4g, cantor tubes 54 - 136g, Dennis tubes 136g, Foley catheter 68g of mercury.

### 3.3.1. Waste management in Health care sector

Table-3: Hg release from thermometer and sphygmomanometer in health care sectors

Equipment name	Quantity of Equipment use/year	Thermometer use per health care/year	Equipment break down (break up percentage)	Hg release (g)
Thermometer	5160	151.76	97.5 %	6288.75
Sphygmomanometer	479	14.09	10 %	5748

According to study findings, it has estimated Hg release from 2 most commonly used Hg containing equipments (Thermometer and sphygmomanometer) in 34 health care sectors in Dhaka City Corporation. Thermometer usage is 151.76/health care/year. In contrast, no. of sphygmomanometer usage is only 14.09/health care/year. Total release of Hg from thermometer and sphygmomanometer is 6288.75 g and 5748 g respectively (Table-3).

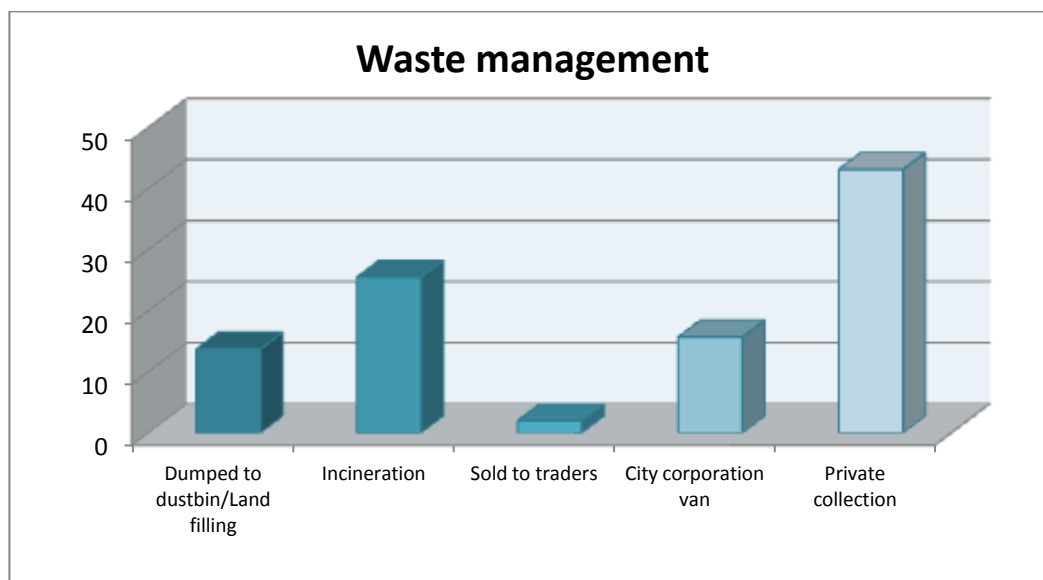


Figure-4: Waste management system in health care sectors

Health care sectors are not concern about waste management. They dispose their waste in 5 different waste management systems namely; land filling, incinerating, selling to traders, dispose to city corporation Van and private collection.

The study revealed that maximum (43%) health care sectors dispose their waste through private collection and least (2%) health service centres sell their waste materials to traders. Moreover, waste management through incineration, transfer to city corporation van and land filling consists nearly 25%, 16% and 14% respectively (Figure-4).

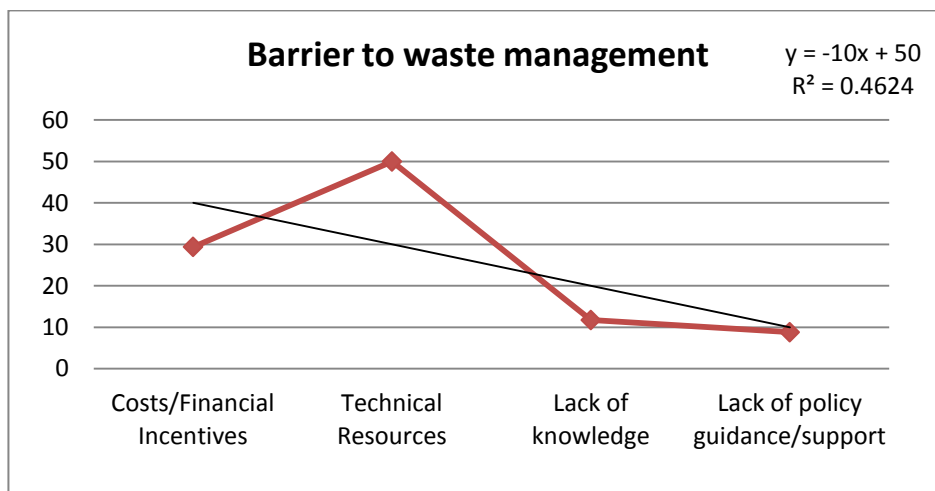


Figure- 5: Barrier of waste management in health care sectors

The study revealed that 50% health care sectors complain that lack of sufficient technical resources is the major constraint in waste management. Moreover, more than 29% health care sectors opine that a financial incentive is the barrier to proper management of waste. In addition, lack of knowledge, and lack of policy guidance are the obstacle of waste management, figuring out 12% and 9% health care sectors’s opinion (Figure-5).

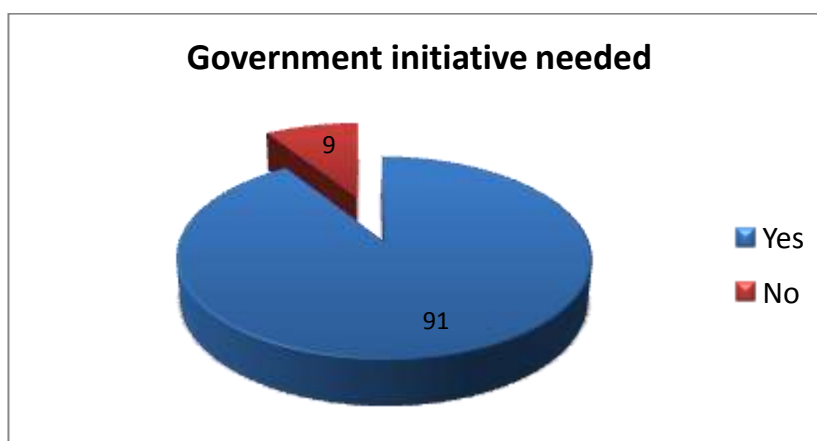


Figure- 6: Manufacturers opinion regarding government initiatives about waste management

According to study findings most of the health care sectors (91%) opine that government initiative is unavoidable to manage waste properly.

However, 9% health care sectors argue that producers can handle waste properly, so, government initiatives are not mandatory in this case (Figure-6).

### **3.3.2. Recovery from Hg hazards from health care sectors**

To understand better the problem of mercury in health-care sector, it is recommended that countries conduct assessments of current mercury usage and health-care waste management programs.

**Short-term steps:** Develop mercury clean up and waste handling and storage procedures. Until countries in transition and developing countries have access to mercury free alternatives it is imperative that safe handling procedures be instituted which minimize and eliminate patient, occupational, and community exposures. Proper procedures should include staff training, educational programs, protective gear, proper spill cleanup response, engineered storage facilities and appropriate waste storage containment, Countries that have access to affordable alternatives should develop and implement plans to reduce the use of mercury equipment and replace them with mercury-free alternatives. Before final replacement has taken place, and to ensure that new devices conform with recommended validation protocols, health-care facilities will need to keep mercury as the “ gold” standard to ensure proper calibration of mercury sphygmomanometers.

**Medium-term steps:** Increase efforts to reduce the number of unnecessary use of mercury equipment. Hospitals should inventory their use of mercury. This inventory should be categorized into immediately replaceable and gradually replaceable. Replaced devices should be taken back by the manufacturer or taken back by the alternative equipment provider. Progressively discourage the import and sale of mercury containing health-care devices and mercury use in health-care settings, also using global multi lateral environmental agreements to this end. Provide support to countries to make sure that the recovered mercury equipment is not pushed back in the supply chain.

**Long-term steps:** Support a ban for use of mercury containing devices and effectively promote the use of mercury free alternatives. Support countries in developing a national guidance manual for sound management of health-care mercury waste. Support countries in the development and implementation of a national plan, policies and legislation on mercury health-care waste.

Promote the principles of environmentally sound management of health-care waste containing mercury, as set out in the UN Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Support the allocation of human and financial resources to ensure procurement of mercury free alternatives and a sound management of health-care waste containing mercury.

### **3.4. Hg use in and release from Beauty product consumer**

#### **3.4.1. Estimation of Hg in different beauty products**

Mercury is a common ingredient found in skin lightening soaps and creams. It is also found in other cosmetics, such as eye makeup cleansing products and mascara. Skin lightening soaps and creams are commonly used in certain African and Asian nations. They are also used among dark-skinned populations in Europe and North America. Mercury salts inhibit the formation of melanin, resulting in a lighter skin tone. Mercury in cosmetics exists in two forms: inorganic and organic. Inorganic mercury (e.g. ammoniated mercury) is used in skin lightening soaps and creams. Organic mercury compounds (thiomersal [ethyl mercury] and phenyl mercuric salts) are used as cosmetic preservatives in eye makeup cleansing products and mascara.

We collected 12 fairness beauty products that have more demand from consumer purchasing point of view. These products were analysed in Bangladesh Council of Science and Industrial Research (BCSIR). All the samples were analyzed in Atomic Absorption Spectrometer using Cold Vapour Unit. The table below shows the Hg concentration in each product.

It is very alarming that all consumer fairness beauty products that we analysed are contained harmful Hg. Highest (4653 ppm) level of Hg recorded in Garnier, on the other hand, lowest (3361 ppm) in Shumons Aroma. Moreover, Hg content in Fair & Lovely Ayurvedic (4004 ppm), Fair & Lovely Max fairness (4174 ppm), Modern (4152 ppm) and Fair & Handsome (Emami) (4133 ppm) exceeded 4000 ppm. Rest of the fairness products contain Hg lower concentration but above 3000 ppm. It can be said from analysis that all products contain Hg ranging from 3000 to 5000 ppm (Table-4).





Figure-7: Beauty fairness cream analysed in BCSIR



Figure-8: Skin lighting cream from China

Table- 4: Concentration of Hg in different fairness cream

Sl. No.	Sample ID	Sample name	Mercury content (ppm)
1.	CREAM-001	PONDS	3450
2.	CREAM-002	Shumons Aroma	3361
3.	CREAM-003	Olay	3603
4.	CREAM-004	Fair & Handsome	3566
5.	CREAM-005	Fair & lo. vely Ayurvedic	4004
6.	CREAM-006	Fair & lovely Max fairness	4175
7.	CREAM-007	Modern	3931
8.	CREAM-008	Garnier	4643
9.	CREAM-009	Botanic	3929
10.	CREAM-010	Modern	4152
11.	CREAM-011	Tibbat	3752
12.	CREAM-012	Fair & Handsome (Emami)	4133

### 3.4.2. Percentage of beauty products consumption

The survey revealed that both male and female are interested to buy beauty products. However, highest (57%) consumers of beauty products were female compared to male which figures only 43% (Figure-9).

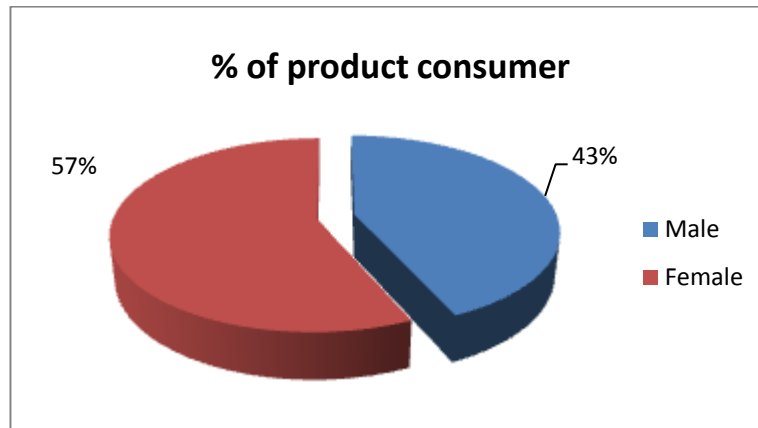


Figure-9: Beauty fairness cream consumption percentage

### 3.4.3. Consumer brand choice

We have surveyed 450 consumers in different shopping complexes of Dhaka city. According to questionnaire survey, we found that maximum (nearly 56%) consumers purchase beauty products of Unilever. Square and Fuji are the second and third highest brand of beauty products, figuring out 19% and 12.52% consumers choice respectively (Figure-10).

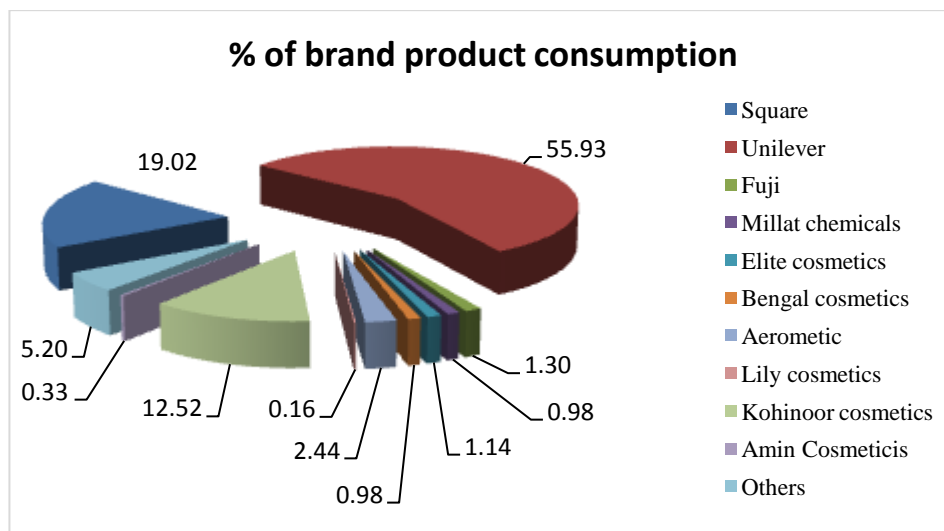


Figure-10: Percentage of brand product consumption

### 3.4.4. Consumption of international brand

The study revealed that maximum (20%) consumers buy products of Nevia. Mostly L'Oreal (nearly 9%), lakme (>6%), Olay (>9%), Lavera (>1%), Ponds (>14%), Garneir (>8%), Jordana (>9%), Neutrogena (7%) and other products (about 16%) are purchased by consumers than other international brands (Figure-11).

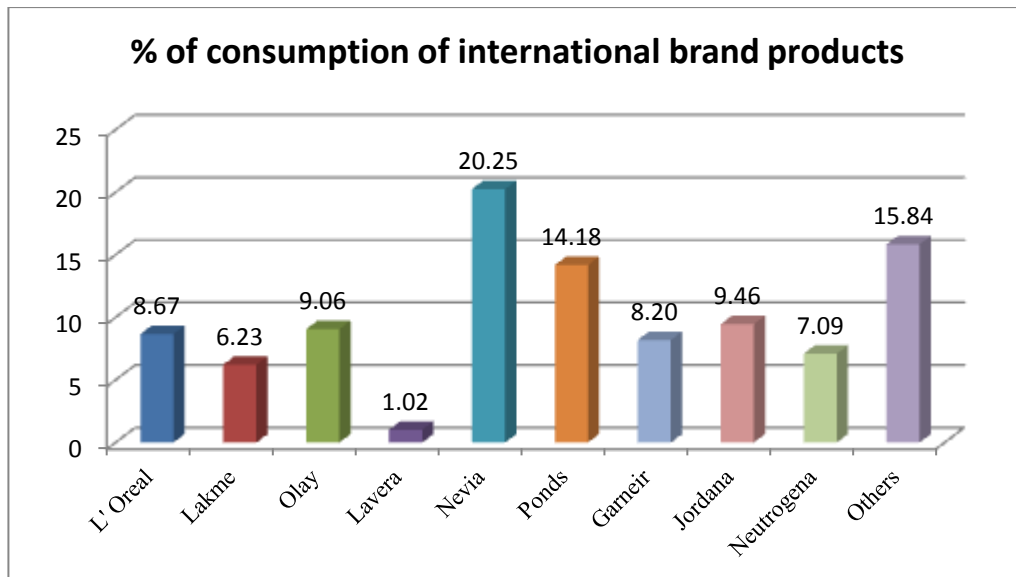


Figure-11: Percentage of international brand of beauty products consumption

### 3.4.5. Consumer's perceptions regarding Hg Hazards:

According to questionnaire survey, the study revealed that awareness Vs unawareness of Hg hazards is almost equal. 53% consumers are familiar to Hg hazards; however, 47% are totally unfamiliar with Hg contamination (Figure-12).

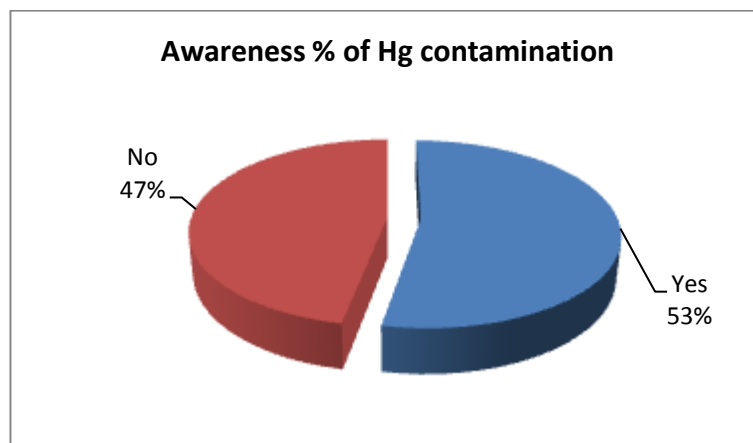


Figure-12: Consumer's perception on Hg contamination and health hazards

### 3.4.6. Health effects and how to measure exposure

The main adverse effect of the inorganic mercury contained in skin lightening soaps and creams is kidney damage. Mercury in skin lightening products may also cause skin rashes, skin discoloration and scarring, as well as a reduction in the skin's resistance to bacterial and fungal infections. Other effects include anxiety, depression or psychosis and peripheral neuropathy. The medical literature reports specific instances of individuals suffering from the aforementioned health effects following exposure to mercury through skin lightening creams and soaps. Mercury in soaps, creams and other cosmetic products is eventually discharged into wastewater. The mercury then enters the environment, where it becomes methylated and enters the food-chain as the highly toxic methylmercury in fish. Pregnant women who consume fish containing methylmercury transfer the mercury to their fetuses, which can later result in neuro-developmental deficits in the children. Exposure to inorganic mercury can be quantified through measurements in blood and urine.

Mercury-containing skin lightening products are hazardous to health and as a result have been banned in many countries. However, there are reports of such products still being available to consumers, and they are advertised on the Internet. Public awareness needs to be raised regarding the types of products and the specific products that contain mercury and the risks associated with mercury exposure. Information on alternatives must also be provided, because skin lightening products that do not contain mercury may contain other hazardous substances.

### 3.5. Hg use in and release from Beauty product manufacturer

We surveyed on 15 beauty products manufacturers. According to our findings only 13% manufacturers are aware about Hg contamination and its hazards. On the other hand, significant no. of manufacturer (83%) is unaware about Hg hazards (Figure-13).



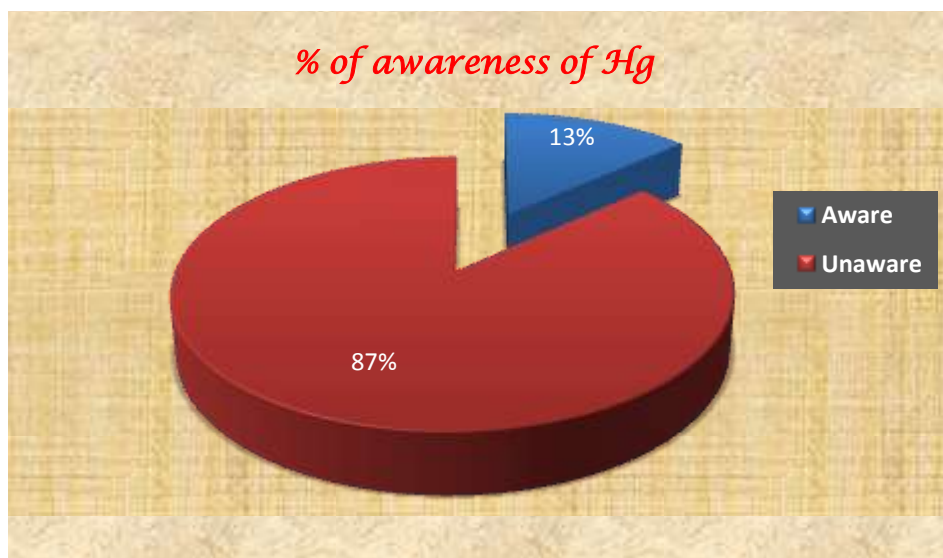


Figure-13: Concern of Hg hazards among beauty product manufacturer



Figure-14: Manufacturer's opinion of regarding waste disposal

Most (75%) of the waste disposed to adjacent water bodies and only 25% manufacturer did not give comment regarding waste management (Figure-14).

It has observed that chemical beauty product manufacturer produce 2.9 tons facial cream per year, whereas, herbal beauty production is 276.25 tons/year. This is because in Bangladesh currently herbal facial cream is becoming popular compared to chemical beauty products.

### 3.6. Hg use in and release from Electrical and electronics equipments

We identified electrical and electronics equipments that contain mercury. Electric switch manufacturer, switch vendor and CFL bulb manufacturer were taken into consideration for obtaining information regarding Hg containing electrical equipments. When Hg awareness concerned, it was found that majority (79%) of the people in this category are unaware about the hazards of Hg.

Only 21% people are aware of Hg contamination and its health and environmental hazards (Figure-15). In Bangladesh, CFL bulb use is increasing dramatically. Hg containing switch is not produced in Bangladesh. However, import of Hg switch from abroad is increasing gradually. Electric switch vendor are exposed to Hg during switch break up. These broken/end-of-life electric equipments are dumped to open place. Management of these equipments are not done properly due to lack of awareness of Hg hazards and strict implementation of existing policies.

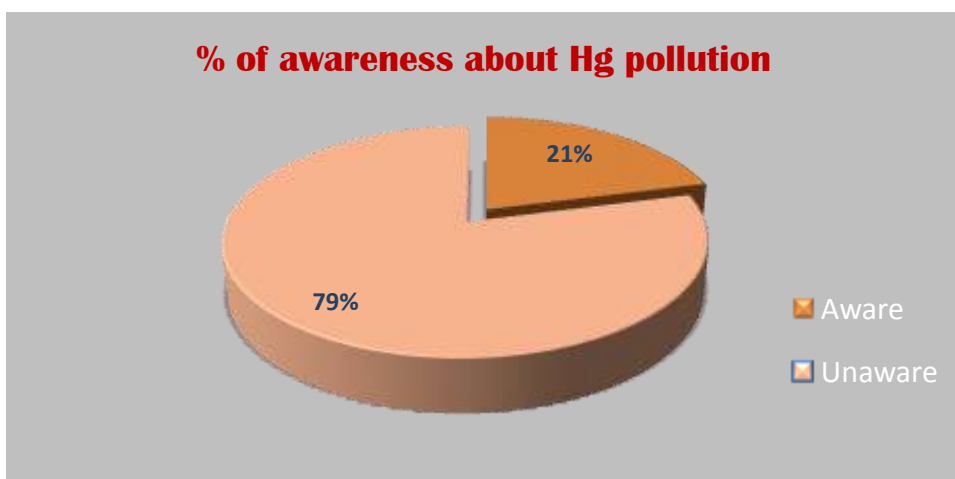


Figure-15: Concern of Hg hazards among electrical equipments manufacturer

### 3.7. Hg use in and release from Jewellery

In jewellery, Hg containing chemicals are used during gold ornaments manufacture, and wash. This Hg containing bi-products are disposed of adjacent land and water bodies. People, who are involved in manufacturing process of gold ornaments, directly exposed of Hg through inhalation. In this study we randomly selected 30 jewelleries for taking response about Hg hazards, whether they are aware about Hg contamination or not. It has estimated that 87% people are unaware and rest 13% aware about Hg waste (Figure-16). Moreover, people who are aware about Hg toxicity, not manage their waste properly. They dumped their waste through sewerage system of Dhaka City Corporation. The ultimate fate of this waste is adjacent Buriganga River.



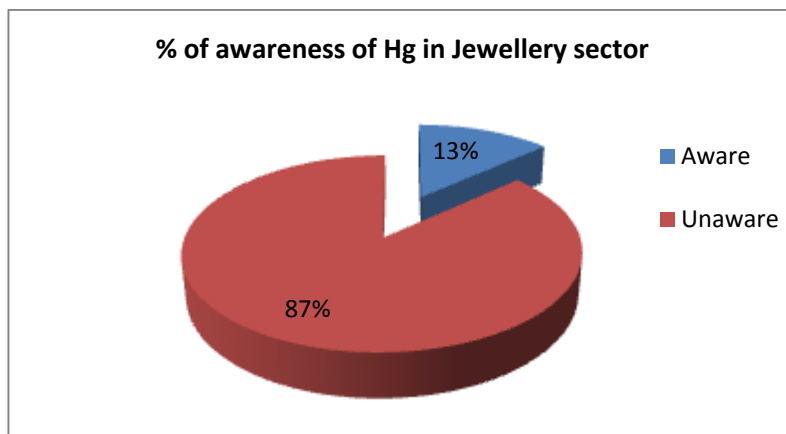


Figure-16: Concern of Hg hazards among jewellery manufacturer

### 3.8. Hg use in and release from Parlour and saloon

This sector is one of the bulky consumer of Hg containing products especially beauty fairness cream, lotion, face pack, cleanser and herbal products. This sector is growing day by day in Bangladesh mainly in Dhaka city because of increasing the income of upper and upper middle class people. In lab test we found that the products that are used in parlour and saloon contain Hg ranging 300 ppb to 500 ppb. So, from health point of view it can be said that these products are vulnerable to human body as well as environment. Moreover, the waste products are dumped with domestic waste which is ultimately gone to waste disposal site. From this site Hg is either evaporated or deposited to land and water bodies. When awareness of Hg contamination concerned, it has observed that 70% in parlour and only 20% in saloon are aware. On the contrary, 30% in parlour and 80% in saloon are not aware of Hg hazards in human health and environment (Figure-17).

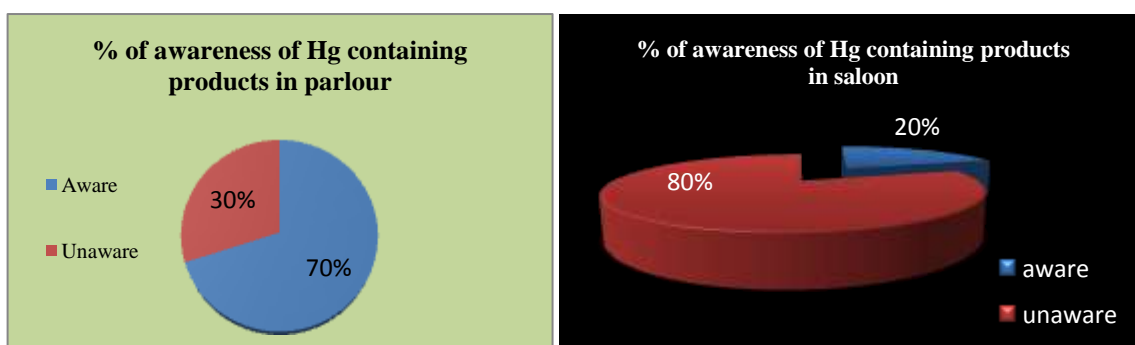


Figure-17: Concern of Hg hazards among parlour and saloon



### 3.9. Hg use in and release from Battery industry

Battery industry use Hg in battery manufacture. Mercury batteries use either pure mercuric oxide or a mixture of mercuric oxide with manganese dioxide as the cathode. 75% battery manufacturers are aware about Hg use, release, dumping and health and environmental concern. Rest 25% are unaware about harmful effects of Hg into human health and environment (Figure-18).

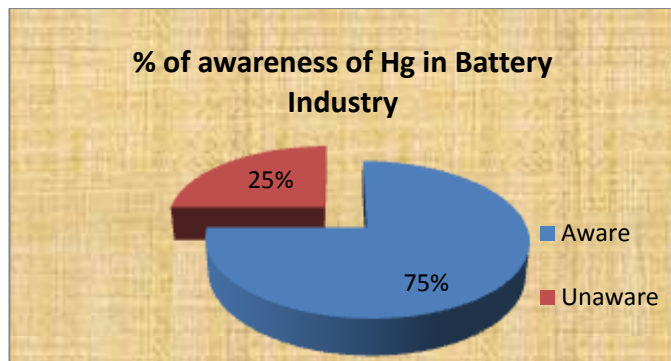


Figure-18: Concern of Hg hazards among battery manufacturer

#### Some others Mercury containing products in Bangladesh





#### **4. Conclusion & Recommendations**

Despite lack of sufficient national data, sufficient understanding has been developed of mercury (including knowledge of its fate and transport, health and environmental impacts, and the role of human activity), based on extensive research over half a century, that international actions to address the global mercury problem should not be delayed. Nonetheless, further research and activities would be useful to improve our understanding and coordination in a number of areas, including:

- Inventories of national uses, consumption and environmental releases of mercury
- Information on transport, transformation, cycling, and fate of mercury in various compartments
- Assessment and monitoring of mercury levels in various media (such as air and air deposition) and biota (such as fish), and associated impacts on humans and wildlife

Additional measures to reducing use of mercury-containing products

- Product stewardship
- Legislation and regulations
- Mercury reductions programs
- Mercury in products phase-down strategy
- Mercury product labelling
- Mercury-added product white paper
- Recycling or disposing of mercury-containing products
- Safe management and disposal of mercury-containing products
- Technology requirements for disposing of mercury-containing equipment
- Information on the national commerce and trade of mercury and mercury-containing materials
- Collaboration among nations dealing with scientific and technical issues, including mercury waste management and remediation

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**S**top mercury, save our planet